Section 6 (Texas Traditional) Report Review

Attachment to letter dated JUL 8 2004

Project Title: Annual Monitoring of Tobusch Fishhook Cactus (*Ancistrocactus tobuschii*) To Address The Requirement of Possible Delisting And An Assessment of The Threat Of *Gerstaeckeria* sp. nov., A Cactus Weevil

Final or Interim Report? Final

Job #: WER 56 **Grant #:** E-13

Reviewer Station: Austin ESFO, _____, _____, _____, _____, _____

Lead station was contacted and concurs with the following comments:
☐ Yes ☐ No ☒ Not applicable (reviewer is from lead station)

Interim Report (check one):

☐ is acceptable as is

☐ is acceptable as is, but comments below need to be addressed in the next report

☐ needs revision (see comments below)

Final Report (check one):

☐ is acceptable as is

☒ is acceptable, but needs minor revision (see comments below)

☐ needs major revision (see comments below)

Comments:

___ The revisions look good. Again, thanks for the hard work and high quality report. After an additional review, we have a final request.

For Figure 1 (Emergence of the Tobusch Fishook Cactus Weevil from its host) and Figure 2 (Emergence of *Monelilema crassum*), the black and white reprints are not reproducible and do not, therefore, show the intended detail. In the current black and white copy of the original document, it is difficult to distinguish between shades of black and gray on the figures. Perhaps cross-hatching or some other type of indicator could be used to help discern differences. Could you please provide three reproducible black and white copies of Figures 1 and 2 for our files. Thank you.

FINAL REPORT

As Required by

THE ENDANGERED SPECIES PROGRAM

TEXAS

Grant No. E - 13

Endangered and Threatened Species Conservation

Project WER56 -- Annual Monitoring Of Tobusch Fishhook Cactus *(Ancistrocactus tobuschii)* To Address The Requirement Of Possible Delisting And An Assessment of The Threat Of *Gerstaeckeria* sp. nov., A Cactus Weevil

Prepared by:

Jackie Poole, Sandra J. Birnbaum and William Calvert

TEXAS PARKS & WILDLIFE

Robert Cook
Executive Director

John Herron
Program Director, Wildlife Diversity

Mike Berger
Division Director, Wildlife

November 17, 2003

FINAL REPORT

STATE: Texas **GRANT NUMBER:** E - 13

GRANT TITLE: Endangered and Threatened Species Conservation

REPORTING PERIOD: 1 September 2001 – 31 August 2003 (year 5 of 5)

PROJECT NUMBER: WER 56

PROJECT TITLE:

Project WER56 -- Annual Monitoring Of Tobusch Fishhook Cactus *(Ancistrocactus tobuschii)* To Address The Requirement Of Possible Delisting And An Assessment of The Threat Of *Gerstaeckeria* sp. nov., A Cactus Weevil

OBJECTIVE(S):

Part A:

1. Monitor Tobusch fishhook cactus populations at Devil's Sinkhole State Natural Area, Kickapoo Caverns State Natural Area, Devil's River State Natural Area, Lost Maples State Natural Area, Garner State Park, highway right-of-way in Kimble County, and two private properties.
2. Monitoring will track Tobusch fishhook cactus individuals through time, assess vigor, and determine causes of mortality
3. Determine Tobusch fishhook cactus population trends at each site.

Part B:

1. To determine the effect of *Gerstaeckeria* sp. nov. on the Tobusch fishhook cactus, specifically,
    a. To determine the life history stages of Gerstaeckeria sp. nov. and the duration of the stages.
    b. To determine the reproductive cycle (i.e., the number of generations per year and the time of occurrence of the generations with respect to season and climate).
    c. To determine abiotic factors (climate, fire, etc. and biotic factors, i.e., predators and parasites) that effect generation timing and reproductive success.
    d. To determine the range and degree of host specificity.
    e. To determine the degree of threat posed by Gerstaeckeria sp. nov. to the Tobusch fishhook cactus, and develop management guidelines.

Segment Objectives:

Part A:

1. Set up monitoring plot at Garner State Park. Monitor established plots at Devil's Sinkhole State Natural Area, Kickapoo Caverns State Natural Area, Devil's River State Natural Area, Lost Maples State Natural Area, Garner State Park, highway right-of-way in Kimble County, and two private properties. Use monitoring protocols employed by Emmett (1995). In February and March, count flower number, and measure plant diameter. In May, record fruit number and measure plant diameters for any new plants. Determine cause of mortality for dead or dying plants.

2. Continue annual monitoring of populations.

3. Prepare final report. Assess population trends and causes of mortality. Evaluate the need to continue monitoring and possible management actions.

Part B:

1) Monitor the occurrence of adults and larval stages at Devil's Sinkhole State Natural Area, Kickapoo Caverns State Natural Area, and Lost Maples State Park, during February through May and monthly through the remainder of the year.

2) Determine the seasonal abundance of *Gerstaeckeria* sp. nov. with respect to temperature, humidity and rainfall.

3) Determine the predators and parasites of *Gerstaeckeria* sp. nov. by field and laboratory observations.

4) Examine other potential hosts for the presence of *Gerstaeckeria* sp. nov.

5) Determine the amount of mortality caused by *Gerstaeckeria* sp. nov at Devil's Sinkhole State Natural Area, Kickapoo Caverns State Natural Area, and Lost Maples State Park.

6) Prepare final report. *Gerstaeckeria* threats assessment and biology.

Summary Of Progress:

Please see Attachments A & B.

Significant Deviations:

None.

Preliminary Findings:

Please see Attachment A & B.

Location:

Part A: Bandera, Edwards, Kerr, Kimble, Kinney, Real, Uvalde, and Val Verde Counties, central Texas.

Part B: Bandera, Edwards, and Kinney Counties, central Texas.

Cost: $16,694.72 (Federal) $22,259.61 (Total)

Prepared by: Jackie Poole (Attachment A); William Calvert (Attachment B)

Date: November 17, 2003

Approved by: _____ **Date:** 03/11/2004
Neil (Nick) E. Carter

Attachment A:

Annual Monitoring Of Tobusch Fishhook Cactus *(Ancistrocactus tobuschii)*

Final Report: June 1999 – November 2003

Jackie M. Poole and Sandra J. Birnbaum
Wildlife Diversity Program
Texas Parks and Wildlife Department
3000 S IH-35, Ste. 100
Austin, Texas 78704

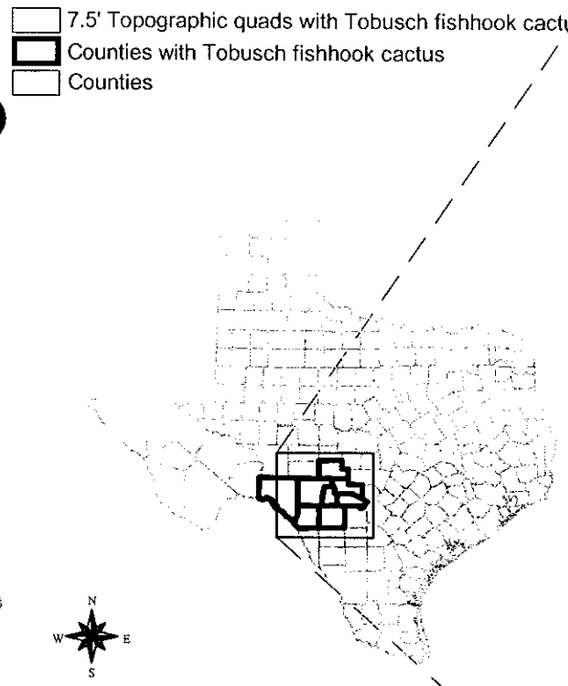
Annual Monitoring of Tobusch fishhook cactus (*Ancistrocactus tobuschii*)

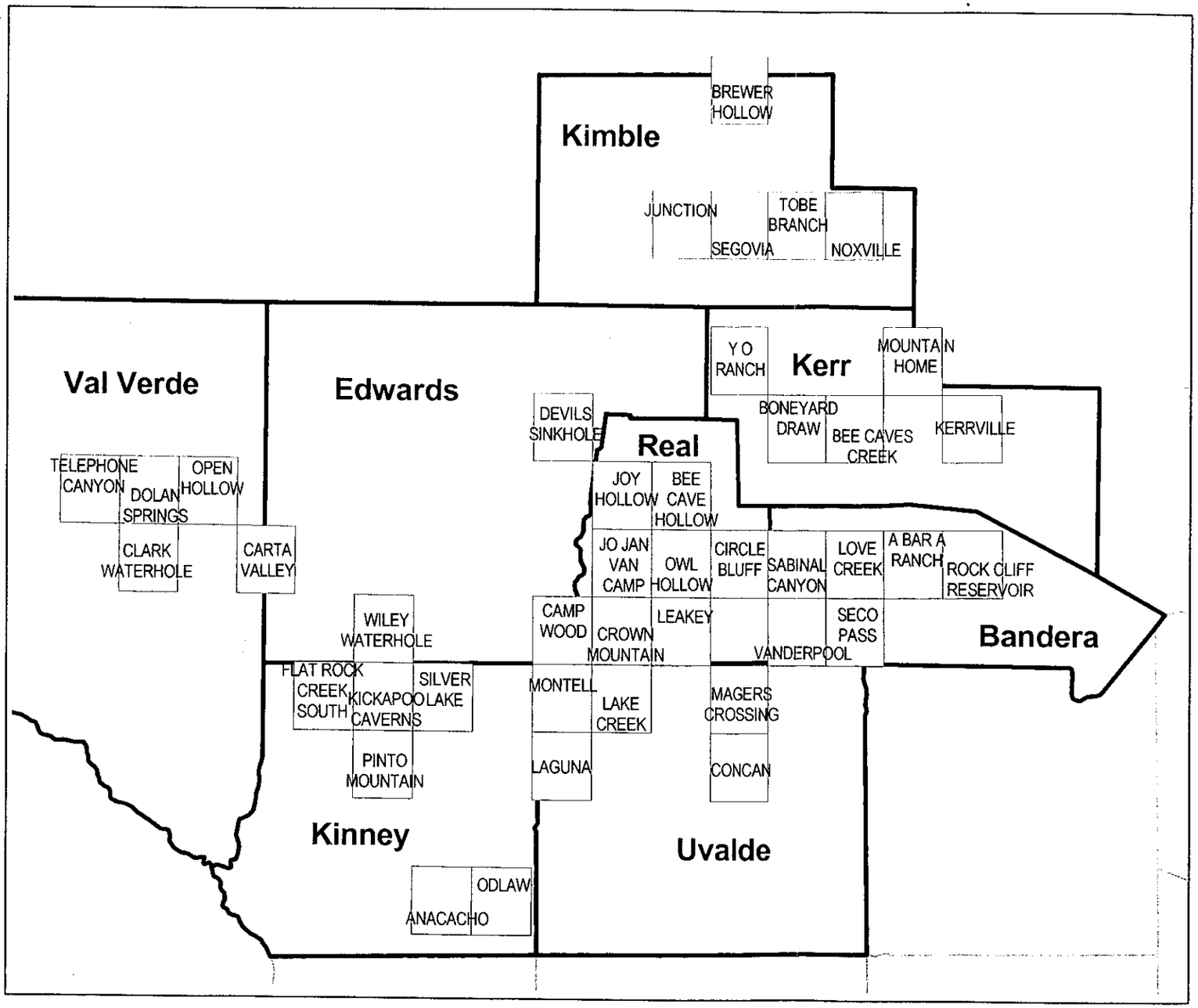
Jackie M. Poole and Sandra J. Birnbaum
Wildlife Diversity Program, Texas Parks and Wildlife Department
3000 I-35 South, Suite 100
Austin, Texas 78704

Introduction: Tobusch fishhook cactus (*Ancistrocactus tobuschii* or *Sclerocactus brevihamatus* var. *tobuschii*), a federally and state listed endangered species, ranges across the south-central portion of the Edwards Plateau (Bandera, Edwards, Kerr, Kimble, Kinney, Real, Uvalde, and Val Verde counties; Figure 1). The species is most commonly found on thin, rocky soils overlaying limestone, and usually occurs within openings in live oak-juniper woodlands. Occasionally the cactus is found within pinyon pine-oak woodlands, cenizo shrublands, or little bluestem grasslands. The small, cylindrical, low-growing cactus bears delicate spine clusters with one hooked central spine. In early spring, an average of two to three yellow flowers is borne at the stem apex (larger plants may produce more flowers). By late spring about two-thirds of the flowers have produced pale reddish green fruits. The fruits are often swarmed by tiny ants that may play a role in seed dispersal. Germination seems to be infrequent as few seedlings are observed in the wild. Growth rate averages several millimeters per year although it is highly affected by moisture availability. Plants become reproductive when the stems reach about 2 cm in diameter, although plants as small as 1.2 cm in diameter have been recorded as flowering. The largest plants observed have been over 10 cm in diameter although this is quite rare. Most plants average between 2 and 5 cm in diameter. Over half the populations of Tobusch fishhook cactus consist of 10 or fewer individuals. Only about 10% of the populations have more than 100 individuals. A rough minimum viable population estimate for the species, using Pavlik's methodology (Pavlik 1996), yielded about 1200 individuals needed to maintain a population.

In the original status report, the species was reported from four populations in Bandera and Kerr counties (Weniger 1979). The species was listed when floods wiped out two of the populations (USFWS 1979). Through the years many additional populations have been found. Over 60 populations of Tobusch fishhook cactus have been verified within the last ten years. Due to the number of populations (many of them on relatively protected sites) and the more widespread range, delisting was often a topic of discussion. An updated status survey was undertaken to assess the situation (Poole and Janssen 2002). During the course of the status survey (1996-1999), it was decided that an intensive monitoring program was needed to determine population trends and investigate the impact of insect herbivory. Additionally if the species was delisted, the monitoring could apply to the five-year monitoring requirement.

Figure 1. Distribution of Tobusch fishhook cactus in Texas





27 October 2003

Projection: UTM, Texas Statewide Mapping System

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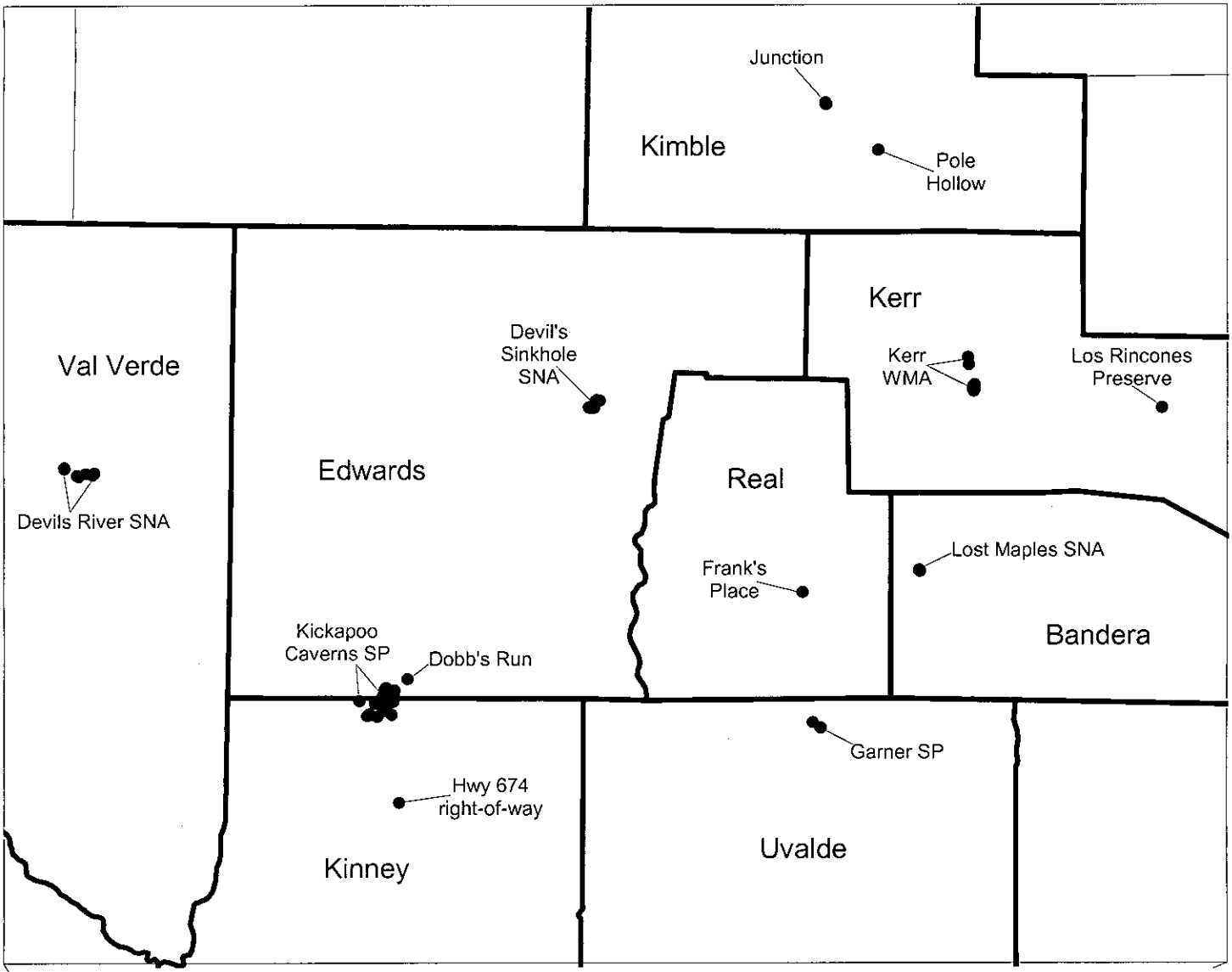
Map compiled by the Texas Parks and Wildlife Department, Wildlife Diversity Program. No claims are made to the accuracy of the data or suitability of the data for a particular use.

Methods: In order to determine population trends and health as well as assess causes of mortality, 12 monitoring sites with a total of 117 plots were established, with at least one site in each county of the range (Figure 2; Table 1). The first 12 plots were established within the Devil's Sinkhole State Natural Area (SNA) by Ray Emmett in 1991 during the course of his dissertation research (Emmett 1995). Emmett also established two plots at the Kickapoo Caverns State Park (SP) in 1993. In 1995 Texas Parks and Wildlife Department (TPWD) staff took over the monitoring of these plots from Emmett. Two small plots along Highway 674 in Kinney County were established by TPWD staff in 1992 as part of a Section 6 project involving monitoring and management of rare and endangered plants along highway rights-of-way (Poole and Janssen 1994). Most of the remaining plots were established in 1996 by Poole and Janssen with the beginning of the status update study. With the addition of the Kerr Wildlife Management Area (WMA) to the study sites and through intensive surveys at Kickapoo Caverns State Park, several other plots were set up in 1999 by Poole. All plots have been monitored continuously since their inception.

Study sites were chosen based on presence of Tobusch fishhook cacti, and are equivalent to a management unit, i.e., Lost Maples SNA, Kerr WMA, etc. Most study sites have multiple plots, with the plots being either named or numbered. Plots usually have only one stake, but a few plots (for example Ray's Site at Kickapoo Caverns SP has two). For ease of management, the data is kept geographically by study site. New stakes and plots have been added continually, primarily due to management concerns on state lands and to track the path of the weevil herbivore. New study sites are rarely added (unless on TPWD property or to address a specific management issue). The Appendix contains the raw data from all sites, plots, and stakes from 1991 to 2003 arranged by site name. However only data from the study period of this project (1998-2003) was analyzed in this report. For a previous analysis of earlier monitoring data, see Emmett 1995 and Poole & Janssen 2002.

Because Tobusch fishhook cacti are patchily distributed and density was not an issue, no attempt was made to locate the plots randomly. Plots were established where cacti were found. When an individual or concentration was located, a ⅜ in., 12-18 in. piece of rebar was driven into the ground roughly within line of sight of all the cacti. In some cases where the ground was too rocky to allow rebar placement, crosses were etched into the rock surface. Originally stakes or crosses were mapped, but with the advent of GPS technology, the coordinates of all rebar stakes and rock crosses have been recorded and entered into a GIS database. From the rebar stake or cross, distance (in meters and centimeters, recorded in the DIST column of the data sheets, see Appendix) and bearing or angle (using a sighting compass, recorded in ANGLE column) was measured from the stake to each plant. In the data tables of the Appendix, stake number is variously labeled as STAKE, STK#, or even blank or the column left out if the plot had only one stake. Although there is no standard plot size, plot size is limited by

Figure 2.
Location of Tobusch fishhook Monitoring Sites and Plots



27 October 2003

Projection: UTM, NAD83, meters, Zone 14

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Map compiled by the Texas Parks and Wildlife Department, Wildlife Diversity Program. No claims are made to the accuracy of the data or suitability of the data for a particular use.

Table 1. Year of establishment and number of plots per site

Site Name	+ Number of plots established / - plot extinct (all plants extirpated)													Total plots with live plants
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Devil's River State Natural Area						+3		+3	+3/-1	+1	-2		+1/-1	7(+11-4)
Devil's Sinkhole State Natural Area	+12			-2		+1/-1	+4		+2-2	-1		-2	-3	8(+19-11)
Dobb's Run										+1				1
Frank's Place						+2								2
Garner State Park								+1					+3	4
Highway 674		+2			-1									1(+2-1)
Junction					+7	+1	+2	-1			+2			11(+12-1)
Kerr Wildlife Management Area									+12/-1	+1/-1	+2/-3	+1/-1	+7/-2	15(+23-8)
Kickapoo Caverns State Park			+2			+12		+1	+10	+1/-1		+4	+1	30(+31-1)
Los Rincones						+1								1
Lost Maples State Natural Area						+9								9
Pole Hollow					+2				-1				+1	2(+3-1)
Total number of plots														91(+118-27)

the tape length (100 m). However some plots may be closer together due to vegetation or other structural line-of-sight interference.

Each plant (or stem) is assigned a unique number (PL# column on the datasheets). An aluminum identification tag with this number is nailed into the ground within a few centimeters of the plant. The numbers are decimalized to allow groupings of individuals for more efficient relocation. The distance and bearing from the stake to the individual allows for reidentification should the tag be lost.

Data was recorded twice a year, at flowering and fruiting season. The stem cross-section of each plant was measured using digital calipers, except during wet conditions when manual calipers had to be employed. Usually Tobusch fishhook cacti are single-stemmed. However injury to the apical meristem (trampling, herbivory, bulldozing, etc.) may cause the plant to form additional stems. When this occurred, each stem was measured and recorded individually. For each stem, two cross-sections, from tubercle tip to tubercle tip, usually perpendicular to each other, were made. Stem cross-section was normally recorded during the flowering season, except when the plant was only located during the fruiting season. One other exception occurred in 1999 when stem diameters were measured in August after 70 plants were found at Kickapoo during a weevil exclosure experiment. The two measurements were averaged, and the result was entered in cm in the DM (diameter) column on the data sheets (see Appendix). This protocol follows Emmett's methodology (Emmett 1995). A few plants were occasionally measured in only one direction due to rock or vegetation impediments. Seedlings were often measured in only one direction as injuries or uprooting can occur from the use of the calipers. Either case is documented in the notes. The number of flowers (including unopened buds and early-forming fruits) were recorded for each individual in early spring, usually during the peak of flowering, and recorded in the FL column. Buds and flowers were usually lumped together, but occasionally buds were indicated as "xB". Any early-formation fruits were normally indicated as "x fr". Aborted flowers were noted as "xA". In the late spring (about six to eight weeks after flowering) the plots were revisited. Each individual was checked for fruits, and the number recorded in the FR column. Aborted fruits were noted by "xA" and dispersed fruits (i.e., only fruit scar left) were usually noted as "dispersed" or "disp.". Any plants not relocated were listed as MIA in the diameter (DM), flower (FL), and fruit (FR) columns, depending on when they disappeared. Missing plants are checked for over a three year period. If they are not relocated after three years, they are assumed to be dead. Occasionally missing plants do reappear as small cacti can pull into the soil, gravel, litter or spikemoss when conditions are unfavorable. With the advent of more favorable conditions, they reappear. Dead plants are recorded as Dead in the DM or FR column depending when mortality was noted. The year, and usually the month, of the demise are written in the Notes column. The cause of mortality is also indicated here. For dead plants and those missing more than three years, the rows are shaded. Additional notes on herbivory, vigor,

stem color, floral visitors, etc. are usually included in the Notes column. As new plants are discovered, they are added to the plot with their date of discovery typically placed in the Notes column.

Although Emmett divided the plants into 5 mm size classes (Emmett 1995), in this analysis, plants were placed in three age/reproductive classes due to the variability observed in changes in stem diameter. Even though changes in stem diameter occur as the plant ages, precipitation can often skew the rate at which these changes occur. Thus dividing the plants into three age/reproductive categories (seedling, non-reproductive, and reproductive) was viewed as more appropriate. Seedlings were defined as individuals less than 1 cm in diameter. A plant was only considered a seedling for one year. After that it was assigned to one of the other two categories. However no instance was observed of a seedling moving to the reproductive class within a year. The non-reproductive or juvenile class was represented by all individuals greater than or equal to 1 cm in diameter that have never been reproductive. After the first year of observation the diameter of these individuals may fall below 1 cm, but they are still considered to be in the non-reproductive class. The reproductive group consisted of individuals of any size (although stems have not been observed flowering at less than 1 cm in diameter) that were reproductive at the time of first observation. In subsequent years, they may not flower or fruit, but they are still recorded as reproductive. In Table 2 an additional category, "reproductive/nonreproductive" was added for plants added to plots at times of year when reproductive structures were not present.

Results: As of May 2003, 118 plots had been established at 12 sites, and 91 plots still contained live plants (Table 1). Table 2 shows the combined demographics from all sites for the study period. Tables 3-14 tabulate the annual demographics for each site. At the end of the 1998 monitoring season, there were 1108 plants. By the end of the 2003 monitoring season, 1936 plants were alive (see Discussion).

On average the seedling class comprises less than 10% of population. Few seedlings appear in the "live – seedling" category as seedlings are only assigned to the "seedling" category for one year. Thus the only instance in which seedling numbers appear in the "live – seedling" category is when new plots/stakes are established. For example when the Kerr site was added in 1999, the one seedling found appears in the "live – seedling" category of both Table 10 and Table 2. Non-reproductive individuals account for between 30-40% of the population, and reproductive plants weigh in at 50-60%. These percentages were calculated by dividing the "total live at end of year" reproductive class number of individuals by the "total live at end of year" sum of individuals from all classes (Table 2).

Reproductive output did not significantly differ from the data obtained by Emmett (1995). Most individuals become reproductive at about 2 cm in diameter.

Table 2. Combined demographics from all sites by year

	1998	1999	2000	2001	2002	2003
Live - Reproductive	616	648	791	746	877	758
Live - Non-reproductive	367	357	498	489	505	529
Live - Seedling (<1 cm in diam.)	0	1	4	0	0	0
Total Live	**983**	**1006**	**1293**	**1235**	**1382**	**1287**
New - Reproductive	42	39	82	68	76	64
New - Non-reproductive	58	91	74	159	94	106
New - Reproductive/non-reproductive	0	40	0	0	0	0
New - Seedling	16	65	43	127	81	91
Total New	**116**	**235**	**199**	**354**	**251**	**261**
New stake - Reproductive	5	48	3	17	18	173
New stake - Non-reproductive	2	29	0	28	8	113
New stake - Reproductive/non-reproductive	0	30	0	0	0	0
New stake - Seedling	0	18	0	25	0	92
Total New Stake	**7**	**125**	**3**	**70**	**26**	**378**
Refound MIA - Reproductive	1	3	2	2	2	1
Refound MIA - Non-reproductive	1	5	5	5	4	9
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**2**	**8**	**7**	**7**	**6**	**10**
Total live at end of year - reproductive	664	738	878	833	973	996
Total live at end of year - non-reproductive	389	454	573	681	611	757
Total live at end of year - reproductive/non-reproductive	0	70	0	0	0	0
Total live at end of year - seedling	55	112	51	152	81	183
Total Live at end of year	***1108***	***1374***	***1502***	***1666***	***1665***	***1936***
MIA - Reproductive	13	12	8	20	18	46
MIA - Non-reproductive	12	16	12	26	49	70
MIA - Seedling	22	12	6	12	27	20
Total MIA	**47**	**40**	**26**	**58**	**94**	**136**
Dead - Reproductive	52	59	48	129	104	153
Dead - Non-reproductive	60	27	18	83	74	87
Dead - Seedling	19	3	2	7	3	13
Total Dead	**131**	**89**	**68**	**219**	**181**	**253**
COD* - weevils	30	12	14	65	82	70
COD* - Moneilema	0	1	1	24	12	16
COD* - weevils & Moneilema	0	0	0	0	0	1
COD* - fly larvae	0	0	0	10	3	0
COD* - ants	0	0	0	0	3	1
COD* - unidentified insect	0	2	1	2	2	7
COD* - collected for weevil study	0	9	1	11	0	4
COD* - hollow	9	12	5	2	0	0
COD* - herbivory	1	1	0	8	0	24
COD* - fungus	5	1	0	3	2	0
COD* - root rot	0	0	0	2	0	0
COD* - soil disturbance	6	2	0	2	2	7
COD* - rot	0	0	0	3	0	0
COD* - trampling	0	0	0	1	0	0
COD* - unknown	80	49	46	86	75	123
* cause of death						
Total mia, dead, removed	***178***	***129***	***94***	***277***	***275***	***389***

Table 3. Annual demographics for Devil's River State Natural Area

Devils River SNA, Val Verde Co.	1998	1999	2000	2001	2002	2003
Live - Reproductive	6	5	19	15	8	4
Live - Non-reproductive	2	1	10	6	7	5
Live - Seedling (<1 cm in diam.)	0	0	0	0	0	0
Total Live	**8**	**6**	**29**	**21**	**15**	**9**
New - Reproductive	0	1	5	3	0	1
New - Non-reproductive	0	0	0	1	0	3
New - Reproductive/non-reproductive	0	0	0	0	0	0
New - Seedling	1	0	3	2	1	1
Total New	**1**	**1**	**8**	**6**	**1**	**5**
New stake - Reproductive	4	11	2			2
New stake - Non-reproductive	0	5	0			1
New stake - Reproductive/non-reproductive	0	0	0			0
New stake - Seedling	0	3	0			0
Total New Stake	**4**	**19**	**2**			**3**
Refound MIA - Reproductive	0	0	0	1	0	0
Refound MIA - Non-reproductive	0	0	2	0	0	0
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**0**	**0**	**2**	**1**	**0**	**0**
Total live - Reproductive	10	17	26	19	8	7
Total live - Non-reproductive	2	6	12	7	7	9
Total live -Reproductive/non-reproductive	0	0	0	0	0	0
Total live - Seedling	1	3	3	2	1	1
Total Live at end of year	***13***	***26***	***41***	***28***	***16***	***17***
MIA - Reproductive	0	0	0	0	2	1
MIA - Non-reproductive	0	0	0	2	0	2
MIA - Seedling	5	1	0	3	0	1
Total MIA	**5**	**1**	**0**	**5**	**2**	**4**
Dead - Reproductive	4	6	0	8	9	4
Dead - Non-reproductive	3	0	0	3	2	0
Dead - Seedling	1	0	0	0	1	0
Total Dead	**8**	**6**	**0**	**11**	**12**	**4**
COD* - weevils	5	3	0	3	6	1
COD* - Moneilema	0	0	0	2	0	1
COD* - weevils & Moneilema	0	0	0	0	0	0
COD* - fly larvae	0	0	0	1	0	0
COD* - ants	0	0	0	0	0	0
COD* - unidentified insect	0	0	0	0	0	1
COD* - collected for weevil study	0	0	0	0	0	0
COD* - hollow	0	3	0	1	0	0
COD* - herbivory	0	0	0	0	0	0
COD* - fungus	0	0	0	0	0	0
COD* - root rot	0	0	0	0	0	0
COD* - soil disturbance	1	0	0	0	1	0
COD* - rot	0	0	0	0	0	0
COD* - trampling	0	0	0	0	0	0
COD* - unknown	2	0	0	4	5	1
* cause of death						
Total mia and dead	***13***	***7***	***0***	***16***	***14***	***8***

Table 4. Annual demographics for Devil's Sinkhole State Natural Area

Devil's Sinkhole SNA, Edwards Co.	1998	1999	2000	2001	2002	2003
Live - Reproductive	7	6	7	2	3	6
Live - Non-reproductive	27	11	8	7	7	7
Live - Seedling (<1 cm in diam.)	0	0	0	0	0	0
Total Live	**34**	**17**	**15**	**9**	**10**	**13**
New - Reproductive	0	2	0	3	1	11
New - Non-reproductive	0	0	1	11	2	8
New - Reproductive/non-reproductive	0	0	0	0	0	0
New - Seedling	0	2	0	3	0	1
Total New	**0**	**4**	**1**	**17**	**3**	**20**
New stake - Reproductive	0	1			1	0
New stake - Non-reproductive	0	1			0	0
New stake - Reproductive/non-reproductive	0	0			0	0
New stake - Seedling	0	0			0	0
Total New Stake	**0**	**2**			**1**	**0**
Refound MIA - Reproductive	0	0	0	0	0	0
Refound MIA - Non-reproductive	0	1	0	0	0	0
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**0**	**1**	**0**	**0**	**0**	**0**
Total live - Reproductive	7	9	7	5	5	17
Total live - Non-reproductive	27	13	9	18	9	15
Total live -Reproductive/non-reproductive	0	0	0	0	0	0
Total live - Seedling	0	2	0	3	0	1
Total Live at end of year	***34***	***24***	***16***	***26***	***14***	***33***
MIA - Reproductive	3	0	2	4	1	0
MIA - Non-reproductive	6	3	1	2	1	0
MIA - Seedling	1	0	0	0	2	0
Total MIA	**10**	**3**	**3**	**6**	**4**	**0**
Dead - Reproductive	7	3	1	1	3	3
Dead - Non-reproductive	29	10	2	0	5	1
Dead - Seedling	12	1	0	0	0	0
Total Dead	**48**	**14**	**3**	**1**	**8**	**4**
COD* - weevils	16	4	2	1	4	2
COD* - Moneilema	0	0	0	0	0	1
COD* - weevils & Moneilema	0	0	0	0	0	0
COD* - fly larvae	0	0	0	0	0	0
COD* - ants	0	0	0	0	0	0
COD* - unidentified insect	0	0	0	0	0	0
COD* - collected for weevil study	0	0	0	0	0	0
COD* - hollow	3	2	0	0	0	0
COD* - herbivory	1	1	0	0	0	0
COD* - fungus	0	0	0	0	1	0
COD* - root rot	0	0	0	0	0	0
COD* - soil disturbance	3	0	0	0	1	0
COD* - rot	0	0	0	0	0	0
COD* - trampling	0	0	0	0	0	0
COD* - unknown	25	7	1	0	2	1
* cause of death						
Total mia and dead	***58***	***17***	***6***	***7***	***12***	***4***

Table 5. Annual demographics for Dobb's Run

Dobb's Run, Edwards Co.			**2000**	**2001**	**2002**	**2003**
Live - Reproductive			2	2	3	1
Live - Non-reproductive			1	3	5	0
Live - Seedling (<1 cm in diam.)			4	0	0	0
Total Live			**7**	**5**	**8**	**1**
New - Reproductive				0	0	0
New - Non-reproductive				1	0	0
New - Reproductive/non-reproductive				0	0	0
New - Seedling				2	0	0
Total New				**3**	**0**	**0**
New stake - Reproductive						
New stake - Non-reproductive						
New stake - Reproductive/non-reproductive						
New stake - Seedling						
Total New Stake						
Refound MIA - Reproductive				0	0	0
Refound MIA - Non-reproductive				0	0	0
Refound MIA - Seedling				0	0	0
Total Refound MIA				**0**	**0**	**0**
Total live - Reproductive			2	2	3	1
Total live - Non-reproductive			1	4	5	0
Total live -Reproductive/non-reproductive			0	0	0	0
Total live - Seedling			4	2	0	0
Total Live at end of year			***7***	***8***	***8***	***1***
MIA - Reproductive				0	0	0
MIA - Non-reproductive				1	0	0
MIA - Seedling				1	0	0
Total MIA				**2**	**0**	**0**
Dead - Reproductive				0	0	2
Dead - Non-reproductive				0	0	5
Dead - Seedling				0	0	0
Total Dead				0	0	**7**
COD* - weevils				0	0	0
COD* - Moneilema				0	0	0
COD* - weevils & Moneilema				0	0	0
COD* - fly larvae				0	0	0
COD* - ants				0	0	0
COD* - unidentified insect				0	0	0
COD* - collected for weevil study				0	0	0
COD* - hollow				0	0	0
COD* - herbivory				0	0	0
COD* - fungus				0	0	0
COD* - root rot				0	0	0
COD* - soil disturbance				0	0	0
COD* - rot				0	0	0
COD* - trampling				0	0	0
COD* - unknown				0	0	7
* cause of death						
Total mia and dead				***2***	***0***	***7***

Table 6. Annual demographics of Frank's Place

Frank's Place, Real Co.	1998	1999	2000	2001	2002	2003
Live - Reproductive	30	38	40	38	45	27
Live - Non-reproductive	21	24	26	16	13	11
Live - Seedling (<1 cm in diam.)	0	0	0	0	0	0
Total Live	**51**	**62**	**66**	**54**	**58**	**38**
New - Reproductive	12	0	2	3	0	1
New - Non-reproductive	9	4	1	4	1	0
New - Reproductive/non-reproductive	0	0	0	0	0	0
New - Seedling	2	3	0	5	0	1
Total New	**23**	**7**	**3**	**12**	**1**	**2**
New stake - Reproductive						
New stake - Non-reproductive						
New stake - Reproductive/non-reproductive						
New stake - Seedling						
Total New Stake						
Refound MIA - Reproductive	0	0	0	0	0	0
Refound MIA - Non-reproductive	0	0	1	0	0	1
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**0**	**0**	**1**	**0**	**0**	**1**
Total live - Reproductive	42	38	42	41	45	28
Total live - Non-reproductive	30	28	28	20	14	12
Total live -Reproductive/non-reproductive	0	0	0	0	0	0
Total live - Seedling	2	3	0	5	0	1
Total Live at end of year	***74***	***69***	***70***	***66***	***59***	***41***
MIA - Reproductive	0	0	0	0	1	4
MIA - Non-reproductive	0	2	0	5	1	3
MIA - Seedling	0	2	1	0	3	0
Total MIA	**0**	**4**	**1**	**5**	**5**	**7**
Dead - Reproductive	7	4	0	7	1	14
Dead - Non-reproductive	5	4	2	4	3	1
Dead - Seedling	1	0	0	0	0	0
Total Dead	**13**	**8**	**2**	**11**	**4**	**15**
COD* - weevils	3	1	0	1	1	5
COD* - Moneilema	0	0	0	2	1	2
COD* - weevils & Moneilema	0	0	0	0	0	0
COD* - fly larvae	0	0	0	0	0	0
COD* - ants	0	0	0	0	0	0
COD* - unidentified insect	0	0	0	0	0	0
COD* - collected for weevil study	0	0	0	3	0	0
COD* - hollow	1	0	0	1	0	0
COD* - herbivory	0	0	0	0	0	0
COD* - fungus	0	0	0	0	0	0
COD* - root rot	0	0	0	0	0	0
COD* - soil disturbance	0	2	0	0	0	0
COD* - rot	0	0	0	0	0	0
COD* - trampling	0	0	0	0	0	0
COD* - unknown	9	5	2	4	2	8
* cause of death						
Total mia and dead	***13***	***12***	***3***	***16***	***9***	***22***

Table 7. Annual demographics of Garner State Park

Garner State Park, Uvalde Co.	1998	1999	2000	2001	2002	2003
Live - Reproductive	2	1	1	1	2	2
Live - Non-reproductive	0	0	0	1	0	0
Live - Seedling (<1 cm in diam.)	0	0	0	0	0	0
Total Live	**2**	**1**	**1**	**2**	**2**	**2**
New - Reproductive	0	0	0	0	0	0
New - Non-reproductive	0	0	2	0	0	0
New - Reproductive/non-reproductive	0	0	0	0	0	0
New - Seedling	0	0	0	0	0	0
Total New	**0**	**0**	**2**	**0**	**0**	**0**
New stake - Reproductive						85
New stake - Non-reproductive						60
New stake - Reproductive/non-reproductive						0
New stake - Seedling						28
Total New Stake						**173**
Refound MIA - Reproductive	0	0	0	0	0	0
Refound MIA - Non-reproductive	0	0	0	0	0	0
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	0	0	0	0	0	0
Total live - Reproductive	2	1	1	2	2	87
Total live - Non-reproductive	0	0	2	0	0	60
Total live -Reproductive/non-reproductive	0	0	0	0	0	0
Total live - Seedling	0	0	0	0	0	28
Total Live at end of year	***2***	***1***	***3***	***2***	***2***	***175***
MIA - Reproductive	0	0	0	0	0	0
MIA - Non-reproductive	0	0	0	0	0	0
MIA - Seedling	0	0	0	0	0	0
Total MIA	**0**	**0**	**0**	**0**	**0**	**0**
Dead - Reproductive	0	1	0	0	0	0
Dead - Non-reproductive	0	0	0	1	0	0
Dead - Seedling	0	0	0	0	0	0
Total Dead	**0**	**1**	**0**	**1**	**0**	**0**
COD* - weevils	0	1	0	1	0	0
COD* - Moneilema	0	0	0	0	0	0
COD* - weevils & Moneilema	0	0	0	0	0	0
COD* - fly larvae	0	0	0	0	0	0
COD* - ants	0	0	0	0	0	0
COD* - unidentified insect	0	0	0	0	0	0
COD* - collected for weevil study	0	0	0	0	0	0
COD* - hollow	0	0	0	0	0	0
COD* - herbivory	0	0	0	0	0	0
COD* - fungus	0	0	0	0	0	0
COD* - root rot	0	0	0	0	0	0
COD* - soil disturbance	0	0	0	0	0	0
COD* - rot	0	0	0	0	0	0
COD* - trampling	0	0	0	0	0	0
COD* - unknown	0	0	0	0	0	0
* cause of death						
Total mia and dead	***0***	***1***	***0***	***1***	***0***	***0***

Table 8. Annual demographics for Highway 674

Hwy 674 right-of-way, Kinney Co.	1998	1999	2000	2001	2002	2003
Live - Reproductive	3	3	3	3	2	1
Live - Non-reproductive	0	0	4	5	0	0
Live - Seedling (<1 cm in diam.)	0	0	0	0	0	0
Total Live	**3**	**3**	**7**	**8**	**2**	**1**
New - Reproductive	0	0	1	0	0	0
New - Non-reproductive	0	1	0	0	0	0
New - Reproductive/non-reproductive	0	0	0	0	0	0
New - Seedling	0	7	0	0	0	0
Total New	**0**	**8**	**1**	**0**	**0**	**0**
New stake - Reproductive						
New stake - Non-reproductive						
New stake - Reproductive/non-reproductive						
New stake - Seedling						
Total New Stake						
Refound MIA - Reproductive	0	0	0	0	0	0
Refound MIA - Non-reproductive	0	0	0	1	0	0
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**0**	**0**	**0**	**1**	**0**	**0**
Total live - Reproductive	3	3	4	3	2	1
Total live - Non-reproductive	0	1	4	5	0	0
Total live -Reproductive/non-reproductive	0	0	0	0	0	0
Total live - Seedling	0	7	0	0	0	0
Total Live at end of year	***3***	***11***	***8***	***8***	***2***	***1***
MIA - Reproductive	0	0	0	1	0	0
MIA - Non-reproductive	0	0	0	0	2	1
MIA - Seedling	0	0	4	0	0	0
Total MIA	**0**	**0**	**4**	**1**	**2**	**1**
Dead - Reproductive	0	0	0	0	1	1
Dead - Non-reproductive	0	0	0	0	2	0
Dead - Seedling	0	0	0	0	0	0
Total Dead	0	0	0	0	**3**	**1**
COD* - weevils	0	0	0	0	1	0
COD* - Moneilema	0	0	0	0	0	0
COD* - weevils & Moneilema	0	0	0	0	0	0
COD* - fly larvae	0	0	0	0	0	0
COD* - ants	0	0	0	0	0	0
COD* - unidentified insect	0	0	0	0	0	0
COD* - collected for weevil study	0	0	0	0	0	0
COD* - hollow	0	0	0	0	0	0
COD* - herbivory	0	0	0	0	0	0
COD* - fungus	0	0	0	0	1	0
COD* - root rot	0	0	0	0	0	0
COD* - soil disturbance	0	0	0	0	0	0
COD* - rot	0	0	0	0	0	0
COD* - trampling	0	0	0	0	0	0
COD* - unknown	0	0	0	0	1	1
* cause of death						
Total mia and dead	***0***	***0***	***4***	***1***	***5***	***2***

Table 9. Annual demographics of Junction highway right-of-way site

Junction, Kimble Co.	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Live - Reproductive	62	64	83	95	153	149
Live - Non-reproductive	24	22	28	32	41	45
Live - Seedling (<1 cm in diam.)	0	0	0	0	0	0
Total Live	**86**	**86**	**111**	**127**	**194**	**194**
New - Reproductive	0	10	39	26	41	11
New - Non-reproductive	6	19	20	45	24	45
New - Reproductive/non-reproductive	0	0	0	0	0	0
New - Seedling	3	2	0	7	3	20
Total New	**9**	**31**	**59**	**78**	**68**	**76**
New stake - Reproductive		3		11		
New stake - Non-reproductive		3		3		
New stake - Reproductive/non-reproductive		0		0		
New stake - Seedling		0		0		
Total New Stake		**6**		**14**		
Refound MIA - Reproductive	0	1	0	0	0	0
Refound MIA - Non-reproductive	0	0	0	0	0	0
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**0**	**1**	**0**	**0**	**0**	**0**
Total live - Reproductive	62	78	122	132	194	160
Total live - Non-reproductive	30	44	48	80	65	90
Total live -Reproductive/non-reproductive	0	0	0	0	0	0
Total live - Seedling	3	2	0	7	3	20
Total Live at end of year	***95***	***124***	***170***	***219***	***262***	***270***
MIA - Reproductive	1	0	1	9	7	23
MIA - Non-reproductive	0	1	1	2	1	4
MIA - Seedling	4	1	0	2	1	0
Total MIA	**5**	**2**	**2**	**13**	**9**	**27**
Dead - Reproductive	10	6	8	31	8	45
Dead - Non-reproductive	11	1	3	3	7	1
Dead - Seedling	0	0	0	1	0	0
Total Dead	**21**	**7**	**11**	**35**	**15**	**46**
COD* - weevils	1	1	4	6	2	8
COD* - Moneilema	0	0	1	6	5	4
COD* - weevils & Moneilema	0	0	0	0	0	0
COD* - fly larvae	0	0	0	0	0	0
COD* - ants	0	0	0	0	0	1
COD* - unidentified insect	0	0	0	0	0	0
COD* - collected for weevil study	0	0	0	1	0	0
COD* - hollow	5	0	0	0	0	0
COD* - herbivory	0	0	0	7	0	23
COD* - fungus	0	0	0	3	0	0
COD* - root rot	0	0	0	1	0	0
COD* - soil disturbance	0	0	0	2	0	2
COD* - rot	0	0	0	0	0	0
COD* - trampling	0	0	0	0	0	0
COD* - unknown	15	6	6	9	8	8
* cause of death						
Total mia and dead	***26***	***9***	***13***	***48***	***24***	***73***

Table 10. Annual demographics for the Kerr Wildlife Management Area

Kerr WMA, Kerr Co.		**1999**	**2000**	**2001**	**2002**	**2003**
Live - Reproductive		18	10	13	11	9
Live - Non-reproductive		8	1	5	46	56
Live - Seedling (<1 cm in diam.)		1	0	0	0	0
Total Live		**27**	**11**	**18**	**57**	**65**
New - Reproductive			5	2	2	5
New - Non-reproductive			2	2	6	5
New - Reproductive/non-reproductive			0	0	0	0
New - Seedling			9	14	31	13
Total New			**16**	**18**	**39**	**23**
New stake - Reproductive			1	2	1	78
New stake - Non-reproductive			0	17	0	49
New stake - Reproductive/non-reproductive			0	0	0	0
New stake - Seedling			0	25	0	64
Total New Stake			**1**	**44**	**1**	**191**
Refound MIA - Reproductive			0	0	0	1
Refound MIA - Non-reproductive			0	0	0	4
Refound MIA - Seedling			0	0	0	0
Total Refound MIA			**0**	**0**	**0**	**5**
Total live - Reproductive		18	16	17	14	93
Total live - Non-reproductive		8	3	24	52	114
Total live -Reproductive/non-reproductive		0	0	0	0	0
Total live - Seedling		1	9	39	31	77
Total Live at end of year		***27***	***28***	***80***	***97***	***284***
MIA - Reproductive			0	0	1	0
MIA - Non-reproductive			1	0	5	10
MIA - Seedling			0	2	5	11
Total MIA			**1**	**2**	**11**	**21**
Dead - Reproductive			11	4	9	7
Dead - Non-reproductive			4	1	3	4
Dead - Seedling			0	3	0	2
Total Dead			**15**	**8**	**12**	**13**
COD* - weevils			2	2	4	7
COD* - Moneilema			0	0	0	1
COD* - weevils & Moneilema			0	0	0	0
COD* - fly larvae			0	0	0	0
COD* - ants			0	0	0	0
COD* - unidentified insect			0	0	0	0
COD* - collected for weevil study			1	0	0	0
COD* - hollow			0	0	0	0
COD* - herbivory			0	0	0	0
COD* - fungus			0	0	0	0
COD* - root rot			0	0	0	0
COD* - soil disturbance			0	0	0	0
COD* - rot			0	0	0	0
COD* - trampling			0	0	0	0
COD* - unknown			12	6	8	5
* cause of death						
Total mia and dead			***16***	***10***	***23***	***34***

Table 11. Annual demographics for Kickapoo Caverns State Park

Kickapoo Caverns SP, Kinney/Edwards Cos.	1998	1999	2000	2001	2002	2003
Live - Reproductive	125	128	221	228	235	214
Live - Non-reproductive	78	71	201	156	181	161
Live - Seedling (<1 cm in diam.)	0	0	0	0	0	0
Total Live	**203**	**199**	**422**	**384**	**416**	**375**
New - Reproductive	16	23	17	27	18	30
New - Non-reproductive	7	39	22	61	39	29
New - Reproductive/non-reproductive	0	40	0	0	0	0
New - Seedling	1	45	17	76	33	45
Total New	**24**	**147**	**56**	**164**	**90**	**104**
New stake - Reproductive	1	33		4	16	1
New stake - Non-reproductive	2	20		8	8	0
New stake - Reproductive/non-reproductive	0	30		0	0	0
New stake - Seedling	0	15		0	0	0
Total New Stake	**3**	**98**		**12**	**24**	**1**
Refound MIA - Reproductive	0	2	0	1	2	0
Refound MIA - Non-reproductive	0	3	1	1	4	3
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**0**	**5**	**1**	**2**	**6**	**3**
Total live - Reproductive	142	186	238	260	271	245
Total live - Non-reproductive	87	133	224	226	232	193
Total live -Reproductive/non-reproductive	0	70	0	0	0	0
Total live - Seedling	1	60	17	76	33	45
Total Live at end of year	***230***	***449***	***479***	***562***	***536***	***483***
MIA - Reproductive	3	2	3	6	5	17
MIA - Non-reproductive	0	1	4	9	24	30
MIA - Seedling	8	5	1	3	14	6
Total MIA	**11**	**8**	**8**	**18**	**43**	**53**
Dead - Reproductive	13	19	17	47	56	63
Dead - Non-reproductive	2	2	3	35	43	35
Dead - Seedling	2	2	2	3	2	11
Total Dead	**17**	**23**	**22**	**85**	**101**	**109**
COD* - weevils	5	2	6	30	61	46
COD* - Moneilema	0	0	0	3	5	0
COD* - weevils & Moneilema	0	0	0	0	0	1
COD* - fly larvae	0	0	0	7	3	0
COD* - ants	0	0	0	0	0	0
COD* - unidentified insect	0	0	0	0	2	0
COD* - collected for weevil study	0	4	0	3	0	4
COD* - hollow	0	7	0	0	0	0
COD* - herbivory	0	0	0	0	0	1
COD* - fungus	0	0	0	0	0	0
COD* - root rot	0	0	0	0	0	0
COD* - soil disturbance	2	0	0	0	0	4
COD* - rot	0	0	0	0	0	0
COD* - trampling	0	0	0	0	0	0
COD* - unknown	10	10	16	42	30	53
* cause of death						
Total mia and dead	***28***	***31***	***30***	***103***	***144***	***162***

Table 12. Annual demographics for Los Rincones Preserve

Los Rincones Preserve, Kerr Co.	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Live - Reproductive	44	45	54	47	45	35
Live - Non-reproductive	52	55	57	43	41	46
Live - Seedling (<1 cm in diam.)	0	0	0	0	0	0
Total Live	**96**	**100**	**111**	**90**	**86**	**81**
New - Reproductive	1	0	0	0	1	0
New - Non-reproductive	7	6	4	0	2	3
New - Reproductive/non-reproductive	0	0	0	0	0	0
New - Seedling	4	5	2	3	2	0
Total New	**12**	**11**	**6**	**3**	**5**	**3**
New stake - Reproductive						
New stake - Non-reproductive						
New stake - Reproductive/non-reproductive						
New stake - Seedling						
Total New Stake						
Refound MIA - Reproductive	0	0	0	0	0	0
Refound MIA - Non-reproductive	0	0	0	0	0	0
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**0**	**0**	**0**	**0**	**0**	**0**
Total live - Reproductive	45	45	54	47	46	35
Total live - Non-reproductive	59	61	61	43	43	49
Total live -Reproductive/non-reproductive	0	0	0	0	0	0
Total live - Seedling	0	5	2	0	2	0
Total Live at end of year	***108***	***111***	***117***	***93***	***91***	***84***
MIA - Reproductive	2	0	0	0	0	0
MIA - Non-reproductive	3	1	0	2	1	1
MIA - Seedling	0	0	0	0	0	1
Total MIA	**5**	**1**	**0**	**2**	**1**	**2**
Dead - Reproductive	1	3	0	7	6	3
Dead - Non-reproductive	2	4	0	18	0	5
Dead - Seedling	0	0	0	0	0	0
Total Dead	**3**	**7**	**0**	**25**	**6**	**8**
COD* - weevils	0	0	0	21	3	1
COD* - Moneilema	0	0	0	0	0	0
COD* - weevils & Moneilema	0	0	0	0	0	0
COD* - fly larvae	0	0	0	1	0	0
COD* - ants	0	0	0	0	0	0
COD* - unidentified insect	0	0	0	0	0	0
COD* - collected for weevil study	0	0	0	0	0	0
COD* - hollow	0	0	0	0	0	0
COD* - herbivory	0	0	0	0	0	0
COD* - fungus	0	0	0	0	0	0
COD* - root rot	0	0	0	0	0	0
COD* - soil disturbance	0	0	0	0	0	1
COD* - rot	0	0	0	0	0	0
COD* - trampling	0	0	0	0	0	0
COD* - unknown	3	7	0	3	3	6
* cause of death						
Total mia and dead	***8***	***8***	***0***	***27***	***7***	***10***

Table 13. Annual demographics of Lost Maples State Natural Area

Lost Maples SNA, Bandera/Real Cos.	1998	1999	2000	2001	2002	2003
Live - Reproductive	317	316	327	280	347	285
Live - Non-reproductive	159	163	158	213	163	195
Live - Seedling (<1 cm in diam., 1st year)	0	0	0	0	0	0
Total Live	**476**	**479**	**485**	**493**	**510**	**480**
New - Reproductive	13	2	12	2	10	3
New - Non-reproductive	27	19	21	34	18	12
New - Reproductive/non-reproductive	0	0	0	0	0	0
New - Seedling	5	1	12	15	11	7
Total New	**45**	**22**	**45**	**51**	**39**	**22**
New stake - Reproductive						
New stake - Non-reproductive						
New stake - Reproductive/non-reproductive						
New stake - Seedling						
Total New Stake						
Refound MIA - Reproductive	1	0	2	0	0	0
Refound MIA - Non-reproductive	1	1	1	3	0	1
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**2**	**1**	**3**	**3**	**0**	**1**
Total live - Reproductive	331	318	341	282	357	288
Total live - Non-reproductive	187	183	180	250	181	208
Total live -Reproductive/non-reproductive	0	0	0	0	0	0
Total live - Seedling	5	1	12	15	11	7
Total Live at end of year	***523***	***502***	***533***	***547***	***549***	***503***
MIA - Reproductive	4	10	2	0	1	0
MIA - Non-reproductive	3	8	5	3	14	19
MIA - Seedling	4	3	0	1	2	1
Total MIA	**11**	**21**	**7**	**4**	**17**	**20**
Dead - Reproductive	10	17	9	19	9	11
Dead - Non-reproductive	8	6	4	17	9	35
Dead - Seedling	3	0	0	0	0	0
Total Dead	**21**	**23**	**13**	**36**	**18**	**46**
COD* - weevils	0	0	0	0	0	0
COD* - Moneilema	0	1	0	10	1	7
COD* - weevils & Moneilema	0	0	0	0	0	0
COD* - fly larvae	0	0	0	1	0	0
COD* - ants	0	0	0	0	3	0
COD* - unidentified insect	0	2	1	2	0	6
COD* - collected for weevil study	0	5	0	3	0	0
COD* - hollow	0	0	5	0	0	0
COD* - herbivory	0	0	0	1	0	0
COD* - fungus	5	1	0	0	0	0
COD* - root rot	0	0	0	0	0	0
COD* - soil disturbance	0	0	0	0	0	0
COD* - rot	0	0	0	3	0	0
COD* - trampling	0	0	0	1	0	0
COD* - unknown	16	14	7	15	14	33
* cause of death						
Total mia and dead	***32***	***44***	***20***	***40***	***35***	***66***

Table 14. Annual demographics of Pole Hollow highway right-of-way site

Pole Hollow, Kimble Co.	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Live - Reproductive	20	24	24	22	23	25
Live - Non-reproductive	4	2	4	2	1	3
Live - Seedling (<1 cm in diam.)	0	0	0	0	0	0
Total Live	**24**	**26**	**28**	**24**	**24**	**28**
New - Reproductive	0	1	1	2	3	2
New - Non-reproductive	2	3	1	0	2	1
New - Reproductive/non-reproductive	0	0	0	0	0	0
New - Seedling	0	0	0	0	0	3
Total New	**2**	**4**	**2**	**2**	**5**	**6**
New stake - Reproductive						7
New stake - Non-reproductive						3
New stake - Reproductive/non-reproductive						0
New stake - Seedling						0
Total New Stake						**10**
Refound MIA - Reproductive	0	0	0	0	0	0
Refound MIA - Non-reproductive	0	0	0	0	0	0
Refound MIA - Seedling	0	0	0	0	0	0
Total Refound MIA	**0**	**0**	**0**	**0**	**0**	**0**
Total live - Reproductive	20	25	25	24	26	34
Total live - Non-reproductive	6	5	5	2	3	7
Total live -Reproductive/non-reproductive	0	0	0	0	0	0
Total live - Seedling	0	0	0	0	0	3
Total Live at end of year	***26***	***30***	***30***	***26***	***29***	***44***
MIA - Reproductive	0	0	0	0	0	1
MIA - Non-reproductive	0	0	0	0	0	0
MIA - Seedling	0	0	0	0	0	0
Total MIA	**0**	**0**	**0**	**0**	**0**	**1**
Dead - Reproductive	0	0	2	5	2	0
Dead - Non-reproductive	0	0	0	1	0	0
Dead - Seedling	0	0	0	0	0	0
Total Dead	**0**	**0**	**2**	**6**	**2**	**0**
COD* - weevils	0	0	0	0	0	0
COD* - Moneilema	0	0	0	1	0	0
COD* - weevils & Moneilema	0	0	0	0	0	0
COD* - fly larvae	0	0	0	0	0	0
COD* - ants	0	0	0	0	0	0
COD* - unidentified insect	0	0	0	0	0	0
COD* - collected for weevil study	0	0	0	1	0	0
COD* - hollow	0	0	0	0	0	0
COD* - herbivory	0	0	0	0	0	0
COD* - fungus	0	0	0	0	0	0
COD* - root rot	0	0	0	1	0	0
COD* - soil disturbance	0	0	0	0	0	0
COD* - rot	0	0	0	0	0	0
COD* - trampling	0	0	0	0	0	0
COD* - unknown	0	0	2	3	2	0
* cause of death						
Total mia and dead	***0***	***0***	***2***	***6***	***2***	***1***

However individuals as small as 1.2 cm in diameter have been observed in flower. An average of two to three flowers are produced per plant and the number of flowers per plant shows a positive correlation with increasing plant diameter. Flower number also shows a positive correlation with increased precipitation. About two-thirds of the flowers produce fruit.

A Tobusch fishhook cactus in good condition usually has a green (or some shade thereof) stem. The spines are usually straw-colored, with new spine growth being especially bright yellow. Individuals in poor condition usually have reddish or yellowish stems and dull gray spines. If such individuals have been reproductive in the past, they usually stop producing flowers, or if flowers are produced, the fruits abort. The plants also usually decrease in diameter.

Annual mortality consistently outweighs recruitment (Table 15), whether mortality is calculated with or without the missing individuals. Recruitment is calculated as the annual number of "new seedlings" divided by the "total live" number of individuals (Table 2). Mortality is calculated by dividing the annual "total mia, dead, removed" individuals by the previous year's "total live at the end of the year" number of individuals (Table 2). Mortality can be split into dead and missing (MIA) individuals, and percentages of dead and missing individuals are calculated in the same manner. Although the highest cause of mortality (64% of total mortality for the entire project period; Table 16) was unknown (including the missing individuals), the second highest cause of mortality was the Tobusch fishhook cactus weevil (20%).

Discussion: Although the total number of live plants from all sites found at the end of the 2003 monitoring season (1936) appears to be almost double that of the 1998 season, much of this increase is due to the finding of new, previously overlooked plants and populations rather than true recruitment. For example Garner (Table 7) jumped from 2 live plants to 175 plants with the discovery of a large new population. The detection of two large populations at the Kerr in 2001 and 2003 (Table 10) increased the population from 36 to 80 (2001), and from 83 to 284 (2003). At one site (Table 9 - Junction) new plants have been continually found. At some sites populations have increased and decreased throughout the study period. Pole Hollow (Table 14) ended with more plants in 2003 than 1998, while Devil's River (Table 3) ended up with fewer. Kickapoo (Table 11) increased in 1999 with intensive surveys but declined significantly in 2002 and 2003. Some sites suffered a more or less steady decline from 1998 to 2003 (Table 5 – Dobb's Run, Table 6 – Frank's Place, Table 8 – Hwy 674, Table 12 – Los Rincones). Only the site with the largest population, Lost Maples (Table 13), has remained more or less stable (annual population numbers within 10% of the 6 year average). Although the discovery of large new populations is always significant, the continual additions of new plants to old plots or the stability of a site is more essential in the long run.

Table 15. Annual recruitment and mortality across all monitoring sites

# of individuals (% recruitment or mortality)	1998	1999	2000	2001	2002	2003
Recruitment	16 (1.6%)	65 (6.5%)	43 (3.3%)	127 (10.3%)	81 (5.9%)	91 (7.1%)
Missing	47 (4.1%)	40 (3.6%)	26 (1.9%)	58 (3.9%)	94 (5.6%)	136 (8.2%)
Dead	131 (11.3%)	89 (8.0%)	68 (4.9%)	219 (14.6%)	181 (10.9%)	253 (15.2%)
Mortality (dead + missing)	178 (15.4%)	129 (11.6%)	94 (6.8%)	277 (18.4%)	275 (16.5%)	389 (23.4%)
Recruitment is calculated by dividing the annual number of "new seedlings" by the "total live" number of individuals (see Table 2).						
Mortality is calculated by dividing the annual "total mia, dead, removed" individuals by the previous year's "total live at the end of the year" number of individuals.						

Table 16. Causes of mortality and percentages of total mortality

Cause of death	1998	1999	2000	2001	2002	2003	Total	% of Dead	% of Dead+MIA
Weevils	30	12	14	65	82	70	**273**	29%	20%
Moneilema (cerambycid beetle)	0	1	1	24	12	16	**54**	6%	4%
Weevils and *Moneilema*	0	0	0	0	0	1	**1**	>1%	>1%
Fly larvae	0	0	0	10	3	0	**13**	1%	1%
Ants	0	0	0	0	3	1	**4**	>1%	>1%
Unidentified insect	0	2	1	2	2	7	**14**	1%	1%
Collected for weevil study	0	9	1	11	0	4	**25**	3%	2%
Hollow	9	12	5	2	0	0	**28**	3%	2%
Herbivory	1	1	0	8	0	24	**34**	4%	3%
Fungus	5	1	0	3	2	0	**11**	1%	1%
Root rot	0	0	0	2	0	0	**2**	>1%	>1%
Soil disturbance	6	2	0	2	2	7	**19**	2%	1%
Rot	0	0	0	3	0	0	**3**	>1%	>1%
Trampling	0	0	0	1	0	0	**1**	>1%	>1%
Unknown	80	49	46	86	75	123	**459**	49%	34%
MIA	47	40	26	58	94	136	**401**		30%

Total number of dead individuals for 1998 through 2003 was 941.

Total mortality from 1998 through 2003 was 1342 individuals.

True recruitment is more closely represented by the annual additions of new seedlings to the population. Recruitment across the entire monitored population appears to usually be less than 10% annually (Table 15; calculated by dividing the number of "new" seedlings by the "total live" plants per year, Table 2). Percent recruitment from all sites combined (Table 2) varied from a low of 1.6% in 1998 to a high of 10.3% in 2003. However at individual sites recruitment percentages are more variable. For example recruitment at the Kerr (Table 10) was 81.8% in 2000, 77.8% in 2001, 54.5% in 2002, and 20.0% in 2003. Although percentages decreased through time due to the amount of individuals in the live population increasing, the number of new seedlings is still high compared to other sites. Perhaps this is an indication of a population just getting established. Kickapoo (Table 12) also had higher than average recruitment in 1999, 2001, and 2003. In the largest population (Lost Maples – Table 13), recruitment is quite small (<1% to 3.0%). Since recruitment is average or high in other large populations (Kickapoo and Kerr), population size does not appear to be a factor. Nor does number of reproductive individuals in the population directly correlate to recruitment. Perhaps Lost Maples represents a very stable population or one in which most available habitat is occupied. Mortality is relatively low at Lost Maples as well although still exceeding recruitment. In small populations the recruitment percentage sometimes exceeds 10% (Table 3 – Devil's River, 1999 and 2000; Table 5 – Dobb's Run 2001; Table 8 - Hwy 674, 1999). This effect is linked to the small size of the population. The number of seedlings found is also affected by the amount and intensity of search effort. Although new seedlings, non-reproductive and reproductive plants are found each year within the plots and sites, effective recruitment (following seedlings from germination to reproduction) needs to be calculated to get the most accurate representation of recruitment.

Population structure is roughly 6:4:1; that is for roughly every six reproductives, there are four non-reproductives and one (usually less than one) seedling. These numbers are calculated from percentages obtained from dividing the "total live" reproductive category by the "total live at end of year" number (Table 2). Although in general the seedling class composes less than 10% of a population, most of the sites break this rule (Table 3 – Devil's River, 1999; Table 4 – Devil's Sinkhole, 2001; Table 5 – Dobb's Run, 2000 and 2001; Table 7 – Garner, 2003; Table 8 – Hwy 674, 1999; Table 10 – Kerr, 2000-2003; Table 11 – Kickapoo, 1999 and 2001). This is mainly related to search effort and the addition of new stakes, small population size, or establishing populations (such as the Kerr). Populations where reproductive individuals are outnumbered by non-reproductive individuals (including seedlings) may represent either new or dying populations. Kerr (Table 10) has a low proportion of reproductive individuals although as time passes, the proportions will probably become more the norm. Devil's River (Table 3) is representative of a dying population, with percentage of reproductive individuals in an almost constant decline. Devil's Sinkhole (Table 4) shows a population that was in critical condition that may now be in recovery although the increase in reproductive individuals has only been recorded for one year. Another declining population (Los Rincones – Table 12) has had higher numbers of non-

reproductive individuals for four out of the six years of study. However some sites such as Frank's Place (Table 6) maintain the roughly 6:4:1 population ratio even while declining. Pole Hollow (Table 14) is a somewhat enigmatic population that has maintained a consistently high number of reproductive individuals (76.9-92.3%), and no seedlings except in 2003 (6.8%).

Flower and fruit formation is fairly consistent among the sites. The primary factors influencing reproductive output are climate and management activities. Flowering is affected by day length, temperature, and geographic location. As the late winter days increase in length and the temperatures warm, flower initiation begins. Flowering begins in the southern part of the range first (usually late January to early February in Kinney County; early February in Val Verde and Uvalde counties), and proceeds northward (mid-February in Real and Bandera counties; late February in Edwards County; and early March in Kerr and Kimble counties). Cold snaps or cool, cloudy weather may delay flowering by days or even weeks. Flowers open about mid-morning on sunny days, and remain open all day. Overcast skies can cause flowers to remain closed, although open flowers have been observed during rain showers. Dry weather may also delay flowering and can lead to abortion. Controlled burns conducted during late bud formation, flowering, or fruiting may also leads to abortion of the reproductive structures. Fruit formation begins shortly after pollination, with maturation occurring in about 10 weeks, again subject to climatic conditions. Dispersal starts at this time, with fruits totally gone within three months of flowering.

Condition and vigor of the individual plants varies across sites and plots/stakes within sites. Lost Maples (Table 13) appears to be the healthiest, most vigorous site. The population is the largest of all the sites. Although recruitment is not high, mortality only topped 10% in 2003 (12%), and numbers of new plants found in the plots exceeded mortality in four of six years. The plants are closely packed in three sub-populations, and all original plots still have live plants. The proportion of the reproductive classes seems stable. Most of the individuals in the population appear green and in good condition. The meta-population at Junction (Table 9) also appears to be in good condition. The population has increased, primarily from the location of new plants within old plots, rather than just from new plots. The two main sub-populations consist of dense to scattered plants, and one of the sub-populations suffers higher mortality than the other. All of the plants at one of the plots at the higher mortality sub-population died. While mortality is greater than seedling recruitment, the location of new plants annually from 1999 to 2003 has compensated for the mortality. Reproductive size class structure is quite normal, and most individuals are in good to average condition.

The Kickapoo site (Table 11) is a large meta-population scattered throughout the entire park. There are also sub-populations on adjacent private lands but these are not actively being monitored. A total of 31 stakes have been established at Kickapoo, with only one no longer containing any Tobusch fishhook cacti. Most plots contain small concentrations of cacti, and have more or less retained, or

even increased, their populations. Two of the plots contain (or have contained) around 100 individuals. One of these plots (Emmett's original monitoring site) suffered a high rate of mortality beginning in 2001 with a 25.8% mortality rate, 36.7% of which was caused by weevils, with a live population at year's end of 258 individuals. In 2002 the mortality rate jumped to 44.6% (65% caused by weevils), diminishing the population to 188. The trend continued in 2003 with the mortality rate hitting 53.7%, with only 101 individuals left in the live population. Weevils accounted for 27.7% of this carnage. Feral hogs have also caused extensive damage to this plot via their rooting activity. Although few causes of mortality are assigned to rooting (only 2 or 2.0%), many of the missing individuals (29) may be the result of the rooting. However the second largest population at Kickapoo presents a brighter story. This plot (named Vireo Territory) had three plants when monitoring began in 1996, and dropped to two individuals in 1998. In 1999 29 new plants were discovered including eight reproductive individuals. Despite several biologists visiting the plot two or more times per year, these plants had never been observed. The population increased to 40 individuals in 2000, 92 individuals in 2001, 100 in 2002, and a slight drop to 96 individuals in 2003 as mortality increased. The larger populations at Kickapoo display the typical reproductive class structure while the small populations have various combinations of reproductive, non-reproductive, and seedling stages. Overall the plants at Kickapoo are in average to good condition, although the threat from weevils and feral hogs looms prominently in the background.

Two sites that have rapidly increased in population due to the discovery of large new populations are Garner and Kerr. At one time the Garner site appeared to be just a plant or two away from extinction. But with the discovery of 173 plants, the Garner site now seems viable. The new plots contain dense concentrations of cacti, with normal reproductive class structure. The individual plants appear healthy and in good condition. Kerr (Table 10) was another site where the population appeared headed toward extinction when new large populations were discovered. The older populations had become decimated by weevils, and remaining individuals were scattered within and among plots. Eight of the original plots lost all of their plants. The new populations contain more or less dense concentrations of plants. The first new population (found in 2001) contained an extremely high percentage of seedlings (57% seedlings, 5% reproductive and 39% non-reproductive), and relatively few have been lost over two years. The population found in 2003 also had a high proportion of seedlings (34%) as well as a good number of reproductive (41%) and non-reproductive (26%) individuals. This suggests that the population found in 2001 was very new. Reproductive class structure has yet to stabilize in these recent populations. Most of the plants at the Kerr are in good to average condition.

The population at Pole Hollow (Table 14) has been more or less stable from 1998 to 2002, but in 2003 the population increased in size by 63.6% due to the addition of new individuals as well as a new stake. There were three widely scattered plots with dense concentrations of individuals at this site although all

individuals died or went missing at one plot by 1999. The proportion of reproductive individuals at this site is quite high (between 77% and 92%), and only three seedlings have been observed (all in 2003). Most of the individuals appear in average and good condition.

There are several populations that appear headed for extinction. The population being monitored at Dobb's Run (Table 5) was very small and concentrated. With the loss of two reproductive plants and their associated non-reproductive offspring, the population will soon cease to exist. However the remaining individual is green and in good condition. Plus there are hundreds of unmonitored plants scattered across Dobb's Run. The story is similar for the Hwy 674 site (Table 8). The population consisted of only a few mature individuals and their non-reproductive progeny. High rates of mortality combined with almost zero recruitment have lead to one remaining reproductive individual. This plant is greenish with reddish yellow tubercle tips, and is in average condition. Devil's River (Table 3) has a small population that suffers a high mortality rate that is only rarely outweighed by recruitment. The plants are for the most part widely scattered, both within and between the plots. The site is at the western edge of the species' range, and thus the climate may be too xeric. Seven of the original 11 plots still have live individuals. The population structure has more non-reproductive individuals than reproductive individuals. Most of the remaining plants are in average condition. The population at Frank's Place (Table 6) has been in a steady decline for the past three years. The plants are concentrated on a small terrace covered with little bluestem. Mortality has consistently outweighed recruitment. However the proportion of reproductive to non-reproductive individuals remains within the norm. Most of the live plants left are of average condition. The population at Los Rincones is very dense, occupying an area of less than 100 m^2. Although the population increased in 1999 and 2000, in 2001 an outbreak of weevils led to a 23.1% decline. The population has continued to slide downhill since then. Although mortality rate has only exceeded 10% twice (23.1% in 2001 and 11.0% in 2003), seedling recruitment has only exceeded mortality in 2000, a year when there was no mortality. Even when all new individuals found per year are considered, mortality was still greater for the last three years. Population structure has almost always contained a 3:2 proportion of non-reproductive to reproductive individuals, and less than 5% seedlings. Most of the individuals left in the population are in average condition.

At one time the largest known population (ca. 1100 individuals), Devil's Sinkhole (Table 4) crashed to a low of 14 live plants in 2002. High mortality, primarily from the Tobusch fishhook cactus weevil, left 11 of the plots without any cacti. Recruitment is still low for this site, although percentages may seem high due to few remaining individuals in the population. Until 2003 the percentage of non-reproductive individuals outweighed the reproductive ones. Although the site once contained stakes surrounded by thick sub-populations, individuals now exist in small isolated concentrations or as remote individuals. Most of the remaining individuals are in good to fair condition.

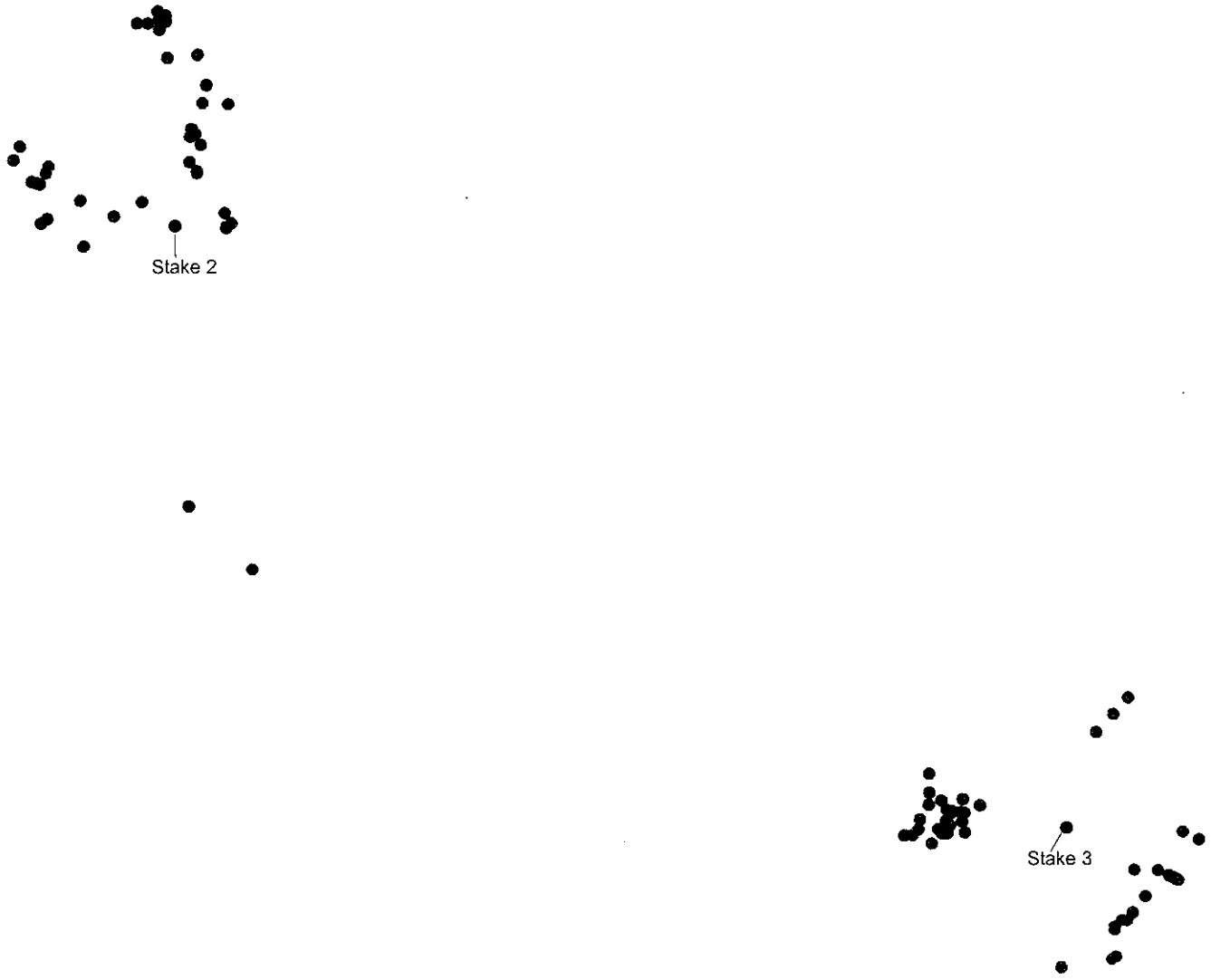
The percent of dead individuals grouped by reproductive class is roughly the same as the percent of live individuals grouped by reproductive class. Thus death does not seem to favor a particular reproductive class. However within the individual sites, there are several years or even sites that do not fit this pattern. More data is needed to clear up confounding effects from very small populations and additions of large new populations.

The percent of missing individuals by reproductive class seems to be more concentrated on the non-reproductive category. Seedlings also suffer a higher percent of missing individuals. Since seedlings form the smallest proportion of the reproductive class structure, the higher percentage of missing seedlings is of more significance. Because of the often smaller size of the non-reproductive and seedling categories, they are often more difficult to relocate as well as more vulnerable to drought. Thus they are more prone to disappearing without a trace. However a high number of reproductive individuals went missing at the Junction site (23 out of 27 missing individuals, and 15% of the live reproductive class). Reasons for this are unknown.

Tobusch fishhook cactus suffers from many types of mortality (Table 16). For almost two-thirds of the plants, cause of mortality could not be determined (mortality is equivalent to dead plus missing individuals). Death from unknown causes most often consisted of a pile of loose spines next to the tag, or a hard, dry, solid or powdery body. Perhaps this was in reaction to drought or disease. Missing (MIA) individuals were usually presented as just the tag or both the tag and the plant missing. Occasionally a lone spine cluster might be found near the tag. Unknown cause of death and missing individuals accounted for the highest percentage of mortality at all sites.

Of the identifiable causes of mortality, the most significant resulted from the Tobusch fishhook cactus weevil (*Gerstaeckeria* sp. nov.). This still-unnamed species oviposits on the cactus, and the larvae mature within the cactus stem, usually killing the plant (Calvert 2003). The larvae leave small chambers, galleries, and exit holes in the dead body of the cactus. The weevil is apparently host specific for Tobusch fishhook cactus. The following sites suffered more than 10% mortality over the six-year period from the weevils (percent of total mortality): Devil's Sinkhole (27.9%), Frank's Place (14.7%), Junction (11.4%), Kerr (18.1%), Kickapoo (30.1%), and Los Rincones (41.7%). It was the second leading cause of mortality at all these sites except Junction. Figures 3-8 present a graphic representation of how weevils may affect a population. The figures show individual plants at two stakes at Devil's Sinkhole, starting at the beginning of Emmett's study in 1991 (Emmett 1995). While numbers actually increase at stake 2 from 1991 to 1993, it is obvious by 1994 that plants were dying or disappearing rapidly. One plant managed to hang on until 2002 when it died from weevil herbivory. Plants at stake 3 suffered a continual decline from 1991 until 1997 when all plants had died or disappeared. Amazingly Lost Maples and Pole

Figure 3.
1991 Stakes 2 & 3
Devil's Sinkhole SNA



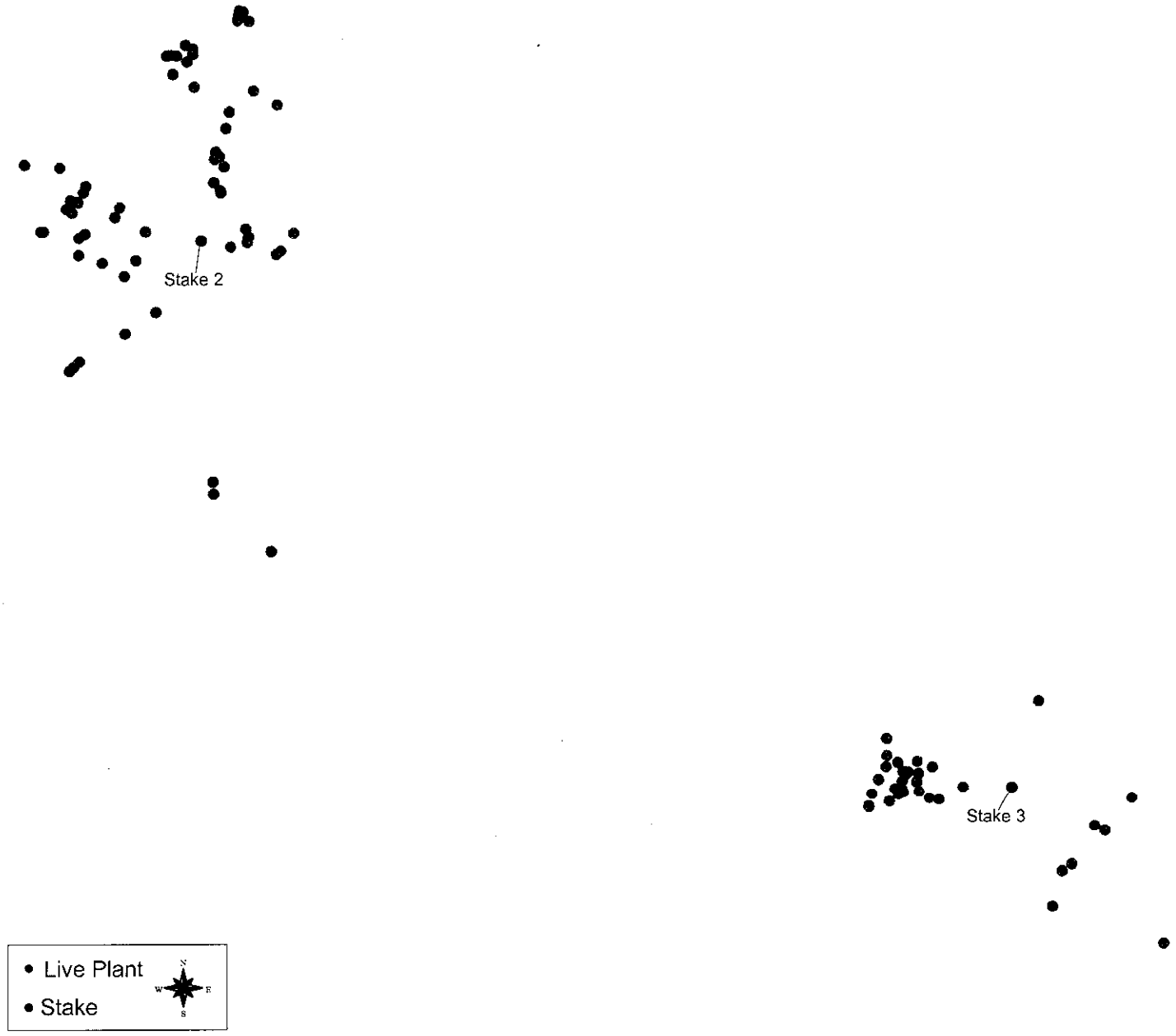
27 October 2003

Projection: UTM, NAD83, meters, Zone 14

TEXAS PARKS & WILDLIFE

Map compiled by the Texas Parks and Wildlife Department, Wildlife Diversity Program. No claims are made to the accuracy of the data or suitability of the data for a particular use.

Figure 4.
1992 Stakes 2 & 3
Devil's Sinkhole SNA



27 October 2003

Projection: UTM, NAD83, meters, Zone 14

TEXAS PARKS & WILDLIFE

Map compiled by the Texas Parks and Wildlife Department, Wildlife Diversity Program. No claims are made to the accuracy of the data or suitability of the data for a particular use.

Figure 5.
1993 Stakes 2 & 3
Devil's Sinkhole SNA



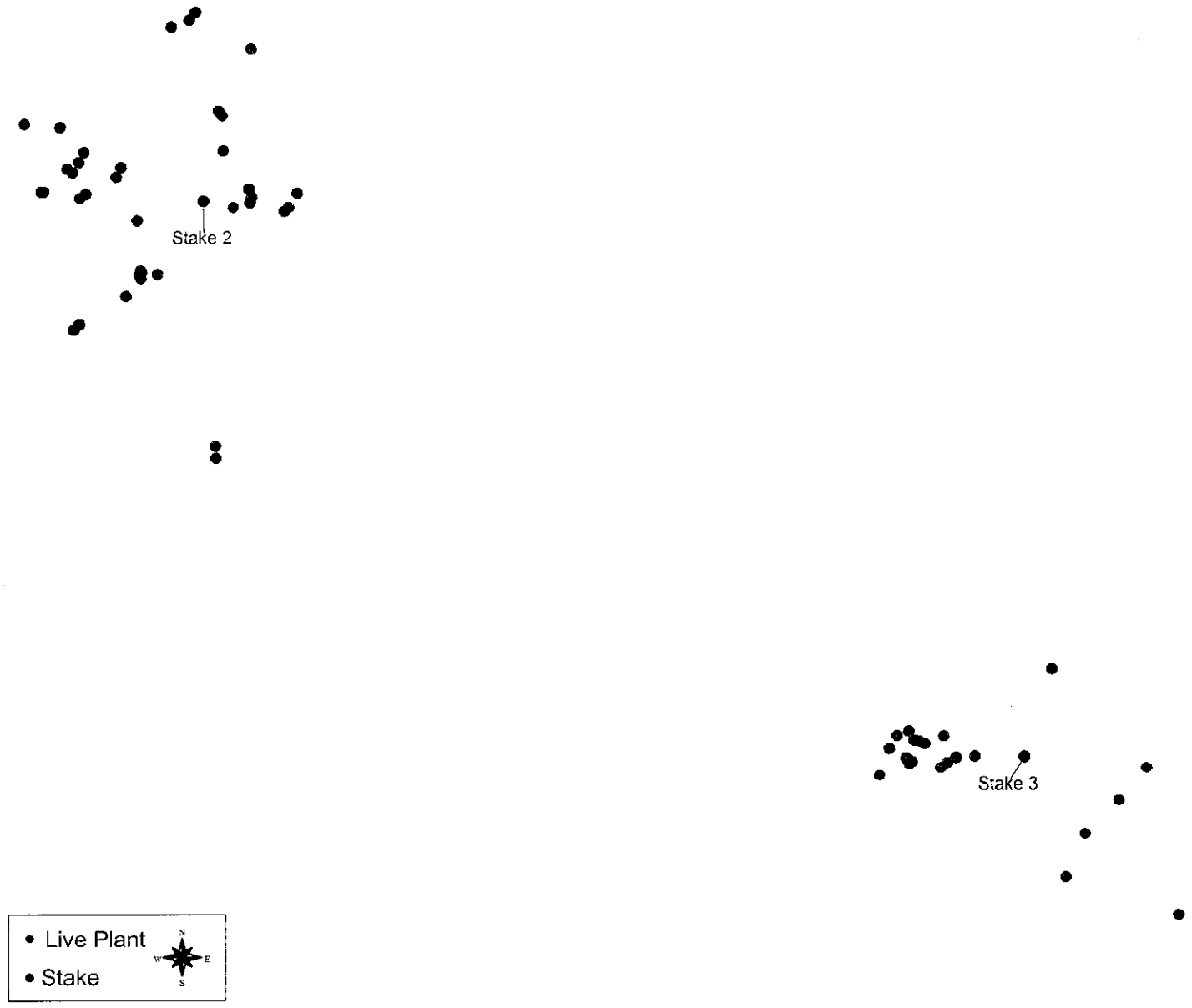
27 October 2003

Projection: UTM, NAD83, meters, Zone 14

TEXAS PARKS & WILDLIFE

Map compiled by the Texas Parks and Wildlife Department, Wildlife Diversity Program. No claims are made to the accuracy of the data or suitability of the data for a particular use.

Figure 6.
1994 Stakes 2 & 3
Devil's Sinkhole SNA



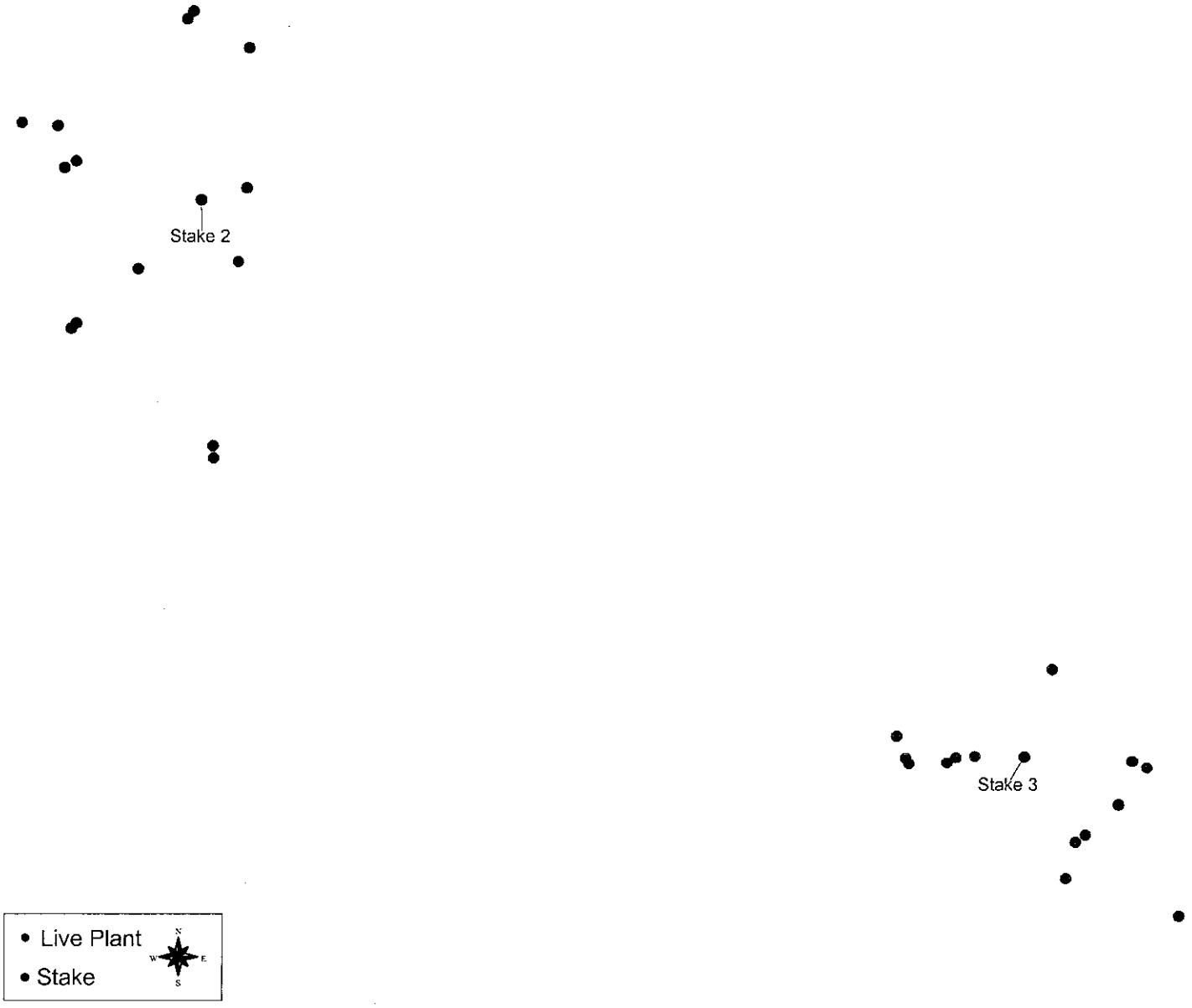
27 October 2003

Projection: UTM, NAD83, meters, Zone 14

TEXAS PARKS & WILDLIFE

Map compiled by the Texas Parks and Wildlife Department, Wildlife Diversity Program. No claims are made to the accuracy of the data or suitability of the data for a particular use.

Figure 7.
1995 Stakes 2 & 3
Devil's Sinkhole SNA



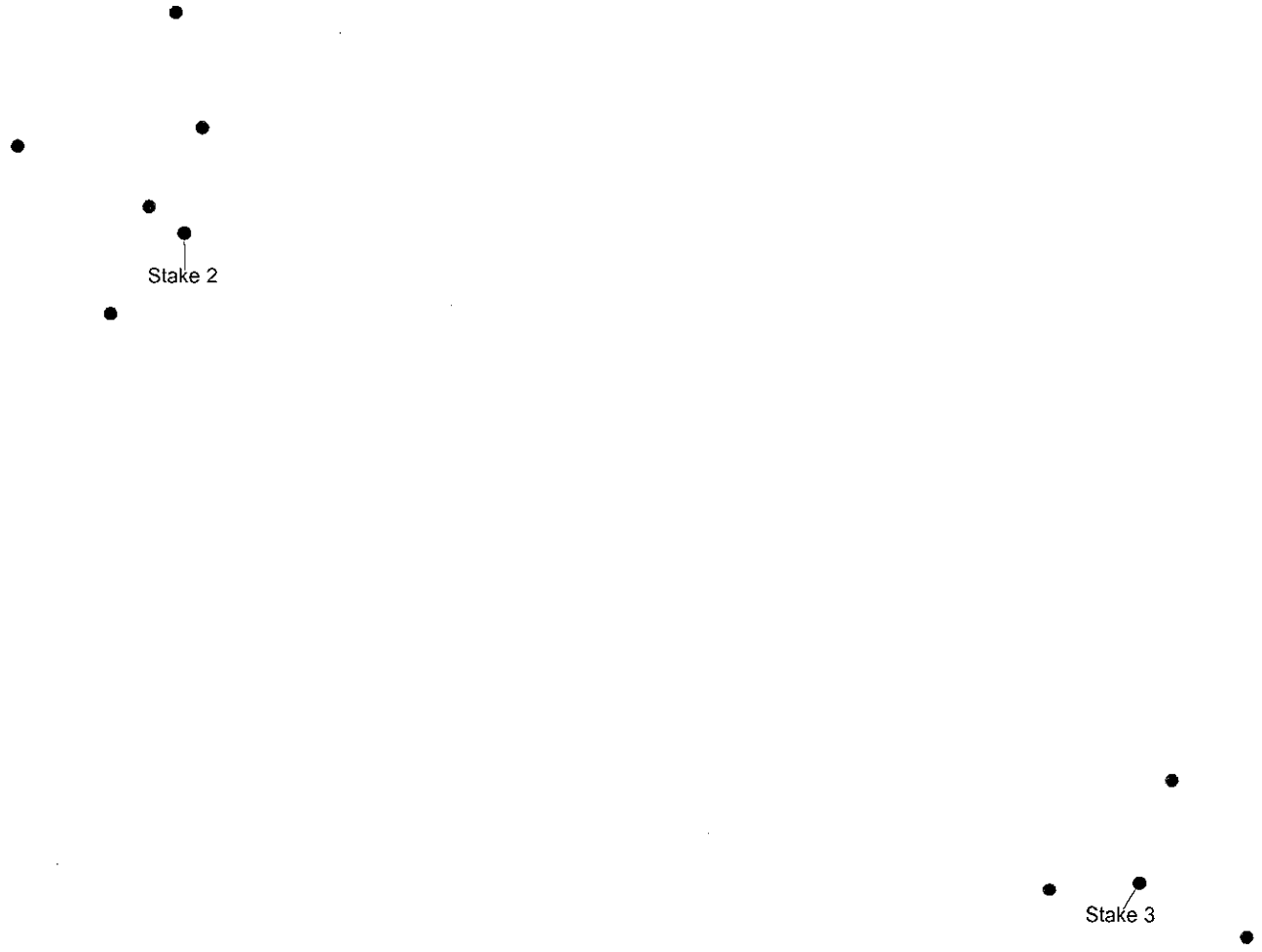
27 October 2003

Projection: UTM, NAD83, meters, Zone 14

TEXAS PARKS & WILDLIFE

Map compiled by the Texas Parks and Wildlife Department, Wildlife Diversity Program. No claims are made to the accuracy of the data or suitability of the data for a particular use.

Figure 8.
1996 Stakes 2 & 3
Devil's Sinkhole SNA



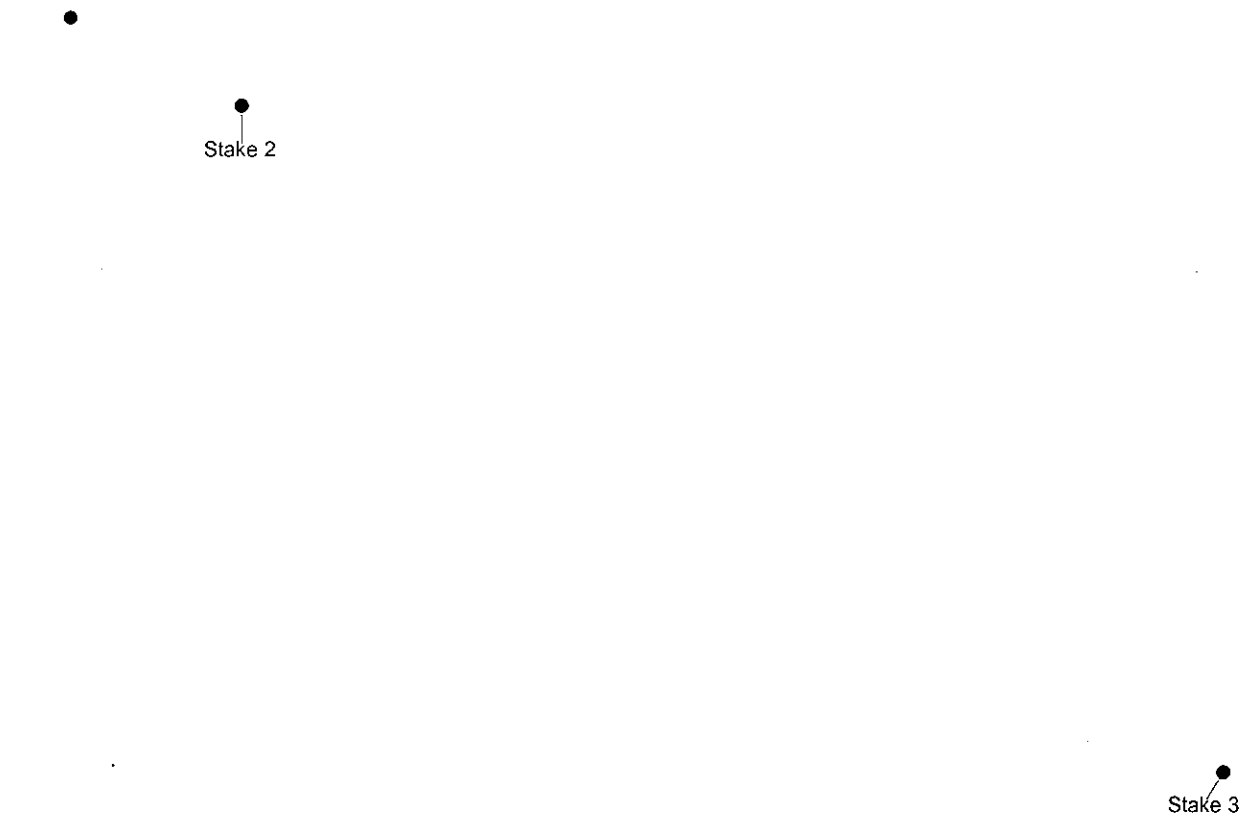
27 October 2003

Projection: UTM, NAD83, meters, Zone 14

TEXAS PARKS & WILDLIFE

Map compiled by the Texas Parks and Wildlife Department, Wildlife Diversity Program. No claims are made to the accuracy of the data or suitability of the data for a particular use.

Figure 9.
1997 Stakes 2 & 3
Devil's Sinkhole SNA



- Live Plant
- Stake

N
W
E
S

10 0 10 20 30 Meters

27 October 2003

Projection: UTM, NAD83, meters, Zone 14

TEXAS PARKS & WILDLIFE

Map compiled by the Texas Parks and Wildlife Department, Wildlife Diversity Program. No claims are made to the accuracy of the data or suitability of the data for a particular use.

Hollow have suffered no instances of weevil predation. The very smallest sites (Dobb's Run, Garner, and Hwy 674) have not been considered in this discussion as their numbers are too small to produce significant trends.

Other insects that inflict mortal damage to Tobusch fishhook cactus include the larvae of the longhorn beetle *Moneilema crassum*. The larvae are much larger than those of the Tobusch fishhook cactus weevil. Only one larva of *Moneilema* can fit within a typical cactus whereas up to five *Gerstaeckeria* larvae have been observed within a single stem. *Moneilema* larvae typically leave the stem entirely hollow, with a large exit hole. *Moneilema* larvae have been identified at Devil's River, Frank's Place, Junction, Kerr, Kickapoo, Lost Maples, and Pole Hollow, but percentage of mortality attributable to this insect is less than 10% at these sites. Unidentified fly larvae have been found within dead Tobusch fishhook cacti. Whether they were the primary cause of death, or were a secondary infection has not been determined. Fly larvae were found at Devil's River, Kickapoo, Los Rincones, and Lost Maples. Fly larvae mortality at these sites accounted for less than 10% of mortality. A small, as yet unidentified, species of ant is found within some of the populations of Tobusch fishhook cactus, especially those at Lost Maples. The ant uses the cactus among other small objects as a base for its mound building. The mounds usually completely cover the cactus, although sometimes the spines, flowers or fruits may protrude. The mounds last for a year or two, and then disappear. Sometimes the cactus disappears with the mound. These ants have been observed at Junction and Lost Maples. Mortality directly ascribed to these insects is less than 1%. Other insects ("unidentified insect" category in Table 2) may also prey on Tobusch fishhook cactus, but their identities remain elusive as their remains have not been well preserved. Unidentified insects have been noted at Devil's River, Kickapoo, and Lost Maples, but never at mortality rates of more than 5%.

A few less than healthy cacti were collected to serve as hosts in the weevil study (Calvert 2003). Plants were collected from Frank's Place, Junction, Kerr, Kickapoo, Lost Maples, and Pole Hollow. This action accounted for no more than 9% mortality at any of the sites. Although not a cause of death, the category "hollow" was recorded. Death in this case is probably from either the weevil or longhorn beetle. It has not been used as frequently in later years as the signs of weevil or longhorn beetle infestation were more thoroughly defined. Hollow individuals were found at Devil's River, Devil's Sinkhole, Frank's Place, Junction, Kickapoo, and Lost Maples, and accounted for less than 5% mortality at these sites.

Predation on Tobusch fishhook cactus is not confined to invertebrates. Mammal herbivory also takes its toll on the cactus, especially at particular sites at certain times (see Table 9 – Junction). Because the spines on Tobusch fishhook cactus are so delicate, they are probably not much of a deterrent. Jackrabbits are the presumed culprit as they have been photographed in populations of the closely related *Sclerocactus brevihamatus* var. *brevihamatus* which were decimated by

herbivory. The cactus is usually eaten to the soil surface. If no tubercles are left, the plant usually dies. However if even one tubercle remains, the plant is usually able to resprout and within a few years become reproductive once more. Aside from Junction where mammal herbivory outranked weevils as the number two cause of mortality (15.6%), herbivory was also seen at Devil's Sinkhole, Kickapoo, and Lost Maples, but at less than 2% mortality.

Fungi may be the cause of rot and root rot although this was not researched. For the present all three are listed separately as rare causes of mortality. See Table 2 for sites where these causes of mortality occurred. Soil disturbance usually involves the plant being uprooted either directly or indirectly by feral hogs, armadillos, and other digging animals. Occasionally if the roots are intact, the plant will reroot. More often however, the plant exhausts its internal food and water resources, and dies. Some plants that were recorded as missing occurred in areas that had been rooted. Death from rooting was noted at Devil's River, Devil's Sinkhole, Frank's Place, Junction, Kickapoo, and Los Rincones. In one case a plant was killed by human trampling. This plant occurred along a commonly used informal trail in Lost Maples.

Populations at Lost Maples, Kerr, and Devil's Sinkhole have been exposed to fire. The fires at Lost Maples and Kerr were controlled burns, and the plants were discovered afterwards. The fire appeared to have little, if any, permanent effect, on the plants. Even when all the spines and tubercles are burned off, and the epidermis turns white, red, or purple, the cactus somehow manages to produce new epidermis and eventually tubercles and spines. At Lost Maples only one plant died directly from the fire. However there was also no baseline data from either site, so it is impossible to be sure whether other plants were not burned beyond recognition. However burning during late bud formation, flowering, and fruiting can cause reproductive structures to abort, thus diminishing the seed crop and potential recruitment. In a plant with low recruitment and a non-substantial soil seed bank (Emmett 1995) such as Tobusch fishhook cactus, all recruitment appears essential to maintain viable populations. However it is relatively easy to schedule controlled burns before the late bud formation or after fruits have dispersed, or to avoid burning in occupied areas altogether.

Conclusion: Although six years may be perhaps too brief a time to assess population trends for a species that lives for probably twice that long, some cautious projections should be made. Small populations (those with 10 or fewer individuals) will probably not survive, or at least increase greatly in size. Monitoring should probably be ceased at Dobb's Run (at least the monitored site), stake 1 at Garner State Park, and Hwy 674. The effort expended on monitoring these few individuals is not worth the data collected. However the miraculous expansion of the population at Vireo Territory (Kickapoo Caverns State Park) may lead to the opposite conclusion, and suggest that even sites where all plants have died should be checked occasionally. It may also not be worthwhile to continue monitoring the declining populations such as those at

Devil's River State Natural Area, Frank's Place, or Los Rincones. However these sites have much to tell us about the dynamics of mortality within the species and minimum viable population size, particularly at the edge of its range as in the Devil's River site. Stable or actively increasing populations such as Junction, Kerr, Lost Maples, and Pole Hollow should continue to be monitored to provide additional demographic information for minimum viable population assessment and management evaluation. The populations at Kickapoo Caverns State Park are of special interest for continued monitoring as some plots such as Vireo Territory continue to expand while others such as Ray's Site may be starting a decline similar to that experienced at Devil's Sinkhole. The Devil's Sinkhole State Natural Area populations should also continue to be monitored to see if the increase in numbers continues. Monitoring twice annually does not appear to be necessary as the proportion of flowers to fruits appears constant. Monitoring at either season would catch reproductive output, and precipitation data should be gathered to relate reproduction to climatic conditions. Data should be analyzed as to size class as well as reproductive stage. With enough demographic and climatic data, it may be possible to determine age and longevity of individuals. Information needs to be gathered on dispersal. If populations die off in an area, how do they become established at other sites and how often? Additional information is needed on mortality data, and causes of death (particularly the unknown category) need to be more thoroughly investigated. Although a significant percentage of mortality is assigned to the Tobusch fishhook cactus weevil, it still needs to be elucidated whether this mortality is part of a natural cycle, or if the cycle has been disrupted. The same is true for *Moneilema*. While mammal herbivory is significant in some populations in some years, overall it appears to be related more to drought than to over-population of the suspect mammals. Rooting, especially from feral hogs, should be carefully watched as these animals become more common within the range of the Tobusch fishhook cactus. Other ground-disturbing activities such as bulldozing, etc. should be avoided in areas with the cactus. Fire management should include fire avoidance in occupied habitat during reproductive season. At present the overall picture may appear stable, but mortality is high and not all sites are stable or increasing. It is too early to determine where the trends for the species as a whole are heading.

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APPENDIX

Monitoring Data

from all sites

for all years

Ancistrocactus tobuschii Data for Devil's River State Natural Area

PL #	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 1 is first utility pole on left side of road after turn, ~ 0.1 mi from crossroad to radio towers; GPS Anc tob 1, GPS at plants																												
	all distances measured over shrubs R021416D																											
1.00	1	42.80	21	2.20	1	2	4.40	4	3+1A	Dead																		seedling at base 4/97; COD unknown not hollow, tag removed; seedling also dead 2/98
1.01	1	43.70	20	3.10		0	3.60	0	0	3.30	0	Dead																discovered 5/96; dead, roots damaged by hole digging 5/98
1.02	1	45.50	20	4.80		3	5.90	4	5	6.20	3	2+1A	5.77	0	0	5.48	1	1	5.40	0	0	4.59	0	dead				discovered 5/96, OK, spines gray, yellow tubercle tip 2/98; OK, a few tan & orange tubercle tips 2/99 & 4/99; green with a few tan and orange tubercle tips, good 2/00 & 4/00; green, good 2 & 4/01; maroonish olive, poor 2/02; COD unknown; collected for weevil study 4/02
1.03	1	42.90	20	2.60		0	3.60	3	3	3.10	0	0	2.63	0	Dead													discovered 5/96, poor, spines gray, body yellow 2/98; OK, body green 2/99; dead, hollow, larva & metamorphosized weevils collected; dead 4/99
1.04	1	44.00	21	2.30		0	2.80	0	0	2.20	0	Dead																discovered 5/96, tag uprooted, replaced 4/97, hollow, but no exit holes, weevils?, dead 4/98
1.05	1	43.70	21	2.30		0	3.30	0	0	2.90	0	0	Dead															discovered 5/96, poor, spines gray, body yellow 2/98, hollow, dead 2/99
1.06	1	43.70	21	2.70		0	3.60	2	3	2.80	0	0	Dead															discovered 5/96, poor, spines gray, body yellow 2/98, hollow, dead 2/99
1.07	1	44.10	22	3.30		2	3.50	3	4	3.10	0	Dead																discovered 5/96, dead, hollow with ex holes, death by weevils 5/98
1.08	1	43.50	20	0.40		0	mia			mia			mia															discovered 5/96, mia 2 & 4/97, 2 & 5/98, 2 & 4/99
1.09	1	43.50	20	2.50		0	3.20	1	1	1.90	0	Dead																discovered 5/96, hunkered down 2/98 hollow with exit holes, death by weevils 5/98
1.10	1	43.60	20	0.60		0	mia			mia			mia															discovered 5/96, mia 2 & 4/97, 2 & 5/98, 2 & 4/99
1.11	1	43.60	20	0.80		0	Dead																					discovered 5/96, dead, COD unknown 2/97
1.12	1	43.60	20	0.50		0	mia			mia			mia															discovered 5/96, mia 2 & 4/97, 2 & 5/98, 2 & 4/99
1.13	1	43.60	20	0.50		0	mia			mia			mia															discovered 5/96, mia 2 & 4/97, 2 & 5/98, 2 & 4/99
1.14	1	43.60	20	0.70		0	mia			mia			mia															discovered 5/96, mia 2 & 4/97, 2 & 5/98, 2 & 4/99

PL #	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.15	1	43.15	20				0.60	0	0	mia			mia			1.10	mia	0	1.04	0	0	1.12	0	0	0.94	0	0	discovered 2/97; bad 5/97; mia 2/98, 5/98, 2/99, 4/99 & 2/00; relocated at edge of grass clump, squishy, green, OK 4/00; green, good 2/01; green, hunkering, OK 4/01; just spines showing 2/02; popped out green , OK 4/02 & 2/03; just spines showing 4/03
1.16	1	44.20	20				1.40		0	Dead																		discovered 4/97; under rock; dead with weevil larva inside, collected but died before pupation 2/98
1.17	1	42.80	21				0.90		0	Dead																		discovered 4/97; to right of 1.18; dead, COD unknown, just spines left 2/98
1.18	1	43.25	21				0.60		0	mia			mia			0.59	mia	0	0.64	0	0	0.74	0	0	0.89	0	0	discovered 4/97; to left of 1.17; mia 2 & 5/98, 2 & 4/99, 2/00; relocated or new, hunkered, dull green, squishy, poor 4/00; dull maroon, poor 2/01; green, hunkering, OK 4/01; only spines showing 2/02; popped out green, OK 4/02 & 2/03; hunkered, green, OK 4/03
1.19	1	42.80	20							0.90		0	0.92	0	0	1.00	0	0	1.45	0	0	1.34	0	dead				seedling; hunkered down, squishy, discovered 5/98; good 2/99 & 4/99; good, green 2/00, hunkered green, OK 4/00; popping out, green, OK 2/ & 4/01; hunkered, OK 2/02; just spines left; COD unknown 4/02
1.20	1	43.70	21																						1.57		0	discovered 4/03; green, good 4/03
Stake 2 is pink-flagged rebar through gate in opening at 180 degrees from transformer post, beyond dead juniper & almost dead Acacia roemeriana;																												
	GPS Ancistrocactus tobuschii 2 at stake																											
2.00	2	43.05	260	5.50	1+2 fr	disp	4.90	4	3+1A	5.20	3	1A	4.94	4	4	4.53	0	0	6.27	3	3A	dead						measured between persimmon & condalia; plant reddish 5/98, green 2/97; yellowish 5/98; green, good 2/99 & 4/99; yellowish-green, poor 2/00; yellow-green, OK 4/00 & 2/01; green, good 4/01; dead, weevil galleries & chambers & exit holes, COD weevils 2/02
3.00	2	31.62	211	3.10	3 fr	2	Dead																					stem hollow, no grubs, maybe weevils dead 2/97
3.01	2	31.62	212				0.50	0	0	0.70	0	0	mia			mia			2.98	0	0	3.39	4	1+3A	4.49	7	5+1A	discovered 2/97; under rock; good 5/98; plant & tag mia 2/99, 4/99, 2/00 & 4/00; plant and tag refound, plant green, good 2 & 4/01;green, good 2 & 4/02, 2/03; inner tepals with pink stripe, stigmas pinkish, anthers yellow 2/03; green, OK 4/03

Ancistrocactus tobuschii Data for
Devil's River State Natural Area

PL #	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
3.10	2	32.50	207																						5.26	11	8+2A	discovered 2/03; green, good 2 & 4/03
4.00	2	19.90	150	5.10	2+6 fr	5disp.																						big, long, heavy spines, dead 5/96
4.01	2	19.98	150	0.40		0	0.60	0	0	mia			mia			mia												discovered 5/96, tag uprooted 2/98 & 2/99, plant mia 98, 99, & 00
4.02	2	19.99	150	0.40		0	0.60	0	0	mia			mia			mia												discovered 5/96, tag uprooted 2/98 & 2/99, plant mia 98, 99, & 00
4.03	2	19.99	150	0.40		0	0.60	0	0	mia			mia			mia												discovered 5/96, tag uprooted 2/98 & 2/99, plant mia 98, 99, & 00
4.04	2	19.98	150	0.40		0	Dead																					Discovered 5/96;COD unknown
4.05	2	20.05	150	0.50		0	mia			mia			mia															discovered 5/96, mia 97, tag uprooted 2/98 & 2/99
4.06	2	20.05	150	0.90		0	mia			mia			mia															discovered 5/96, may not be Ancistrocactus tobuschii, mia 97, tag uprooted 2/98 & 2/99
5.00	2	39.85	85	4.60	3+5 fr	1, rest disp.	5.40	6	7	5.50	5	5	Dead															orangish at base 2/98, dead, larva collected 2/99
6.00	from # 5	12.80	58	3.10	2	3	3.20	0	Dead																			sick 2/97, squishy, dull green, COD unknown, no insect holes 4/97
6.10	2	43.05	75										6.14	7	6+1A	6.15	5	disp	7.23	7	2+5A	6.35	9	7+5A	dead			yellow petals with pinkish midribs, may not be Ancistrocactus tobuschii, petals partially eaten on 1 flower 2/99, fruits split open, drying 4/99; dull dark green, good, right beside serious hog rooting, tag mia 2/00, more fresh rooting, plant covered with dust, OK, fruit dispersed with a few seeds on plant, one flower (stigma yellow, petals dirty yellow) partially eaten, plant green with a few tan tubercle tips, good 2/01, green, good 4/01, purplish-green, good 2 & 4/02, dead, collected for weevil study 2/03, COD other insect (not weevils or Monellema) 3/03
Stake 3 is the second round metal fence post from the gate.																												
7.00	3	42.10	180	3.40	2 fr	1A	5.20	4	5	5.70	3	3	Dead															very orange 5/98; hollow with weevil chambers, dead 2/99
8.00	3	40.60	164	3.20	1+2 fr	disp.	4.30	3	3	Dead																		Dead, hollow, probably weevils, tag & flag removed 2/98
Stake 4 is 0.2 mi NE of Finnegan house, then ~40 m SE of road where road drops by clump of juniper, shinoak, and mountain laurel;																												
	GPS 4 at plants R021416A																											

Ancistrocactus tobuschii Data for Devil's River State Natural Area

PL #	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.00	4	2.87	112							1.70	1	1A	3.04	3	3	3.20	1	1	4.37	3	1+2A	4.28	3	3	dead			maroonish, OK 2/00; dark green, OK 4/00, 2 & 4/01; almost black, OK 2/02; purple, good 4/02; dead 2/03; large cavity in root, COD Monellema; collected for weevil study 2/03
2.00	4	3.43	113																0.88	0	0	1.09	0	0	1.59	0	0	under rock, discovered 2/01; green, OK 2/01; green, OK, hunkering 4/01, 2 & 4/02; green, good 2/03; green, OK 4/03
2.10	4	3.48	112																						1.21	0	0	discovered 2/03, edge of rock; green, OK 2 & 4/03
2.20	4	3.55	112																						1.13	0	0	discovered 2/03; green, good 2/03; green, OK 4/03
3.00	4	3.16	112																1.11	0	0	0.65	mia	0	mia			under rock, discovered 2/01; green, OK 2 & 4/01; plant mia 2/02; popped out of crustose lichen, olive OK 4/02; plant mia 2 & 4/03
	12 seedlings were found at 112 degrees at 3.11 m at the base of a dead plant 2/98; of the 12 seedlings, 1 was dead,																											
	10 were mia, digging in the area; 8 seedlings were found at 93 degrees at 3.41 m at the base of a dead plant 2/98;																											
	of the 8 seedlings, 6 were mia 5/98; all seedlings from both sets were mia 2/99, 2 & 4/00, 2 & 4/01																											
4.00	4	2.75	118																			0.92	0	0	mia			discovered 2/02, purplish, OK 2 & 4/02; plant mia 2 & 4/03
Stake 5 is 0.3 mi NE of Finnegan house on main road, W side of road by two large (1 m square) rocks, stake is old utility pole E of road;																												
	GPS5 at plant R021416B																											
1.00	5	56.50	257							5.10	7	1, rest disp.	5.00	8	8	5.93	6	4+2A	6.60	9	10	5.24	0	0	5.73	2	2A	squishy, sunken in center 5/98; flowers pinky green, Ancistrocactus brevihamatus?, plant green, healthy 2/99 & 4/99; dark yellowish-green, OK, 2 flowers partially eaten, petals dusky yellow, long spines 2/00; dark yellowish-green, OK 4/00; flowers and stigma yellow, plant olive, OK 2/01; green, good 4/01; olive with some yellow tubercles, poor 2/02; a few orange tubercules, OK 4/02; on northeast side of rocks under small cenizo 2/03; one flower partly eaten, olive, OK 2/03; slightly orangish-green, OK 4/03
Stake 6 is 0.6 mi NE of Finnegan house on main road, N side of road, 2nd fenceless fencepost with wire beside E of a fenceless fencepost by a dead juniper;																												
	GPS6 at stake																											

PL #	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.00	6	25.85	290							6.60	7	2+1A, rest disp.	6.98	11	11	6.71	0	0	dead									buds too tight for color 2/98; plant very yellow 5/98; buds too tight, but probably Ancistrocactus brevihamatus, olive green, good 2/99; reddish olive green, OK 2/00; very poor, yellowish 4/00; COD insects (hollow with large galleries) 2/01
2.00	6	17.40	65							4.70	2	0	Dead															flowers greenish-yellow 2/98; dead bu firmly rooted 5/98; hollow, probably weevils, dead 2/99
Stake 7 is an uprooted stump with rocks in roots, <0.1 mi E from junction to Finnegan House, main trail, and road to HQ																												
	2/9/99 GPS7 Ancistrocactus tobuschii cluster; reshot 2/10/99 GPS7 stake R021415A																											
1.00	7	26.12	310										2.49	1	1	2.77	0	0	2.80	1	1	dead						tag mia, replaced; greeen with a few tan tubercle tips; pulling into soil; OK 2/00; green good 4/00, 2 & 4/01; hollow, possible weevil chambers, COD weevils 2/02
1.10	7	26.06	310													3.89	1	disp?	3.94	1	1	3.58	0	0	dead			discovered 2/00; green, good 2 & 4/00; tag mia, replaced; green, good 2 & 4/01; olive; OK 2 & 4/02; just spines left; COD unknown 2/03
2.00	7	26.70	310										3.14	1	1	3.86	2	disp?	4.90	3	4	3.73	0	dead				tan and poor; probably Ancistrocactus brevihamatus 4/99; olive green with a few tan tubercle tips; OK 2 & 4/00; 2/01; green; OK 4/01;orangish, squishy, poor 2/02; weevil exit holes;COD weevils 4/02
3.00	7	26.87	311										3.44	3	2	4.19	nd	0	4.43	2	3A	2.98	0	dead				looks tan and bad; probably Ancistrocactus brevihamatus 4/99; petals pinkish, stigma yellow, body olive green with a few tan tubercle tips, long spines; OK 2 & 4/00; tag mia, replaced, olive; OK 2/01; green with reddish tubercle tips, very squishy, poor 4/01;green; OK 2/02; uprooted by mammal; COD uprooting 4/02
4.00	7	26.64	311										5.26	3fl+1fr	5	5.68	2+2fr	1	5.51	2	dead							reddish green; OK 2 & 4/00; flowers yellow, body olive; OK 2/01; hollow with large chambers, larvae inside, collected for weevil study 4/01
5.00	7	26.98	315										2.45	0	0	3.05	1	disp?	2.94	0	removed							closest to stake; olive green; OK; tag chewed, replaced 2/00; green, good 4/00; tag mia, replaced; plant green, good 2/01; removed for weevil study; hollow 4/01

Ancistrocactus tobuschii Data for
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PL #	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
6.00	7	27.00	315										2.55	0	0	3.62	1	disp?	3.49	0	removed							to right and behind of 5.00; reddish green, OK; tag chewed; replaced 2/00; green, good 4/00; tag mia, replaced, plant maroonish-green, OK 2/01; removed for weevil study, larvae inside 4/01
7.00	7	27.02	315										2.44	0	0	2.81	1	disp?	2.93	0	0	2.22	0	mia	mia			to right of 6.00; reddish green, OK, tag chewed, replaced 2/00; green, good 4/00; tag mia, rreplaced, plant green, good 2/01; green, OK 4/01;only spines showing, maybe dead 2/02; hole in vicinity, plant mia 4/02, 2 & 4/03
8.00	7	27.01	315										1.74	0	0	2.24	1	disp?	2.20	0	0	2.08	0	mia	mia			left and between 6.00 & 7.00; tag chewed, replaced, reddish green, OK, flower partially eaten 2/00; green, good 4/00; tag mia, replaced, plant green, good 2 & 4/01;green OK 2/02; hole in vicinity, plant mia 4/02, 2 & 4/03
9.00	7	23.45	341										5.23	3	3	5.25	2	2	dead									found by Bea Harrison in prickly pear 2/99; dark reddish green, OK 2 & 4/00; COD insects (Moneilema?), large gallery in body 2/01
9.01	7	23.41	341													0.48	0	0	mia			mia			mia			between 9.00 and 11.00, one measurement only; poor 2/00; poor, looks dead 4/00; plant mia 2 & 4/01, 2 & 4/02, 2 & 4/03
10.00	7	23.48	341										1.06	0	0	1.53	0	0	mia			mia			mia			behind and right of 9.00; one measurement only; OK 2/00; poor, maybe dead 4/00; plant mia 2 & 4/01, 2 & 4/02, 2 & 4/03
11.00	7	23.40	341										0.90	0	0	0.93	0	0	mia			0.60	mia	0	mia			in front of 9.00; may be a small seedling behind 4/99 (see 9.01); OK 2/00; poor, maybe dead 4/00; plant mia 2 & 4/01; plant mia 2/02; popped out, olive, OK 4/02; plant mia 2 & 4/03
12.00	7	27.00	316										4.41		1fr+1A	4.73	2	disp?	4.70	0	0	dead						good, may not be Ancistrocactus tobuschii; discovered 4/99;dark reddish green, long spines, flowers past, good 2/00, green, good 4/00; olive, OK 2 & 4/01;dead, weevil galleries, COD weevils 2/02
13.00	7	26.90	311										3.09		0	3.08	0	0	3.40	2	3	dead						good, may not be Ancistrocactus tobuschii; discovered 4/99; maroon, OK 2 & 4/00; green, good 2/01;dead, dry, corky inside, no evidence of weevils, COD unknown 2/02

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PL #	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
14.00	7	26.95	311										2.56		0	1.80	0	0	dead									good, may not be Ancistrocactus tobuschii, discovered 4/99; maybe dead, but firmly rooted 2 & 4/00, just spines left, COD unknown 2/01
14.01	7	26.96	311													0.93	0	0	mia			mia			mia			behind 14.00, discovered 2/00, green, good 2 & 4/00; plant and tag mia 2 & 4/01, 2 & 4/02, 2 & 4/03
15.00	7	27.00	311										2.30		0	2.24	0	0	dead									good, may not be Ancistrocactus tobuschii, disoovered 4/99, green, good 2 & 4/00, orange mush inside, flies 2/01
Dead plant beside 14.00, 14.01, and 15.00, COD unknown, probably parent of all three 2/(																												
16.00	7	26.97	311										0.96		0	1.05	mia	0	1.05	0	dead							OK, may not be Ancistrocactus tobuschii, discovered 4/99; plant mia 2/00, relocated, under grass in front o 3.00, green, good 4/00, red, poor 2/01, hard, dry, solid, COD unknown 4/01
17.00	7	27.07	311										0.54		0	0.68	0	0	0.60	0	0	0.75	0	0	dead			OK, may not be Ancistrocactus tobuschii, discovered 4/99; OK 2/00, very loose and squishy, poor 4/00, green, OK 2 & 4/01; might be dead 2/02; olive, OK 4/02, just spines left, COD unknown 2/03
18.00	7	27.10	311													3.08	0	0	3.29	0	0	3.00	0	dead				discovered 2/00, green, good 2 & 4/00, tag mia, replaced, plant green, good 2 & 4/01; green, OK 2/02, dead, COD weevils, collected for weevil study 4/02
19.00	7	16.40	332													0.91		0	mia			dead						discovered 4/00, olive green, OK 4/00 hole in vicinity of where plant was, plant mia 2 & 4/01; relocted, dead, COD unknown, red inside 2/02
20.00	7	16.50	333													4.11		disp?	4.03	0	0	3.55	0	dead				discovered 4/00, green, good 4/00, nibbled on one tubercle, olive with a few yellowish tuberdes, OK 2 & 4/01;orange, poor, firmly rooted 2/02, dead, weevil chambers and exit holes, collected for weevil study, COD weevils 4/02
20.01	7	16.52	333																0.50		0	0.51	mia	0	0.71	0	0	on west side of 20.00, not tagged, discovered 4/01; green, OK 4/01; plant mia 2/02; relocated, olive, OK 4/02; might be dead 2/03; olive, OK 4/03
21.00	7	~24.86	~318																3.55	1	1A	2.97	2	0	mia			discovered 2/01; green with a few tan tubercle tips, OK 2 & 4/01;purplish, OK 2/02; green, OK 4/02; plant mia 2 & 4/03

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PL #	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
22.00	7	~24.97	~318																4.38	2	2	3.97	1	0	dead			discovered 2/01; maroonish-green, OK 2/01; green, good 4/01;purplish, OK 2/02; green with tan tubercle tips, OK 4/02; dead, COD weevils, collected for weevil study 2/03
23.00	7	~24.84	~320																4.39	1	1	dead						discovered 2/01; yellowish-green, OK 2 & 4/01; dead, hollow, no evidence o insects, COD unknown 2/02
Stake 8 is a pointed iron gate post with gate latch on W side of gate 0.4 mi NE from Finnegan House; GPS8 at plants																												
1.00	8	34.50	336										5.02	2	2	3.95	0	0	dead									flowers yellow, plant reddish, good 2/99; OK, pinkish orangey green 4/99 reddish, poor 2/00; new spine growth, plant orange red, OK 4/00; body solid COD unknown 2/01
2.00	8	34.47	336										2.55	1	0	3.23	0	0	3.78	0	0	4.11	3	3	4.37	3	2+1A	flowers yellow, plant green, good 2/99 reddish green, OK 2 & 4/00; slightly reddish-light green, OK 2 & 4/01& 2/02; slightly reddish green, good 4/02; reddish-green, OK 2 & 4/03
3.00	8	34.19	336																			1.18	0	0	1.25	0	0	discovered 2/02; maroonish-green, OK 2 & 4/02, 2/03; hunkered, green, OK 4/03
Stake 9 (still needs rebar) 0.1 mi NE from SW end of residence landing strip, W side of strip and 0.1 mi SW of road to E of strip,																												
opposite inactive harvester ant mound; GPS9 at plants R021322A																												
1.00	9												4.91	8	4+1A	4.29	4	disp	6.57	7	4+5A	6.11	10	10+3A	6.16	7	3+2A+ 3 dehis	between tasajillo, small Opuntia lindheimeri and hog plums, flowers greenish-yellow, plant looks good 2 & 4/99; next to hog plum, old ant mound across road, flowers pinkish, stigma yellow orange, long spines, green, good 2/00; fruit already dispersed, 1 partial fruit with seeds left, green, good 4/00; pale green, OK 2 & 4/01; green, good 2 & 4/02, 2/03
1.01	9																								0.42		0	discovered 4/03; at 5 o'clock on 1.00 (road is noon); green, OK 4/03
Stake 10 is 1 mi W of gate in fence, 0.6 mi W of Devil's River triangle																												

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PL #	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.00	10	6.50	146													6.17	5	3	dead									flowers dusky yellow, long spines, body green, good 2/00; green with some yellow tubercle tips, OK 4/00; body solid, COD unknown 2/01
2.00	10	6.60	160													6.56	6	5	dead									flowers slightly pinkish yellow, long spines, body reddish green, OK 2 & 4/00; COD weevils, galleries 2/01
Stake 11 (3314063N 310621.5E) is on the west side of the road ~0.4 miles NE of residence, between condalia, persimmons, and prickly pears																												
1.00	11	18.11	196																						5.53	10	9+2A	discovered 2/03; attached by exposed root, green, OK 2/03; yellowish-green loosely rooted, OK 4/03
1.01	11	18.16	196																						2.55	0	0	discovered 2/03; seedling of 1, not rooted, replanted, poor 2/03; barely rooted, purple, poor 4/03
2.00	11	7.70	11																						3.99	5	3+2A	discovered 2/03; green, good 2 & 4/03
Data was taken and recorded by Jackie Poole on 2/96, 5/96, 2/18/97, 4/28/97, 2/10/98, 5/4/98, 2/9-10/99, 4/19/99, 2/17/00, 4/24/00, 2/15/01, 4/24/01,																												
2/13/02 with Sandy Birnbaum, 4/26/02, 2/14/03 with Bea Harrison, 4/21/03																												

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
Stake 1 = GPS R022721B; ~18m east of live oak, east of parking area																													
1.00	1	11.30	5																										
Stake 1a =																													
1.00	1a	0.10	300	5.20		5			5	4.90	3	2	Dead																
1.10	1a	0.65	266							Dead																			
Stake 2 = GPS1 R022721C																													
2.00	2	5.47	250	3.20	3	0																							
2.10	2	5.35	250			0	Dead																						
2.20	2	5.47	205				4.40	6	6	3.80	3	3	3.50	2	nd	Dead													
2.21	2	?	?							0.90	0	Dead																	
2.22	2	6.30	212							1.60	0	0	2.20	0	0	mia			mia			mia			mia				
2.23	2	6.20	214							1.90	1	1	2.10	1	1	mia			Dead										
2.24	2	5.96	214							1.40	0	0	1.50	0	0	mia			mia			mia							
2.25	2	5.95	215							1.60	0	0	1.80	0	0	1.30	0	0	1.50	0	0	mia			mia			mia	
2.26	2	5.95	215							1.30	0	0	1.40	0	0	Dead													
2.27	2	6.08	216							0.80	0		Dead																
2.30	2	7.78	212				4.30	2	2	4.00	2	1	3.90	2	1														
2.31	2	7.78	212				0.40	0	0	0.60	0	0	0.90	0	0	mia			mia			mia							
2.32 R.E.s data	2	7.78	212				1.00	0		0.80	0		Dead																
2.32	2	?	?													0.90	0	Dead											
2.40	2	11.10	218				3.50	2	0	4.00	3	1	4.50	2	1	2.70	0	Dead	Dead										
2.41	2	11.15	218				2.30	0	0	3.00	2	1	3.90	4	4	2.20	0	Dead	Dead										
2.50	2	12.02	218				3.80	3		4.50	3	1																	
2.60	2	11.15	218				3.80	2	0	3.60	1	1	4.50	3	3	2.90	0	0	Dead										
2.70	2	11.64	218				3.50	3	0	4.00	4	4	4.40	3	0	3.60	0	0	Dead										
2.71	2	5.46	238				3.00	1		3.20	1	0																	
2.80	2	4.40	246				4.60	4	0	3.80	1	1	2.60	0															

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 1 = GPS F															
1.00	1								5.09	7	6+2A	nd			discovered 2/02; along animal trail, stepped on, green, good, 2 & 5/02; eaten to soil level, poor 3 & 5/03
Stake 1a =															
1.00	1a														discovered 2/10/91; earliest '92 flowering (2/8/92); COD - M; dead 2/12/94
1.10	1a														discovered 4/19/91; COD - unknown; dead 2/6/93; no data in Ray Emmett's file
Stake 2 = GPS1															
2.00	2														discovered 2/10/91; COD - unknown; dead 4/19/91
2.10	2														discovered 4/19/91; dead 3/7/92; COD - unknown
2.20	2														discovered 3/14/92; partly eaten 5/92; sickly 8/92; better, new pup? 3/93; sickly 8/93; seedling 2/94; 2 larvae (beetle & lepidoptera); Dead 2/95
2.21	2														discovered 3/6/93; mia 8/93; COD unknown; dead 8/19/93
2.22	2														discovered 3/13/93; needs tag 4/94 & 2/95; mia 2/95; plant, tag, and flag mia 3/97; mia 98
2.23	2														discovered 3/13/93; sickly 8/93; only spines left 96
2.24	2														discovered 3/13/93; needs new tag 4/94 & 2/95; no tag 2/96; plant, tag, and flag mia 3/97
2.25	2														discovered 3/13/93; needs new tag 4/94; tagged; sickly 2/95; green 2/96; plant, tag, and flag mia 3/97; placed flag in vicinity 5/98
2.26	2														discovered 3/13/93; Dead 95
2.27	2														discovered 3/13/93; not seen 8/93; COD - unknown; 2/12/94
2.30	2														discovered 3/14/92; 2 additional seedlings 4/94; Dead 95
2.31	2														discovered 3/14/92; mia 95; tag & flag mia 2/96; plant, tag, and flag mia 3/97
2.32 R.E.'s data	2														discovered 3/14/92; not seen 8/93; COD - unknown; dead 2/12/94
2.32	2														not healthy; Dead 95
2.40	2														discovered 3/14/92; pup w/ 2.41; sickly 8/93; only spines left 96
2.41	2														discovered 3/14/92; pup with 2.40; sickly 8/93; only spines left 96
2.50	2														discovered 3/14/92; COD - unknown; dead 8/19/93
2.60	2														discovered 3/14/92; not seen 8/92; only spines left 96
2.70	2														discovered 3/14/92; not seen 8/92; sickly 8/93; nestled in grass, grass growing up through cactus (year ?); Dead 96
2.71	2														discovered 3/14/92; COD - unknown; dead 8/19/93
2.80	2														discovered 3/14/92; sickly 8/93; very sickly 2 & 4/94; Dead 95

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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
2.90	2	6.53	250				1.80	0		1.90	0		Dead																
2.91	2	6.53	250				1.70	0		1.90	0		Dead																
3.00	2	7.87	264	1.60	0	0	1.90	0	0	2.40	0	0	3.00	0	0	Dead													
3.10	2	10.18	266				2.60	2	0	2.60	3	0	3.00	1	0	Dead													
3.20	2	10.35	266				1.90	0	0	2.00	2	0	2.30	2	1	Dead													
3.30	2	10.35	266				1.40	0	0	1.60	1	0	1.50	0	0	mia	mia	mia	mia			mia							
4.00	2	7.50	266	3.00	2	1	2.80	1	0	2.90	0	0	2.90	0	0	Dead													
5.00	2	3.63	272	2.60	2	1	3.60	2		3.70	2	1																	
5.10	2	8.92	276				1.90	0	0	1.50	0	0	1.70	0	0	1.90	1	0	1.30	0	Dead								
5.20	2	8.52	275				1.60	0	0	1.60	1	1	2.10	0	0	Dead													
5.30	2	4.96	265							3.40	2	2	3.30	2	Dead														
5.35	2	33.50	270													nd	nd	nd	Dead										
6.00	2	5.75	278	2.00	0	0	3.30	1	0	3.20	2	1	3.50	2	0	Dead													
7.00	2	8.80	280	2.00	0		2.60	2	2	2.10	0		2.20	0	Dead														
7.01	2	8.80	280	1.80	0		2.40	1	1	2.00	0				Dead														
7.02	2	8.80	280	1.20	0		1.80	0		1.20	0		0.90	0	Dead														
8.00	2	8.48	280	1.80	1	1	2.60	2	2																				
9.00	2	8.31	280	2.60	2	2	2.70	0	0	2.40	0	0	2.00	0	0	2.00	0	0	Dead										
10.00	2	10.25	290	1.10	0	0	1.90	0	0	1.80	0	0	1.80	0	0	1.30	0	0	1.30	0	0	1.70	0	0	1.30	0	0	0.99	0
10.10	2	8.20	285	2.10	nd	1	1.80	1	1	1.90	1	1	2.10	0	0	mia			Dead										
10.20	2	8.22	288	1.30			1.10	0		1.30	0		1.20	0	Dead														
10.21	2	8.08	290							3.30	2	2	Dead																
10.30	2	5.66	285				0.90	0	0	0.90	0	0	1.20	0	0	mia	mia	mia	mia			mia							
10.40	2	8.80	285				2.10	1	Dead																				
10.50	2	12.41	286				2.40	1	0	3.40	3	3	3.80	2	0	3.80	3	3	Dead										
11.00	2	2.40	299	2.20															1.20	0	0	1.10	0	Dead					

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PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.90	2														discovered 3/14/92; pup with 2.91; sickly 8/93; COD - grubs, dead 2/12/94
2.91	2														discovered 3/14/92; pup with 2.90; sickly 8/93; COD - grubs, dead 2/12/94
3.00	2														discovered 2/10/91; tag missing; Dead 95
3.10	2														eaten out 2/95; Dead 95
3.20	2														discovered 3/14/92; pup with 3.3; Dead 95
3.30	2														discovered 3/14/92; pup with 3.20; tag missing; mia 95; tag & flag mia 2/96; plant, tag, and flag mia 3/97
4.00	2														discovered 2/10/91; between rocks; damaged 2/94; Dead 95
5.00	2														discovered 2/10/91; sickly appearance 8/92; looks better 3/93; COD unknown, dead 8/19/93
5.10	2														discovered 4/19/91; 1.2 cm 4/91; spines are gray, probably dead but still firmly in ground 2/96; Dead, center hollow, but no insects 8/96
5.20	2														discovered 3/14/92; not seen 8/92; Dead 95
5.30	2														discovered 3/13/93; sickly 8/93; COD - unkown, dead 4/29/94
5.35	2														data unclear from 2/95; overlooked 5/95; Dead 96
6.00	2														discovered 2/10/91; Dead 95
7.00	2														discovered 2/10/91; pup with 7.01 & 7.02; sickly 8/93; COD - unknown; dead 4/29/94
7.01	2														discovered 2/10/91; pup with 7.00 & 7.02; sickly 8/93; too crowded to measure 2/94; COD - unknown; 4/29/94
7.02	2														discovered 2/10/91; pup with 7.00 & 7.01; sickly 8/93; COD - unknown; dead 4/29/94
8.00	2														discovered 2/10/91; COD - grubs, dead 8/12/92
9.00	2														discovered 2/10/91; hollow, Dead 96
10.00	2	0	2.02	1fr	1 disp	2.42	0	0	1.87	0	dead				discovered 2/10/91; green, hunkered down in *Selaginella* 5/96, 3 & 5/97, 2 & 5/98, 2/99; popped out, green, good 5/99 & 3/00; slightly reddish-green, OK 5/00; green, good 3 & 5/01; squishy, green, hunkered, OK 2/02; weevils chambers, COD weevils 5/02
10.10	2														discovered 4/19/91; sickly 8/92; eaten, may pup 4/94; apparently not 2/95; Dead 96
10.20	2														discovered 4/19/91; COD - grubs, dead 4/29/94
10.21	2														discovered 3/13/93; not seen 8/93; COD - unknown, dead 2/12/94
10.30	2														discovered 3/14/92; near ant mound 3/92; not seen 8/92; mia 95; hole left where plant was 2/96; plant, tag, and flag mia 3/97
10.40	2														discovered 3/14/92; COD - grubs, dead 8/12/92
10.50	2														discovered 3/14/92; uprooted 2/96
11.00	2														discovered 2/10/91; plant damaged in 91; hunkered down in *Selaginella* 8/96 & 3/97; maybe dead 3/97; COD unknown, stem hollow, tag & flag removed 5/97

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
11.10	2	10.20	290				0.40	0	mia	mia	mia	Dead																	
11.20	2	9.05	290				1.90	0	Dead																				
12.00	2	10.25	285	3.40	2	2	1.20	Dead																					
13.00	2	12.12	342	5.80	7	7	4.30			Dead																			
13.10	2	10.86	343				1.70	0		Dead																			
13.20	2	10.90	343				2.40	1		Dead																			
13.30	2	12.12	343				1.60	0		1.50	0		Dead																
14.00	2	12.02	345	1.40	0		1.40	0		1.10	0		1.20	0	Dead														
15.00	2	12.15	348	3.60	5	0																							
16.00	2	12.65	348	3.00	3	3	3.00	0		3.10	2	1	Dead																
17.00	2	11.55	348	2.60	2	2	2.30	2		1.90	1	1	1.60	0	Dead														
17.10	2	11.55	348	1.10	0		1.40	0		1.00	0		Dead																
17.20	2	11.55	348	1.00	0	0	1.60	0	0	1.10	0	0	1.40	0	0	1.80	0	0	Dead										
17.30	2	11.55	348	1.60	0		1.70	0		1.80	0		Dead																
17.40	2	10.55	342							2.00	1	0	Dead																
17.41	2	11.26	342							1.50	0	0	1.70	0	0	Dead													
17.42	2	10.01	346							2.00	1	0	Dead																
17.43	2	10.05	6							3.90	2	2	3.50	0	Dead														
17.44	2	10.32	10							4.40	2	2																	
17.45	2	11.22	8							1.60	0																		
17.46	2	11.22	8							0.80	0		Dead																
17.47	2	14.35	5							1.40	0																		
17.48	2	10.12	10							1.10	0	0	1.20	0	0	1.50	0	0	mia			mia			mia				
18.00	2	9.90	350	0.50	0		0.60	0		1.00	0	Dead																	
18.10	2	12.37	350	1.00		0	1.50	0		1.70	0		2.10	0	Dead														
18.20	2	12.02	350	0.70	nd	0	0.70	0	0	0.90	0	0	0.90	0	0	1.20	0	0	0.90	0	0	Dead							
18.30	2	12.02	350	1.00		0	1.70	0		1.30	0		Dead																
18.40	2	7.95	256				3.90	3		3.80	2	2	Dead																
19.00	2	10.15	360	3.00	3	3	Dead																						
19.10	2	14.55	2				1.30	0	Dead	1.20	0																		
19.20	2	14.73	2				2.50	2	Dead																				
19.21	2	14.73	2				2.30	2	Dead																				
19.22	2	14.73	2				1.50	0	Dead																				
19.30	2	14.95	2				2.50	1		2.80	2	1	Dead																

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
11.10	2														discovered 3/7/92, very new seedling, "replaces" parent(?) 11.00, not seen 8/92, 3 & 8/93, COD - unknown, dead 2/6/93
11.20	2														discovered 3/14/92, was one pup form stem, COD - grubs, dead 8/12/92
12.00	2														discovered 2/10/91, COD - unknown, dead 3/7/92
13.00	2														discovered 2/10/91, sickly appearance 3 & 8/92, COD - grubs, dead 2/6/93
13.10	2														discovered 3/14/92, not seen 8/92, COD - unknown, dead 2/6/93
13.20	2														discovered 3/14/92, not seen 8/92, COD - unknown, dead 2/6/93
13.30	2														discovered 3/14/92, one pup from stem, COD - grubs, dead 2/12/94
14.00	2														discovered 2/10/91, COD - grubs, dead 4/29/94
15.00	2														discovered 2/10/91, COD - unknown, dead 4/19/91
16.00	2														discovered 2/10/91, not seen 8/92, sickly 8/93, COD - unknown, dead 2/12/94
17.00	2														discovered 2/10/91, very sick appearance 2/94, COD - grubs, dead 4/29/94
17.10	2														discovered 2/10/91, very sickly, may be dead 8/93, COD - unknown, 2/12/94
17.20	2														discovered 2/10/91, pile of spines 2/96
17.30	2														discovered 2/10/91, COD - grubs, dead 2/12/94
17.40	2														discovered 3/13/93, COD - grubs, dead 2/12/94
17.41	2														discovered 3/13/93, dead 95
17.42	2														discovered 3/13/93, COD - grubs, dead 2/12/94
17.43	2														discovered 3/13/93, COD - grubs, dead 4/29/94
17.44	2														
17.45	2														
17.46	2														30 cm NE of 17.45, discovered 3/13/93, COD - unkown, dead 2/12/94
17.47	2														
17.48	2														discovered 3/13/93, not seen 8/93, mia 96 & 97, plant, tag, and flag mia 5/98
18.00	2														discovered 2/10/91, not seen 8/93, COD -grubs, dead 8/19/93
18.10	2														discovered 4/19/91, COD - grubs, dead 4/29/94
18.20	2														first seen 4/19/91, under edge of rock, mia 8/96, one loose spine cluster in the vicinity, COD unknown, center of stem hollow, no insects, tag removed 3/97
18.30	2														discovered 4/19/91, COD - grubs, dead 2/12/94
18.40	2														discovered 3/14/92, very sickly 8/93, COD - grubs, dead 2/12/94
19.00	2														discovered 2/10/91, COD - unknown, dead 3/7/92
19.10	2														discovered 3/14/92, COD - grubs, dead 3/27/93
19.20	2														discovered 3/14/92 pup with 19.21 & 19.22, COD - grubs, dead 8/12/92
19.21	2														discovered 3/14/92, pup with 19.20 & 19.22, COD - grubs, dead 8/12/92
19.22	2														discovered 3/14/92, pup with 19.20 & 19.21, COD - grubs, dead 8/12/92
19.30	2														discovered 3/14/92, COD - grubs, dead 2/12/94

Ancictrocactus tobuschii Data for
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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
19.40	2	14.99	2				2.40	2		1.90	0		Dead																
19.50	2	14.71	2				3.60	3	Dead																				
19.60	2	14.71	2				1.30	0		1.40	0		Dead																
19.70	2	14.34	2				1.40	0		1.20	0		Dead																
19.80	2	14.50	2				2.90	2		2.70	2	2	Dead																
19.90	2	14.71	2				1.90	0		1.80	0		1.70	0	Dead														
20.00	2	5.80	2	1.10	0	0	1.40	0	0	1.30	0	0	nd	0	0	mia	mia	mia	1.40	0	0	mia			mia			mia	
20.10	2	14.98	3				3.00	3		2.50	0		Dead																
21.00	2	5.33	2	2.60	2	0	2.50	1		2.00	0	Dead																	
22.00	2	5.55	5	2.00	1	0	2.10	1		2.20	1	1	1.80	0															
23.00	2	8.50	5	4.00	4	4	3.50	2		4.30	2	2																	
23.10	2	8.45	5				1.40	0		Dead																			
24.00	2	7.40	5	1.60	0		2.20	1		1.70	Dead																		
25.00	2	3.85	5	2.20	1	0	2.70	2		2.80	0		Dead																
25.10	2	3.85	5	1.80	1	0	2.10	1	Dead																				
25.20	2	3.85	5	1.40	0		2.10	0		1.50	0		Dead																
25.30	2	3.85	5	1.20	0		1.50	0		1.40	1	0	Dead																
25.40	2	3.85	5	1.80	1		Dead																						
25.50	2	3.85	5	1.20	0	Dead																							
25.60	2	14.45	5				4.10	6		3.60	1	0	Dead																
26.00	2	5.00	10	3.40	2	1	3.50	2		3.00	1	1	2.60	0	Dead														
26.01	2	5.00	10				0.40	0		Dead																			
26.10		3.45	14	2.50	nd	0	3.20	1	1	2.60	1	1	3.20	1	0	Dead													
26.20	2	3.35	15	1.60		0	1.90	1		1.70	0		Dead																
26.21	2									0.50	0		Dead																
26.30	2	7.80	16	1.20		0	Dead																						
26.40	2	10.23	12				4.40	4		4.00	3	0																	
26.41	2	10.02	22				3.10	2		2.80	2	Dead																	
26.42	2	10.02	22				3.10	0		2.60	2	Dead																	
27.00	2	3.00	68	1.80	1	0	2.40	0	0	2.40	1	1	2.40	1	1	2.00	0	0	Dead										
27.10	2	3.10	78				1.20	0	0	1.40	0	0	1.40	0															

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
19.40	2														discovered 3/14/92; damaged 3/92; rock atop, sickly 5/93; not seen 8/93, COD - grubs, dead 2/12/94
19.50	2														discovered 3/14/92; COD - grubs, dead 8/12/92
19.60	2														discovered 3/14/92; one pup from stem, COD - grubs, 2/12/94
19.70	2														discovered 3/14/92, COD - grubs, dead 2/12/94
19.80	2														discovered 3/14/92; not seen 8/93, COD - grubs, dead 2/12/94
19.90	2														discovered 3/14/92; sickly 8/93, COD - grubs, dead 4/29/94
20.00	2														discovered 2/10/91;not seen 2/94; refound 4/94; tag buried under grass clump 2/96; flag present, but plant & tag mia 3/97; flag mia, but placed in vicinity 5/98
20.10	2														discovered 3/14/92; sickly 8/93, COD - unknown, dead 2/12/94
21.00	2														discovered 2/10/91; sick appearance 2/93, COD - grubs, dead 4/30/93
22.00	2														discovered 2/10/91; sick 2/94, COD - grubs, dead 4/29/94
23.00	2														discovered 2/10/91; COD - grubs, dead 8/19/93
23.10	2														discovered 3/7/92; COD - unknown, dead 2/6/93
24.00	2														discovered 2/10/91; COD - grubs, dead 2/27/93
25.00	2														discovered 2/10/91; sickly 8/93; COD - M, dead 2/12/94
25.10	2														discovered 2/10/91; COD - unknown, dead 8/12/92
25.20	2														discovered 2/10/91; pup with 25.30; only one sickly head remains 8/93; COD - M, dead 2/12/94
25.30	2														discovered 2/10/91 with 25.20; only 1 sickl head remains 8/93; COD - grubs, dead 2/12/94
25.40	2														discovered 2/10/91; COD - unknown, dead 3/7/92
25.50	2														discovered 2/10/91; COD - unknown, dead 4/19/91
25.60	2														discovered 3/14/92; ant mound nearby 3/92 & 3/93; COD - grubs, dead 2/12/94
26.00	2														discovered 2/10/91; may have grub 3/92; sickly 8/93 & 2/94; COD - grubs, dead 4/29/94
26.01	2														discovered 3/7/92; COD - unknown, dead 2/6/93
26.10															discovered 4/19/91; Dead 95
26.20	2														discovered 4/19/91; COD - unknown, dead 2/12/94
26.21	2														discovered 3/6/93; transect 1, not seen 8/93; COD - unknown, dead 2/12/94
26.30	2														discovered 4/19/91; COD - unknown, dead 3/7/92
26.40	2														discovered 3/14/92; COD - grubs, dead 4/30/93
26.41	2														discovered 3/14/92; pup with 26.42; not seen 8/93; COD - unknown, dead 8/19/93
26.42	2														discovered 3/14/92; pup with 26.41; not seen; COD - unknown, dead 8/19/93
27.00	2														discovered 2/10/91; just spines left 2/96
27.10	2														discovered 3/14/92; with larvae 2/95; Dead 95

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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
27.20	2	6.00	78				2.80	2	0	3.10	2	0	3.50	2	0	Dead												
28.00	2	3.30	80	3.80	0	Dead																							
28.10	2	3.00	84	3.20		1	4.10	3		4.00	2	1	Dead																
28.20	2	3.00	85	0.90	nd	0	1.60	0	0	1.80	0	0	1.80	0	0				Dead										
28.30	2	5.20	90				3.00	3	0	2.80	2	1	2.70	2	2	Dead													
28.40	2	4.95	93				1.80	1		1.70	0	Dead																	
28.50	2	1.95	95				3.60	4	0	3.10	0	0	2.90	1	1	Dead													
28.51	2	1.95	95				3.50	3	0	2.70	0	0	2.80	1	1	Dead													
28.52	2	?	?							0.40	0	0	0.40	0	0	mia	mia	mia	mia			mia							
28.60	2	5.47	87							1.40	0	0	1.70	0	0	mia	mia	mia	mia			mia							
29.00	2	20.60	160	3.80	4	3	4.50	3		3.90	2	2	Dead																
30.00	2	16.40	170	4.00	5	5	3.90	2	2	3.70	3	1	3.50	3	0	3.60	6	5	2.70	0	Dead								
30.10	2	15.62	170				4.30	3	0	4.30	3	3	nd	nd	nd	3.00	2	0	Dead										
30.20	2	4.59	142												na	2.40	2	2	1.60	0	Dead								
Stake 3 = GPS2 R022721E																													
31.00	3	9.07	260	2.00	1	1	2.00	0		1.10	0		Dead																
31.10	3	8.00	256	2.20		0	2.20	0		2.30	1		Dead																
31.20	3	9.57	260	1.90		1	Dead																						
32.00	3	8.74	262	1.80	3	0	1.90	2	Dead																				
32.10	3	7.20	262	2.50		0	2.60	2		1.60	0		Dead																
32.20	3	3.15	263				5.10	3	0	4.70	2	2	4.30	1	0	3.90	3	2	2.50	0	Dead								
32.21	3	4.35	262							3.80	1	1	3.10	0	0	3.30	2	2	2.50	0	Dead								
32.22	3	4.35	262							3.30	1	1	2.70	0	0	2.60	2	2	1.70	0	Dead								
32.23	3	4.35	262							2.90	0	0	2.70	0	0	2.80	0	0	2.10		Dead								

Ancictrocactus tobuschii Data for
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PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
27.20	2														discovered 3/14/92, 2 flower buds eaten 3/92, with larvae 2/95; Dead 95
28.00	2														discovered 2/10/91; COD - unknown, dead 4/19/91
28.10	2														discovered 4/19/91; COD - M, dead 2/12/94
28.20	2														discovered 4/19/91; Dead 96
28.30	2														discovered 3/14/92; Dead 95
28.40	2														discovered 3/14/92; sick 3/93; COD - grubs, dead 8/19/93
28.50	2														discovered 3/14/92; pup with 28.51 rock atop 4/93; sickly 8/93; needs tag 4/94; Dead 95
28.51	2														discovered 3/14/92; pup with 28.5; rock atop 4/93; sickly 8/93; needs tag 4/94; Dead 95
28.52	2														discovered 3/6/93; not seen 8/93; mia 95 & 96; plant, tag, and flag mia 3/97
28.60	2														discovered 3/13/93; mia 95 & 96; plant, tag, and flag mia 3/97
29.00	2														discovered 2/10/91; sickly 8/93; seedling near carcass; COD - unknown, dead 2/12/94
30.00	2														discovered 2/10/91; sickly 8/93; looks dead, but still firmly rooted 2/96; Dead, weevil chambers but no bugs 8/96
30.10	2														discovered 3/14/92; sickly 8/93; eaten to ground 2/94; 2 pups forming 4/94; spines gray, stem hollow 2/96
30.20	2														in spikemoss, retracted ca. 1" in *Selaginella*, but feels loose 2 & 5/96; stem hollow, but no bugs; Dead 8/96
Stake 3 = GPS2															
31.00	3														discovered 2/10/91; was damaged, pup forming 2/93; COD - M, dead 2/12/94
31.10	3														discovered 4/19/91; COD - grubs, 2/12/94
31.20	3														discovered 4/19/91; COD - unknown, dead 3/14/92
32.00	3														discovered 2/10/91; top eaten, adding new head in 91? doesn't look like this in 92; collected carcass with grub; COD - grubs, dead 8/12/92
32.10	3														discovered 4/19/91; was damaged, pup forming 2/93; COD - M, dead 2/12/94
32.20	3														discovered 3/20/92; damaged 2/94; 3 seedlings 2/94; 8 seedlings 4/94; sickly 4/94; very hunkered down, green 2/96; killed by grubs 5/96
32.21	3														discovered 3/13/93; pup with 32.22 & 32.23; ant mound surrounding 8/93; bad, dying 2/96; killed by weevils (collected) 5/96
32.22	3														discovered 3/13/93; pup with 32.21 & 32.23; ant mound 8/93; bad, dying 2/96; killed by weevils (collected) 5/96
32.23	3														discovered 3/13/93; pup with 32.21 & 32.22; ant mound 8/93; bad, dying 2/96; killed by weevils 5/96

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
32.30	3	4.78	253				3.30	2		2.50	2	2	2.60	0	Dead													
32.31	3	4.78	253				2.20	0		1.80	1	1	1.90	0	Dead													
32.32	3	4.92	258							1.00	0	0	0.80	0	0	0.80	0	0	1.00	0	0	mia	mia	Dead					
32.40	3	5.39	255				5.10	5	0	4.80	1	1	4.50	3	3	Dead													
32.50	3	7.45	255				2.70	1	Dead																				
32.60	3	6.88	258				1.40	0	Dead																				
32.70	3	9.34	255				2.20	1	0	1.70	1	1	1.60	0	0	Dead													
33.00	3	6.88	264	2.50	1	1	2.70	1	Dead																				
33.10	3	7.12	266	4.20		3	4.10	3		3.90	3	3	Dead																
33.20	3	6.18	266	2.20		0	2.20	0		Dead																			
33.30	3	7.37	259				2.10	1		2.40	1	1	Dead																
33.32	3	?	?													1.00	0	0	mia			mia			mia			
33.40	3	7.37	259				1.30	0	0	nd	nd	nd	1.70	0	0	Dead													
33.50	3	7.37	259				0.70	0	0	0.80	0	0	0.90	0	0	mia		nd	Dead										
33.60	3	7.37	259				0.70	0	0	nd	nd	0	0.80	0	0	0.90	0	0	Dead										
33.70	3	7.37	259				0.50	0	0	nd	nd	nd	0.60	0	0	0.80	0	0	Dead										
34.00	3	8.65	266	2.00	1	0	2.40	1	0	2.40	1	1	2.00	0	0	Dead													
34.10	3	7.36	260	1.00	nd	0	1.10	0	0	1.00	0	0	nd	0	0	Dead													
35.00	3	7.03	260	4.00	3	3	4.10	2	1																				
36.00	3	6.01	260	3.00	2	2	3.30	1	0	2.70	0		Dead																
36.10	3	7.18	260	0.90		0	1.30	0		0.90	0		Dead																
36.20	3	7.20	260				1.40	0	0	1.00	0	0	nd	0	0	mia	mia	mia	mia			mia							
37.00	3	7.37	260	3.60	3	0	Dead																						
37.10	3	7.57	262	1.40	nd	0	1.50	0	0	1.20	0	0	nd	0	nd	1.40	0	0	mia			mia			mia				
38.00	3	7.15	262	1.40	0		1.70	0		Dead																			
38.10	3	7.14	271	2.50		1	2.60	0		2.80	0		3.20	1	0														
38.20	3	7.20	260				0.30	0		0.40	0		Dead																
38.30	3	7.20	260				0.70	0		Dead																			
39.00	3	8.25	272	3.40	3	0	1.50	0		1.20	0		Dead																
39.10	3	8.25	272	1.20	0	0	1.70	0	0	1.50	0	0	1.50	0	0	Dead													

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
32.30	3														discovered 3/20/92, pup with 32.31, COD - unknown, dead 4/29/94
32.31	3														discovered 3/20/92, pup with 32.30, CPD - unknown, dead 4/29/94
32.32	3														discovered 3/6/93; not seen 8/93, very hunkered down 2 & 5/96, loose spine clusters found, tag & flag removed 5/97
32.40	3														discovered 3/20/92, Dead 95
32.50	3														discovered 3/20/92, COD - grubs, dead 8/12/92
32.60	3														discovered 3/20/92, may actually be pup from stump 3/92, COD - grubs, dead 8/12/92
32.70	3														discovered 3/20/92, sickly 2/94, Dead 95
33.00	3														discovered 2/10/91, COD - grubs, dead 8/12/92
33.10	3														discovered 4/19/91, COD - grubs, 2/12/94
33.20	3														discovered 4/19/91, eaten by mammal, new head forming 3/92, COD - unknown, dead 2/6/93
33.30	3														discovered 3/20/92, COD - grubs, dead 2/12/94
33.32	3														sickly 2/95, mia 96, plant, tag, & flag mia 3/97, mia 98
33.40	3														discovered 3/20/92, not seen 8/92, 3 seedlings 4/94, Dead 95
33.50	3														discovered 3/20/92, not seen 8/92, refound 5/95, stem hollow, Dead 2/96
33.60	3														discovered 3/20/92, not measured 2/93, only spines left 2/96
33.70	3														discovered 3/20/92, not seen 8/92, only spines left 2/96
34.00	3														discovered 2/10/91, Dead 95
34.10	3														discovered 4/19/91, not censused 2/94, refound 4/94, Dead 95
35.00	3														discovered 2/10/91, COD - grubs, dead 8/12/92
36.00	3														discovered 2/10/91, COD - unknown 2/12/94
36.10	3														discovered 4/19/91, COD - unknown, dead 2/12/94
36.20	3														discovered 3/20/92, not censused 2/94, refound, very sick 4/94, mia 95, tag & flag mia also 2/96, 3/97, 5/97
37.00	3														discovered 2/10/91, COD - unknown, dead 3/14/92
37.10	3														discovered 4/19/91, not censused 2/94, refound 4/94, DM 95 - 1.4, mia 96 & 97, tag, plant, & flag mia 5/98
38.00	3														discovered 2/10/91, damaged and sickly 8/92, 1 small seedling 8/92, COD - unknown, dead 2/6/93
38.10	3														discovered 4/19/91, COD - grubs, dead 4/29/94
38.20	3														discovered 3/20/92, COD - unknown, dead 2/12/94
38.30	3														discovered 3/20/92, COD - unknown, dead 2/6/93
39.00	3														discovered 2/10/91, eaten in 91, pup forming in 92, COD - unknown, dead 2/12/94
39.10	3														discovered 2/10/91, needs new tag 4/94, Dead 95

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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
39.20 R.E.'s data	3	8.25	272	1.10		0	1.60	0	Dead																				
39.20	3	?	?													1.40	0	0	Dead										
39.30	3	6.30	271	0.30		0	Dead																						
39.40	3	6.30	271	0.30		0	Dead																						
39.50	3	6.30	271	0.30		0	Dead																						
39.60	3	6.30	271	0.30		0	Dead																						
39.70	3	6.30	271	0.30		0	Dead																						
40.00	3	6.83	271	1.60	1	0	1.80	0	0	1.60	0	0	1.90	1	1	Dead													
40.10	3	6.83	271	1.40	1	0	1.70	1	0				Dead																
40.20	3	6.83	271	1.10	0		1.60	0	Dead																				
40.30	3	6.10	271	0.30		0	0.70	0		0.70	0		Dead																
40.40	3	6.10	271	0.30		0	0.40	0		0.40	0		Dead																
41.00	3	6.89	270	2.40	2	0	Dead																						
41.10	3	6.89	270	1.10	0		1.70	0		Dead																			
42.00	3	7.57	275	3.40	3	0	1.50	0	0	1.10	0	0	nd	0	0	1.50	0	Dead	Dead										
42.10	3	7.57	275	3.40	3	0	1.30	0	0	1.10	0	0	nd	0	0	1.20	0	Dead	Dead										
43.00	3	5.29	277	3.00	3	0	2.00	0	0	1.60	0	0	nd	0	0	Dead													
44.00	3	8.35	277	2.20	2	2	2.80	1		2.40	2	2	Dead																
44.01	3	?	?							0.90	0	0	0.80	0	0	mia	mia	mia	mia			mia							
44.02	3	?	?							0.30	0	0	0.60	0	0	mia	mia	mia	mia			mia							
44.03	3	?	?							0.30	0	0	0.50	0	0	Dead													
44.04	3	?	?							0.40	0	0	nd	0	0	Dead													
44.05	3	?	?							0.30	0		Dead																
44.10	3	8.35	277	2.60	2	2	3.00	2		2.00			1.50	0	Dead														
44.20	3	8.35	277			0	1.00	0		Dead																			
45.00	3	6.35	278	2.00	0		1.70	0					Dead																
45.10	3	6.35	278	1.40	0		1.70	0					Dead																

Ancictrocactus tobuschii Data for
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PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
39.20 R.E.'s data	3														discovered 4/19/91; COD - grubs, dead 8/12/92
39.20	3														too far gone to discern cause of mortality, Dead 96
39.30	3														discovered 4/19/91; COD - unknown, dead 3/14/92
39.40	3														discovered 4/19/91; COD - unknown, dead 3/14/92
39.50	3														discovered 4/19/91; COD - unknown, dead 3/14/92
39.60	3														discovered 4/19/91; COD - unknown, dead 3/14/92
39.70	3														discovered 4/19/91; COD - unknown, dead 3/14/92
40.00	3														Dead 95 +
40.10	3														discovered 2/10/91; mistakenly thought to be dead through Sp. 93; seen alive 8/93; COD - grubs, dead 2/12/94
40.20	3														discovered 2/10/91; COD - G (grubs), dead 8/12/92
40.30	3														discovered 4/19/91; not seen 8/92; COD - unknown, 2/12/94
40.40	3														discovered 4/19/91; not seen 8/93; COD - unknown, 2/12/94
41.00	3														discovered 2/10/91; COD - unknown, dead 3/14/92
41.10	3														discovered 2/10/91; COD - M, dead 2/6/93
42.00	3														discovered 2/10/91, eaten 3/91; 2 pups forming 4/91; pup with 42.1; not censused 2/94; refound 4/94; only spines left 2/96
42.10	3														discovered 2/10/91; pup with 42.00; not censused 2/94; refound 4/94; only spines left 2/96
43.00	3														discovered 2/10/91, eaten 3/91; 1 pup forming 4/91; not censused 2/94; refound 4/94; Dead 95
44.00	3														discovered 2/10/91; 2 seedlings around carcass; COD - G (grubs); dead 2//12/94
44.01	3														discovered 3/6/93; transect 4; mia 95 & 96; plant, tag, and flag mia 3/97
44.02	3														discovered 3/6/93; transect 4; mia 95 & 96; plant, tag, and flag mia 3/97
44.03	3														discovered 3/6/93; transect 4; Dead 95
44.04	3														discovered 3/6/93; transect 4; not censused 2/94; refound 4/94; Dead 95
44.05	3														discovered 3/6/93; transect 4; COD - unknown, dead 2/12/94
44.10	3														discovered 2/10/91; COD - grubs, dead 4/29/94
44.20	3														discovered 4/19/91; COD - unknown, dead 2/6/93
45.00	3														discovered 2/10/91, eaten 3/91; 2 pups forming 4/91; one pup existed previously (45.1); pup with 45.1 & 45.2; not measured; rock atop 2/93; COD - grubs; dead 2/12/94
45.10	3														discovered 2/10/91; pup with 45.00 & 45.20; not measured; rock atop 2/93; COD - grubs; dead 2/12/94

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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
45.20	3	6.35	278	2.00	0		1.70	0			0		Dead																
45.30	3	6.43	270							0.90	0	0	nd	0	0	Dead													
46.00	3	8.70	284	2.60	2	2	2.90	2	2																				
47.00	3	5.85	10	3.00	2	2	3.50	1	0	2.50	1	1	nd	nd	0	3.10	3	3	2.50	2	0	3.50	0	Dead					
48.00	3	7.20	15	5.40	4	4	Dead																						
49.00	3	8.42	18	6.00	9	9	Dead																						
50.00	3	7.80	88	3.60	2	0																							
50.10	3	7.80	88	nd	0	0	0.80	0	0	0.80	0	0	0.90	0	0	1.30	0	0	mia			mia			mia				
50.20	3	7.80	88	nd	nd	0	0.70	0	0	0.70	0	0	0.80	0	0	1.70	0	0	mia			mia			mia				
51.00	3	6.83	85	3.80	4	4	Dead									2.90	3	3	Dead										
51.10	3	6.88	85													1.80	1	1	1.20	0	Dead	Dead							
52.00	3	7.25	108	2.00	1	0	Dead																						
53.00	3	7.10	108	2.60	2	0	Dead																						
53.10	3	7.10	108	3.00	3	0	Dead																						
54.00	3	6.88	108	2.00	3	0	Dead																						
55.00 R.E.'s data	3	6.65	108	3.00	2	1	3.10	0		3.10	0		3.20	2	0														
55.00	3	6.72	110													1.00	0	0	0.70	0	Dead	Dead							
55.10 R.E.'s data	3	6.65	108	3.00	1		3.10	0		2.80	0		3.80	2	0														
55.10	3	6.61	110																0.70		0	0.70	0	mia	mia			mia	
55.20 R.E.'s data	3	6.65	108	2.80	1		3.10	0		2.50	0		3.20	2	0														
56.00	3	5.93	108	2.40	2	2	2.20	0		Dead																			
56.10	3	4.70	115	2.50		0		Dead																					
57.00	3	6.15	124	3.00	2	2		Dead																					
58.00	3	6.34	135	2.80	2	0	2.20	0	0	2.00	0	0	1.40	0	0	1.60	0	0	Dead										
59.00	3	6.54	140	3.20	3	3		Dead																					

Ancictrocactus tobuschii Data for
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PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
45.20	3														discovered 2/10/91; 45.00 eaten 3/91; two new pups forming 4/91, one other pup (45.10) existed prior to this; pup with 45.00 & 45.20; rock atop, not measured 2/93; COD - grubs, dead 2/12/94
45.30	3														discovered 3/13/93, not censused 2/94, refound 4/94; Dead 95
46.00	3														discovered 2/10/91; one seedling surr. Carcass, COD - unknown, dead 8/12/92
47.00	3														discovered 2/10/91; very dessicated 2/92, not censused 2/94, refound 4/94, very hunkered down in Selaginella 2/96, great, very green 5/96, good, coming out of Selaginella 3/97, top of stem popped off, weevil exit holes, tag & flag removed 5/97
48.00	3														discovered 2/10/91; COD - unknown, dead 2/22/92
49.00	3														discovered 2/10/91; COD - unknown, dead 2/15/92
50.00	3														discovered 2/10/91; COD - unknown, dead 4/19/91
50.10	3														discovered 4/19/91; mia 96 & 97; tag, plant, and flag mia 5/98
50.20	3														discovered 4/19/91; not seen 8/92; mia 96 & 97; tag, plant, and flag mia 5/98
51.00	3														discovered 2/10/91; big hole in side 2/96; COD - unknown, dead 3/20/92
51.10	3														looks dead 2/96; COD unknown, only spines left, 5/96
52.00	3														discovered 2/10/91; COD - unknown, dead 3/20/92
53.00	3														discovered 2/10/91; COD - unknown, dead 3/20/92
53.10	3														discovered 2/10/91; COD - unknown, dead 3/20/92
54.00	3														discovered 2/10/91; COD - unknown, dead 3/20/92
55.00 R.E.'s data	3														discovered 2/10/91;pup with 55.10 & 55.20; ant mound 2/93; COD - M, dead 4/29/94
55.00	3														bad, spines gray, plant loose in ground, 2/96; gone, only a hole in ground left 5/96; presumed dead 3/97
55.10 R.E.'s data	3														discovered 2/10/91; pup with 55.0 & 55.2; ant mound 2/93; COD - M, dead 4/29/94
55.10	3														found in 5/96; mia 5/97, 2 & 5/98, 2 & 5/99
55.20 R.E.'s data	3														discovered 2/10/91; pup with 55.0 & 55.1; ant mound 2/93; COD - M, dead 4/29/94
56.00	3														discovered 2/10/91; COD - unknown, dead 2/6/93
56.10	3														discovered 4/19/91; damaged and forming pup 8/91; COD - unknown, dead 3/20/92
57.00	3														discovered 2/10/91; COD - unknown, dead 3/20/92
58.00	3														discovered 2/10/91; sickly 2/93, completely hollow 2/96
59.00	3														discovered 2/10/91; COD - unknown, dead 3/20/92

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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
60.00	3	6.37	142	1.20	0		1.40	0		1.10	0		Dead			1.60	0	0	Dead										
61.00	3	6.70	148	2.40	0		Dead																						
61.10	3	6.51	147	1.60		0	Dead																						
62.00	3	8.18	152	2.80	2	2	Dead																						
63.00	3	8.25	154	2.40	0	0	2.50	0	0	1.80	0	0	2.00	0	nd	2.20	0	0	Dead										
64.00	3	8.30	175	4.20	4	4	Dead																						
Stake 4 = GPS3 R022722B																													
1.00	4	2.10	103																										
65.00	4	3.95	256	4.40	4	4	Dead																						
66.00	4	3.95	278	4.20	4	4	Dead																						
67.00	4	4.67	278	2.60	3	3	Dead																						
68.00	4	4.35	286	2.60	1	1	2.80	0		2.50	1	1	2.50	2	0														
68.01	4	4.35	275							0.60	0	0	0.90	0	0	0.90	0	0	0.50	0	Dead								
68.02	4	?	?													2.10	1	1A	Dead										
68.10	4	4.35	286	2.00	2	2	2.20	0	Dead																				
68.20	4	4.35	286	2.60	2	2	1.20	0		Dead																			
68.30	4	4.35	286	2.00	1	1	Dead																						
68.40	4	4.48	275				2.00	0		2.00	0		2.40	2	Dead														
68.41	4	5.01	269							0.80	0	0	1.00	0	0	1.10	0	0	1.00	0	0	1.00	0	mia	mia			mia	
68.42	4	5.01	269							0.60	0	0	0.80	0	0	1.00	0	0	mia	mia	0	0.90	0	0	1.30	0	0	1.38	0
68.43	4	5.01	269							0.70	0	0	0.90	0	0	0.90	0	0	1.00	0	0	mia			mia			mia	
68.44	4	5.01	269							0.70	0	0	0.60	0	0	1.20	0	0	mia			1.70	0	0	Dead				
68.45	4	5.01	269							0.60	0	0	0.60	0	0	0.80	0	0	mia			mia			mia				

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PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
60.00	3														discovered 2/10/91; sickly 2/93; COD - unknown, dead 2/12/94; hollow 2/96
61.00	3														discovered 2/10/91; COD - unknown, dead 3/20/92
61.10	3														discovered 4/19/91; COD - unknown, 3/20/92
62.00	3														discovered 2/10/91; COD - unknown, dead 3/20/92
63.00	3														damaged 3/92, pup formed 2/93, not found 4/94, top popped off 2/96
64.00	3														discovered 2/10/91; COD - unknown, dead 2/15/92
Stake 4 = GPS3															
1.00	4					4.10	5	3+2A	3.98	7	3+3A	dead			discovered 3/01; dark olive, OK 3/01, maroonish-green, good 5/01, olive, good, one flower may have opened 2/02, green, OK 5/02, collected for weevil study, COD probably weevils 3/03
65.00	4														discovered 2/10/91; COD - unknown, dead 2/15/92
66.00	4														discovered 2/10/91; collected carcass with grubs, COD - grubs, dead 2/15/92; brought grubs to maturity in lab
67.00	4														discovered 2/10/91; COD - unknown, dead 2/15/92
68.00	4														discovered 2/10/91; sickly 8/93; COD - M, dead 4/29/94
68.01	4														discovered 3/13/93, 4 cm South of 68.00; hollowed out, insect, collected 5/96
68.02	4														completely hollow 2/96
68.10	4														discovered 2/10/91; eaten between 91 & 92 census; one pup forming and measured prior to death, COD - M, dead 3/20/92
68.20	4														discovered 2/10/91; eaten between 91 & 92 census; one pup forming in 92; COD - unknown, dead 2/6/93
68.30	4														discovered 2/10/91; COD - unknown, dead 2/15/92
68.40	4														discovered 3/20/92; COD - M, dead 4/29/94
68.41	4														discovered 3/13/93, 1 m South of 68.4, 1 m Southeast of 68.5; only spines showing, hunkered down 2/96; spines detached, looks weird 3/97; a few loose spines, no plant 5/97; mia 98; tag & pl mia 2/99 & 5/99
68.42	4	0	Dead												discovered 3/13/93; see 68.41; needs pin 4/94; measured in one direction only; yellowish 2/98; green, good, new spine growth 5/98; green, good, soil loose 2/99; green, good 5/99; COD unknown, collected by Bill Calvert 3/00
68.43	4														discovered 3/13/93; see 68.41; plant and tag mia 3/97, 2/98, 5/98, 2/99 & 5/99
68.44	4														discovered 3/13/93; see 68.41; in grass 3/97; hollow with weevil exit holes 2/98
68.45	4														discovered 3/13/93; see 68.41; tag mia also 2/96; found tag 3/97; plant and tag mia 5/97, 5/98

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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
68.46	4	?	?							0.80	0		Dead																
68.50	4	5.61	277				2.50	1	1	2.20	0	0	2.10	0	0	2.20	1	1	Dead										
68.60	4	4.40	279				3.50	1		3.20	1	1	3.20	1	Dead														
68.70	4	4.40	279				0.80	0		0.70	0		Dead																
68.80	4	4.35	286				0.30	0	Dead																				
68.90	4	4.35	286				0.60	0	Dead																				
69.00	4	5.24	286	5.60	5	5	Dead																						
69.10	4	5.61	290	1.60		0	Dead																						
69.20	4	5.26	282				0.70	0	0	0.70	0	0	0.90	0	0	1.00	0	0	1.20	0	0	1.60	0	0	1.40	0	Dead		
69.30	4	5.26	282				0.30	0	Dead																				
70.00	4	4.24	290	3.40	1	0	3.30	2	Dead																				
70.01	4	4.23	285							0.70	0		0.80	0	Dead														
71.00	4	3.15	292	3.00	2	2	3.60	0	0	2.80	2	2	3.00	0	0	3.30	3	3	Dead										
72.00	4	2.35	295	2.20	1	1	2.80	1	1	2.60	2	2	3.00	0	0	3.00	0	0	Dead										
72.10	4	?	?													2.30	0	0	Dead										
73.00	4	4.57	295	3.60	5	5	4.80	4	Dead																				
73.10	4	4.40	296	1.10	nd	0	1.20	0	0	1.40	0	0	2.10	0	0	2.50	1	0	Dead										
74.00	4	2.20	298	2.60	3	3	Dead																						
74.10	4	4.30	298	2.60		0	Dead																						
75.00	4	3.14	304	3.40	2	2	2.60	0		2.20	0																		
75.10	4	3.14	304	1.20	0	Dead																							
76.00	4	3.16	308	5.20	5	5	5.40	6	2	5.20	5	5	4.80	3	2	4.20	0	0	Dead										
76.10	4	12.53	312				4.10	1	0	nd	nd	2	3.50	0	0	1.60	2	3	2.80	0	Dead								
77.00	4	2.30	318	4.60	4	4	4.50	3		4.30	4	4	4.20	1	0														
77.10	4	3.11	320	4.20		5	4.60	3		3.90	3	3	Dead																
77.20	4	3.11	320	0.90		0				1.30	0	Dead																	
77.30	4	3.11	320	0.90		0				0.90	0	Dead																	
77.40	4	3.11	320	0.90		0				1.30	0		Dead																

Ancictrocactus tobuschii Data for
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PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
68.46	4														discovered 3/13/93; COD - unknown, dead 2/12/94; see 68.41
68.50	4														discovered 3/20/92; fruit odd shape, light color 4/92; sick 8/92; hole at base 2/96
68.60	4														discovered 3/20/92; not seen 8/92; one seedling 2/94; COD - M; dead 4/29/94
68.70	4														discovered 3/20/92; not seen 8/92, 8/93; COD - M; dead 2/12/94
68.80	4														discovered 2/15/92; not yet tagged in 92; not seen 8/92; COD - unknown; dead 8/12/92
68.90	4														discovered 2/15/92; not yet tagged in 92; not seen 8/92; COD - unknown; dead 8/12/92
69.00	4														discovered 2/10/91; COD - grubs; dead 2/15/92
69.10	4														discovered 4/19/91; COD - unknown; dead 3/20/92
69.20	4														discovered 3/20/92; wedged in between 3 rocks 2/96; good 5/96; measured in one direction only 2/98; hollow with weevil exit hole 5/98
69.30	4														discovered 3/20/92; COD - unknown; dead 8/12/92
70.00	4														discovered 2/10/91; 2 small unmonitored seedlings surround carcass; COD - grubs; dead 8/12/92
70.01	4														discovered at 70.00 (dead) 3/13/93; rock atop 2/94; COD - unknown; dead 4/29/94
71.00	4														discovered 2/10/91; damaged? 3/92; fruit half regular size 5/95; top popped off 2/96
72.00	4														discovered 2/10/91; very sickly 8/93; hollow, top popped off but still attached (an exit hole?) 2/96
72.10	4														6" from 72.00; Dead 96
73.00	4														discovered 2/10/91; COD - grubs; dead 8/12/92
73.10	4														discovered 4/19/91; damaged 2/94; sickly 2/95; Dead 96
74.00	4														discovered 2/10/91; damaged (stepped on?) 2/15/92; COD - unknown; dead 3/20/92
74.10	4														discovered 4/19/91; eaten; pup forming 91; COD - M; dead 3/20/92
75.00	4														discovered 2/10/91; damaged/sickly 3 & 8/92, 2/93; not seen 8/93; one seedling near carcass; COD - unknown; dead 2/12/94
75.10	4														discovered 2/10/91; COD - unknown; dead 4/19/91
76.00	4														discovered 2/10/91; hollow 2/96
76.10	4														discovered 3/20/92; not measured 2/93; 2 or 3 orange tubercles with gray spines 2/96; some new spine growth, firmly rooted 5/96; COD unknown 8/96
77.00	4														discovered 2/10/91; sickly 8/93; COD - unknown; dead 4/29/94
77.10	4														discovered 4/19/91; sick appearance 4/93; not seen 8/93 COD - grubs; dead 2/12/94
77.20	4														discovered 4/19/91; COD - M; dead 8/19/93
77.30	4														discovered 4/19/91; COD - M; dead 8/19/93
77.40	4														discovered 4/19/91; COD - unknown; dead 2/12/94

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
77.50	4	3.11	320	1.00	nd	0	nd	nd	nd	1.30	0	0	1.20	0	0	1.40	0	0	Dead										
77.60	4	3.11	320	1.20	nd	0	nd	nd	nd	1.40	0	0	1.40	0	0	1.50	0	0	Dead										
78.00	4	2.45	322	3.00	2	2	Dead																						
79.00	4	3.62	334	5.00	5	5	4.60	3	Dead																				
80.00	4	2.68	334	1.40	0	0	1.90	0	0	2.20	0	0	2.20	0	0	2.30	0	0	Dead										
81.00	4	2.76	345	2.40	2	2	2.60	1		2.40	1	1	2.30	0	Dead														
82.00	4	4.80	45	3.40	0		Dead																						
82.10	4	10.63	42				4.40	2	Dead																				
82.11	4	10.63	42							0.40	0		Dead																
82.12	4	10.63	42							0.50	0		Dead																
82.13	4	10.63	42							0.40	0		Dead																
82.14	4	10.63	42							0.50	0		Dead																
82.15	4	10.63	42							0.40	0		Dead																
83.00	4	5.10	50	1.40	0		Dead																						
84.00	4	5.27	50	1.40	0		Dead																						
84.10	4	5.27	50	1.20	0		Dead																						
85.00	4	5.28	52	2.80	3	3	Dead																						
86.00	4	4.85	54	2.20	1	0	2.80	1	0	2.70	1	1	2.70	1	1	2.40	0	0	1.70	0	Dead								
86.10	4	4.85	54	1.40	0		1.80	0	Dead																				
86.20	4	4.85	54	3.40	3	3	Dead																						
87.00	4	4.93	60	2.20	2	2	Dead																						
87.10	4	5.30	58	1.70		0	Dead																						
87.20	4	5.18	58	3.20		0	Dead																						
87.30	4	5.18	58	2.10		0	Dead																						
87.40	4	5.18	58	1.10		0	Dead																						
88.00	4	2.76	84	3.20	2	2	3.90	4	0	3.90	3	3	4.20	4	4	3.80	4	5	Dead										
88.10	4	3.15	85													3.90	5	4	Dead										
88.20	4	4.15	113													22.30	2	1A	Dead										
88.30	4	4.55	145													2.80	1	Dead	Dead										
89.00	4	1.80	104	3.60	4	4	Dead																						
89.10	4	1.82	103				0.80	0	0	nd	nd	nd	1.10	0	0	1.70	1	0	0.70	0	0	Dead							
89.20	4	4.81	112				3.10	2	0	2.70	1	1	2.80	1	1	2.40	3	2	Dead										
89.22	4	2.96	117							1.70	0	0	1.90	0	0	2.20	2	1	Dead										
89.23	4	2.17	168							1.80	0	0	2.30	1	0	2.70	3	3	Dead										

Ancictrocactus tobuschii Data for
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PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
77.50	4														discovered 4/19/91; ? cm from 92; pup with 77.6; no tag nor flag, only spines left 2/96
77.60	4														discovered 4/19/91; ? cm from 92; pup with 77.50; no tag nor flag 2/96; Dead 96
78.00	4														discovered 2/10/91; COD - unknown; dead 3/20/92
79.00	4														discovered 2/10/91; COD - G (grubs), dead 8/12/92
80.00	4														discovered 2/10/91; just spines nested in grass 2/96
81.00	4														discovered 2/1091; sick 2 & 8/93; COD - unknown; dead 4/29/94
82.00	4														discovered 2/10/92; COD - grubs; dead 3/20/92
82.10	4														discovered 3/20/92; 6+ seedlings surrounding plant 3/92; 6+ seedlings surrounding carcass; COD - grubs; dead 8/12/92
82.11	4														discovered 3/13/93; at 82.10 (dead); COD - unknown; dead 2/12/94
82.12	4														discovered 3/13/93; at 82.10 (dead); COD - unknown; dead 2/12/94
82.13	4														discovered at 82.10 (dead) 3/13/93; COD - unknown; dead 2/12/94
82.14	4														discovered 3/13/93; at 82.10 (dead); COD - unknown; dead 2/12/94
82.15	4														discovered 3/13/93; at 82.10 (dead); COD - unknown; dead 2/12/94
83.00	4														discovered 2/10/92; COD - unknown; dead 3/20/92
84.00	4														discovered 2/10/92; COD - unknown; dead 3/20/92
84.10	4														discovered 2/10/91; COD - unknown; dead 3/20/92
85.00	4														discovered 2/10/92; COD - unknown; dead 3/20/92
86.00	4														discovered 2/10/91; 1 seedling 2/94; looks dead but firmly rooted 2/96; dead; stem hollow, no insects 8/96
86.10	4														discovered 2/10/91; COD - grubs; dead 8/12/92
86.20	4														discovered 2/10/91; COD - unknown; dead 3/20/92
87.00	4														discovered 2/10/91; COD - unknown; dead 3/20/92
87.10	4														discovered 4/19/91; COD - unknown; dead 3/20/92
87.20	4														discovered 4/19/91; COD - unknown; dead 3/20/92
87.30	4														discovered 4/19/91; COD - unknown; dead 3/20/92
87.40	4														discovered 4/19/91; COD - unknown; dead 3/20/92
88.00	4														discovered 2/10/91; hollow 2/96
88.10	4														top popped off like a hatch 2/96
88.20	4														hollow 2/96
88.30	4														hollow; only spines left 2/96
89.00	4														discovered 2/10/91; COD - unknown; dead 3/20/92
89.10	4														discovered 3/20/92; 14 seedlings by carcass 8/92;+AU204 just spines left; COD unknown 3/97
89.20	4														discovered 3/20/92; sickly 8/93; hole in root; root hollow 2/96
89.22	4														discovered 3/13/93; needs tag 4/94; tag replace 2/95; hollow 2/96
89.23	4														discovered 3/13/93; hole in stem; stem hollow 2/96

Ancictrocactus tobuschii Data for
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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
89.24	4	1.90	168							2.90	0	0	3.50	1	1	3.30	1	0	Dead										
89.25	4	6.30	125										na			3.30	3	3	Dead										
89.30	4	4.81	112				2.80	0	0	2.40	0	0	2.40	0	0	2.70	4	0	Dead										
89.31	4	4.81	112										na			2.80	4	2	mia			mia			mia				
89.40	4	5.40	115							2.70	2	2	2.80	1	1	2.60	2	1	Dead										
89.41	4	5.40	115							2.60	1	1	2.40	0	0	1.50	1	0	Dying		Dead								
89.42	4	5.40	115							2.40	1	1	2.00	1	1	2.60	1	1	Dying		Dead								
89.43	4	5.40	115							2.00	0	0	2.00	0	0	2.60	0	2	Dying		Dead								
90.00	4	1.55	110	3.20	2	1	3.00	2	0	2.80	1	1	2.60	1	1	2.40	0	0	Dead										
90.10	4	~49.70	101	3.00		3	Dead												4.80	5	2+4A	6.80	14	12+4A	Dead				
91.00	4	27.30	44	3.60	3	3	3.40	1																					
92.00	4	26.51	45	1.60	0	0	1.80	0	0	1.70	1	1	1.70	0	0	Dead													
92.10	4	23.75	54		0			0		1.50	0					3.40	2	0	Dead										
93.00	4	27.64	46	4.00	4	4	4.30	4	0	4.20	3	3	4.30	2	2	Dead													
93.10	4	27.64	46	1.20	0	0	1.80	0	0	1.60	0	0	1.90	0	0	Dead													
94.00	4	26.41	46	2.80	1	1	Dead																						
95.00	4	25.56	48	4.00	3	3	3.80	2	1	3.50	1	1	Dead																
95.10	4	28.74	58	1.80		0	Dead																						
Stake 4A (R022722A) is ~100m East of Stake 4, near ashe juniper stump with large flat limestone rock																													
1.00	4A	3.90	181																									4.04	
2.00	4A	~46.15	~266																										
3.00	4A	4.58	179																										
3.01	4A	4.56	179																										
3.02	4A	4.60	179																										
90.20	4A	3.90	181																										
Stake 6 = GPS4 R022722D; stake is at the edge of Condalia																													
96.00	6	5.55	346	3.60	nd	3	4.10	4	4	4.30	2	2	5.30	4	4	5.60	5	3	Dead										

Ancictrocactus tobuschii Data for
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PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
89.24	4														discovered 3/13/93; hole in bottom, stem hollow 2/96
89.25	4														hollow tube inside stem 2/96
89.30	4														discovered 3/20/92; hole at stem base, stem hollow 2/96
89.31	4														no flag nor tag 2/96, 5/98; mia 96, 97, 98
89.40	4														discovered 3/13/93; tag reads 89.21 - change tag; pup with 89.41, 89.42, & 89.43; Dead 96
89.41	4														discovered 3/13/93; pup with 89.40, 89.42, & 89.43; only spines left 5/96
89.42	4														discovered 3/13/93; pup with 89.40, 89.41, & 89.43; looks dead but firmly rooted 5/96; dead, hollow 8/96
89.43	4														discovered 3/13/93; pup with 89.40, 89.41, & 89.42; looks dead but firmly rooted 5/96; dead, hollow 8/96
90.00	4														discovered 2/10/91; Dead 96
90.10	4														discovered 4/19/91; weevil exit holes 2/98, COD - unknown, dead 3/20/92
91.00	4														discovered 2/10/91; COD - grubs, dead 5/21/92
92.00	4														discovered 2/10/91; pup with 92.10, alive even after co-pup 92.10's grub-death 2/94, 4/94, Dead 95
92.10	4														pup with 92.0, 92.0 remains alive after 92.1's grub-death 2/94, 4/94; should be renumbered & retagged, hole in root & at stem base, Dead 96
93.00	4														discovered 2/10/91; Dead 95
93.10	4														discovered 2/10/91; Dead 95
94.00	4														discovered 2/10/91; COD - unknown, dead 2/15/92
95.00	4														discovered 2/10/91; sickly 8/93; COD - grubs, dead 2/12/94
95.10	4														discovered 4/19/91; COD - unknown, dead 3/20/92
Stake 4A (R0227															
1.00	4A	0	Dead												green, good, discovered 5/99, plant collected by Bill Calvert, weevil larva, seedling accidentally uprooted, replaced 3/00; seedling and tag mia 5/00
2.00	4A											2.03	1	1A	discovered 3/03; green, good 3 & 5/03
3.00	4A											2.38	2	2	discovered 3/03; green, good 3 & 5/03
3.01	4A											1.19	0	0	discovered 3/03; green, good 3 & 5/03
3.02	4A											1.03	0	0	discovered 3/03; green, good 3 & 5/03
90.20	4A														weevil exit holes 2/98
Stake 6 = GPS4															
96.00	6														discovered 3/30/91; 1 seedling 4/94; fruit only half developed; hollow, uprooted 2/96

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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
96.10	6	6.15	222																3.10	5	2+2A	4.30	6	3+3A	mia			mia	
97.00	6	6.40	354	2.50	nd	3	2.70	2	0	3.00	2	2	3.50	2	2	3.20	2	Dead	Dead										
98.00	6	8.76	351	4.30		0	Dead																						
99.00	6	8.79	351	0.40	nd	0	0.80	0	0	0.90	0	0	1.60	0	0	2.30	1	0	Dead										
100.00	6	9.74	354	1.60	nd	0	1.70	0	0	1.90	0	0	2.00	0	0	2.90	4	1	Dead										
100.10	6	9.10	350													3.40	3	4	Dead										
101.00	6	8.11	356	3.20		4	Dead																						
101.10	6	7.63	354				1.00	0	0	1.30	0	0	1.90	0	0	3.00	3	3	Dead										
101.20	6	8.01	354				0.60	0	0	0.60	0	0	1.20	0	0	1.80	0	nd	Dead										
101.30	6	8.66	352				1.00	0	0	1.20	1	1	2.00	2	2	2.80	0	Dead	Dead										
101.31	6	8.56	354							0.80	0	0	1.20	0	0	1.60	0	0	1.00	0	Dead								
101.32	6	8.80	354							1.20	0	0	1.70	0	0	2.30	0	Dead	Dead										
101.33	6	8.94	354							1.10	0	0	1.60	0	0	1.70	1	0	Dead										
101.34	6	9.06	354							1.60	0	0	2.10	1	0	1.90	0	Dead	Dead										
101.35	6	7.75	350							1.40	0	0	1.80	0	0	2.20	0	0	Dead										
101.36	6	7.45	358													1.20	0	0	1.00	0	0	mia			mia			mia	
101.37	6	~7.44	358																0.70	0	0	mia			mia			mia	
101.40	6	9.08	354				2.50	0	0	3.40	4	3	4.40	5	5	3.60	1	0	Dead										
102.00	6	8.88	360	0.90	nd	nd	1.10	0	0	1.30	0	0	2.00	0	0	2.40	1	0	Dead										
102.10	6	8.88	360				0.90	0	0	1.20	0	0	1.90	0	0	2.00	0	Dead	Dead										
103.00	6	9.00	360	1.70		0	Dead																						
104.00	6	9.00	360	2.20	nd	3	2.30	1	1	3.00	3	0	4.00	6	6	3.90	6	5	Dead										
105.00	6	9.86	10	1.80	nd	0	2.60	1	1	2.40	1	0	3.00	2	2	3.90	3	4	Dead										
106.00	6	7.51	10	1.80		1	Dead																						
107.00	6	7.51	10	2.20		3	Dead																						
108.00	6	6.83	14	3.40	nd	4	nd	0	0	1.80	0	0	2.50	0	0	3.00	0	Dead	Dead										
108.10	6	7.22	15													1.50	0	0	Dead										
109.00	6	9.90	18	1.70	nd	0	1.80	0	0	1.40	0	0	1.60	0	0	mia			Dead										
110.00	6	9.24	19	2.20	nd	0	2.50	0	0	2.30	1	1	2.30	0	0	2.60	2	1	Dead										
110.10	6	5" from	110													0.80	0	0	0.80	0	0	mia			mia			mia	

Ancictrocactus tobuschii Data for
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PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
96.10	6		mia												1 fruit moved ~1 cm from plant 5/96, totally orange 8/96, purplish green, healthy, scar beneath a tubercle 3/97, plant mia 3 & 5/00
97.00	6														discovered 3/30/91, tubercles purplish 3/95, hollow 2/96
98.00	6														discovered 3/30/91, eaten ?/91, formed pup before death, COD - M, dead 3/20/92
99.00	6														discovered 3/30/91, hole at base 2/96
100.00	6														discovered 3/30/91, sickly 2/94, 1 fruit eaten & larval hole 5/95, only spines left 2/96
100.10	6														hollow 2/96
101.00	6														discovered 3/30/91, COD - unknown, dead 3/20/92
101.10	6														discovered 3/20/92, hollow 2/96
101.20	6														discovered 3/20/92, Dead 96
101.30	6														discovered 3/20/92, smallest diameter, flower & fruit production!!!, Dead 96
101.31	6														discovered 3/13/93, at 101.30, green, really hunkered 2/96, stem hollow, killed by grubs? 5/96
101.32	6														discovered 3/13/93, Dead 96
101.33	6														discovered 3/13/93, barely alive 5/95, Dead 96
101.34	6														discovered 3/13/93, Dead 96
101.35	6														discovered 3/13/93, rock atop 2/94, root hollow, no insects 2/96
101.36	6														hunkered down in rock 2/96, either 101.36 or 101.37 is missing or they are beside each other & indistinguishable 5/96, only one small spine cluster in vicinity 3/97, tag loose 2/98, 5/98, mia 97, 98, 99
101.37	6														hunkered down in rock 2/96, either 101.36 or 101.37 is missing or they are beside each other & indistinguishable 5/96, only one small spine cluster in vicinity 3/97
101.40	6														discovered 3/20/92, Auto-self Sp. 1993, Dead 96
102.00	6														discovered 3/30/91, Dead 96
102.10	6														discovered 3/20/92, not seen 8/93, Dead 96
103.00	6														discovered 3/30/91, COD - unknown, dead 2/15/92
104.00	6														discovered 3/30/91, damaged? 3/92, auto-slef sp. 1993, fruit 1/2 developed 5/95, Dead 96
105.00	6														discovered 3/30/91, 2 larvae collected, 2 seedlings at plant base 2/96, Dead 96
106.00	6														discovered 3/30.91, COD - unknown, dead 2/15/92
107.00	6														discovered 3/30/91, COD - unknown, dead 2/15/92
108.00	6														discovered 3/30/91, eaten 3/92, pup formed 2/93, sickly 2/95, only one spine cluster left 2/96
108.10	6														spines only 2/96
109.00	6														discovered 3/30/91, sickly 8/93, Dead 96
110.00	6														discovered 3/30/91, hollow, larvae gone? 2/96
110.10	6														mia 8/96, 97, 98, 99

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
111.00	6	10.00	21	2.70	nd	3	3.40	2	0	3.20	2	0	3.70	2	1	4.30	3	2	4.10	0	0	Dead							
111.10	6	10.00	21	2.70	nd	2	2.90	0	0	3.10	0	0	3.10	1	1	4.00	2	1	3.50	0	0	Dead							
111.20	6	6.17	26																			1.90	0	0	2.10	0	Dead		
111.30	6	6.21	26																			1.00	0	0	0.80	0	0	1.01	0
111.40	6	6.25	27																			1.30	0	0	1.50	0	Dead		
111.50	6	6.17	26																			0.70		0	mia	mia	Dead		
111.60	6	6.17	26																			0.70		0	1.10	0	0	0.71	0
113.00	6	8.62	22	1.50	nd	0	1.80	0	0	1.90	0	0	1.90	0	0	2.00	0	0	Dead										
113.10	6	8.95	15							2.20	1	1	2.40	1	1	4.60	5	3A	Dead										
113.11	6	8.95	15													2.30	2	0	Dead										
114.00	6	10.24	28	1.20	nd	0	1.70	0	0	1.50	0	0	1.90	0	0	Dead													
115.00	6	10.20	28	2.20	nd	1	2.60	1	1	2.40	0	0	3.40	1	1	3.70	1	mia	Dead										
116.00	6	10.06	29	2.40	nd	0	2.70	1	0	2.40	1	0	3.20	1	1	3.80	3	Dead	Dead										
116.10	6	11.60	58																			0.70	0	0	0.60	0	0	Dead	
116.20	6	11.70	57																			0.90	0	0	1.00	0	0	Dead	
116.30	6	11.80	58																			0.80	0	0	1.40	0	0	mia	
116.40	6	11.81	58																			1.20		0	1.40	0	0	Dead	
Stake 6A = R022722E																													
117.00	6A	12.78	246	1.60		0	2.40	0		2.70	0		3.70	3	0														
Stake 6B = GPS5 R022722G (under persimmon)																													
1.00	6B	-66.30	102																									3.81	4

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
111.00	6														discovered 3/30/91, pup with 111.1; plant orange 8/96; COD unknown, just spines left 3/97
111.10	6														discovered 3/30/91, pup with 111.00; just spines left 3/97
111.20	6														in seedling ring by salmon pin with blue dot 3/97; measured in one direction only 2/98; stem w/4 chambers, 2 exit holes, 2 dried & dead larvae 5/98
111.30	6	0	2.06	0	0	2.90	0	0	3.30	2	1+1A	dead			in seedling ring by green pin with orange & blue dots 3/97; measured in one direction only 2/98; green, good 3 & 5/00, 3 & 5/01, green, good 2 & 5/02, removed for weevil study 3/03; COD weevils 5/03
111.40	6														in seedling ring by green pin with blue dot, barely rooted 3/97; measured in one direction only 2/98; dead weevil inside stem 5/98
111.50	6														in seedling ring, ca. 10 mm from 111.60 & pin, discovered 5/97; solid & dry, COD unknown 5/98
111.60	6	Dead													in seedling ring by green pin with blue dot? or blue pin, discovered 5/97; measured in one direction only 2/98; COD unknown, collected by WHC 99
113.00	6														discovered 3/30/91, 2 larvae collected, Dead 96
113.10	6														discovered 3/13/93, hollow, larvae gone 2/96
113.11	6														pup of 113.11, 2/95; 1 more pup 5/95, hollow, larvae gone 2/96
114.00	6														discovered 3/30/91, sickly 2/94, Dead 95
115.00	6														discovered 3/30/91, tag missing, ground disturbed, one spine cluster left 2/96
116.00	6														discovered 3/30/91, Auto-self Sp. 1993, hollow 2/96
116.10	6														in seedling ring, not by a pin, in gravel, loosely rooted 3/97; measured in one direction only 2/98, killed by larva, collected 2/99
116.20	6														in seedling ring, not by a pin, in grass, loosely rooted 3/97, measured in one direction only 2/98; seed ring off, plant hollow, probably killed by weevils 2/99
116.30	6		mia			mia				mia?	mia				in seedling ring, ca. 20 mm from orange pin with blue dot, in grass 3/97, measured in one direction only, either two-headed or two plants 2/98; plant mia 99, 3 & 5/00, 3 & 5/01, 2 & 5/02
116.40	6														in seedling ring, ca. 50 mm from orange pin with blue dot, in grass 3/97, measured in one direction 2/98; slightly hollow, weevil? 2/99
Stake 6A = R02															
117.00	6A														discovered 3/30/91, may be pup? 2/93, needs tag 8/93; COD - M, dead 4/29/94
Stake 6B = GPS:															
1.00	6B	4	Dead												dull gray spines, body orangish & maroon, OK 5/99; COD unknown, collected by Bill Calvert 3/00

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
2.00	6B	-63.70	-104																									3.07	3
2.01	6B	63.53	106																										
118.00	6B	20.90	80	1.50	nd	0	2.50	0	0	2.90	2	0	3.80	2	2	2.10	0	0	2.10	0	Dead							
118.10	6B	23.59	114																										
118.20	6B	23.53	113																										
119.00	6B	15.73	103	1.20		0	1.70	0				Dead																	
120.00	6B	15.73	103	2.20		0	3.00	2	2	2.80	0	Dead																	
121.00	6B	15.73	103	2.00		0	2.60	0		2.30	0	Dead																	
122.00	6B	30.42	107	1.90		0	2.20	0		Dead						3.90	3	3	2.70	0	Dead								
123.00	6B	16.30	107	3.30		3	4.20	2		3.50	2	0																	
123.10	6B	15.67	108				3.70	4	4	3.20	2	0																	
123.20	6B	15.67	108				0.80	0		Dead																			
123.30	6B	15.67	108				0.70	0	0	0.60	0	0	mia	0	0	Dead													
123.40	6B	15.67	108				0.80	0	0	0.80	0	0	1.00	0	0	1.20	0	0	1.20	0	0	Dead							
123.50	6B	15.67	108				0.60	0	0	0.70	0	0	0.70	0	0	0.75	0	0	0.90	0	0	Dead							
123.60	6B	11.66	102																1.80	1	1	2.50	1	0	2.60	2	Dead		
124.00	6B	15.06	109	0.90		0	0.90	0		0.80	0		Dead																
124.10	6B	16.94	108				3.40	0		3.10	1	0																	
125.00	6B	15.06	109	0.90		0	Dead																						
126.00	6B	16.19	112	1.50		0	3.10	3	3	2.60	0	Dead																	
127.00	6B	16.19	112	0.70		0	1.20	0		1.10	0	Dead																	
128.00	6B	16.19	112	0.80		0	1.40	0		Dead																			
128.10	6B	16.19	112				1.00	0		0.90	0		Dead																
128.20	6B	16.19	112				0.90	0		0.80	0	Dead																	

Stake 7 = GPS6 R022723A

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.00	6B	3	3.90	3	3	mia			dead						green, good 5/99; a few tan tubercle tips, otherwise green and good 5/00; plant mia 3 & 5/01, dead, COD unknown, 2/02
2.01	6B					1.09		0	1.47	0	0	1.16	0	0	discovered 5/01; green, good, hunkered in Selaginella 5/01; green, OK, hunkered in 2/02, 3 & 5/03
118.00	6B														discovered 3/30/91; auto-self sp. 1993; weevil collected 5/96
118.10	6B					4.51	5	1+3A	4.26	0	dead				discovered 3/01; green, good 3 & 5/01; green, OK 2/02; weevil chambers and exit holes, weevil in soil below cactus, COD weevils 5/02
118.20	6B					2.45	0	0	1.65	0	dead				discovered 3/01; green, good 3 & 5/01; very hunkered, dead? 2/02, dead, COD unknown, collected for weevil study 5/02
119.00	6B														discovered 3/30/91; COD - grubs, dead 2/13/93, one weevil matured from carcass in field 4/30/93
120.00	6B														discovered 3/30/91; ants 2/93; COD - grubs, 4/30/93
121.00	6B														discovered 3/30/91; ants surrounding 2/93; COD - grubs, dead 4/30/93
122.00	6B														discovered 3/30/91, 1 fruit 1/2 size of others, nipped at top 5/95; looks dead 2/96; killed by grubs 5/96, according to R. Emmett's data - killed by grubs, 2/13/93
123.00	6B														discovered 3/30/91, 2 seedlings 3/92, pollination bag knowcked off, perhaps before flowering, completely senesced?; COD - grubs, dead 4/30/93
123.10	6B														discovered 3/21/92; COD - unknown, dead 8/19/93
123.20	6B														discovered 3/21/92; COD - unknown, dead 2/13/93
123.30	6B														discovered 3/21/92; not seen 8/93, 2/94; refound 4/94, Dead 95
123.40	6B														discovered 3/21/92; not seen 8/93; COD unknown, stem hollow, no insects 3/97
123.50	6B														discovered 3/21/92; not seen 8/93; sickly 2/95, COD unknown, stem hollow, no insects 3/97
123.60	6B														hollow with weevil exit holes 5/98
124.00	6B														discovered 3/30/91; COD - unknown, dead 2/12/94
124.10	6B														discovered 3/21/92; COD - grubs, dead 4/30/93
125.00	6B														discovered 3/30/91; COD - unknown, dead 3/20/92
126.00	6B														discovered 3/30/91; COD - unknown, dead 8/19/93, one seedling nearby 4/94
127.00	6B														discovered 3/30/91; COD - unknown, dead 8/19/93
128.00	6B														discovered 3/30/91; COD - grubs, dead 2/13/93, two weevils matured from carcass in lab 5/93
128.10	6B														discovered 3/20/92; COD - grubs, dead 2/12/94
128.20	6B														discovered 3/20/92; COD - unknown, dead 8/19/93
Stake 7 = GPS6															

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
1.00	7	23.10	280																										
2.00	7	4.40	231																										
3.00	7	~5.30	~126																										
4.00	7	~7.57	~133																										
129.00	7	2.07	241	2.20	nd	1	3.90	3	3	4.10	3	2	4.20	3	3	3.70	2	0	Dead										
129.10	7	3.54	210				2.10	nd	0	1.80	0	0	1.90	0	0	1.50	0	Dead	mia										
130.00	7	2.10	269	1.60	nd	0	2.30	1	1	2.50	1	0	2.50	2	2	2.40	1	0	1.80	0	0	2.30	0	0	Dead				
130.10	7	2.36	273																			1.10	0	0	1.20	0	nd	1.14	0
131.00	7	2.85	328	2.20	nd	1	3.00	2	0	3.00	2	2	3.10	1	1	4.00	3	3	3.60	4	2	Dead							
132.00	7	1.90	340	4.50	nd	4	4.90	3	1	4.20	1	1	4.20	0	0	Dead													
132.10	7	1.90	340													6.50		0	Dead										
132.20	7	1.90	340													3.80	0	0	Dead										
133.00	7	9.30	23	3.30	nd	3	3.10	1	1	3.30	2	1	3.80	3	3	3.30	0	0	Dead										
133.10	7	9.30	23	2.80	nd	1	2.80	0	0	3.00	1	1	3.40	3	3	2.50	0	0	Dead										
134.10	7	3.45	28	4.00		4	Dead																						
135.00	7	2.75	31	4.60	nd	3	4.70	5	5	4.10	1	0	3.30	0	0	2.80	0	Dead	Dead										
136.00	7	2.87	34	5.40		5	4.60	0	0	4.60	2	0	Dead																
137.00	7	3.15	45	1.70	nd	0	2.00	0	0	2.30	0	0	2.30	0	0	2.10	2	2	1.30	0	Dead								
138.00	7	5.72	45	3.70	nd	2	4.40	1	0	4.00	2	2	3.60	0	0	3.30	0	Dead	Dead										
138.10	7	6.31	42				4.60		3	4.40	2	0	4.60	3	2	3.00	0	Dead	Dead										
138.11	7	6.33	28							2.30	0	0	2.50	0	0	2.20	0	Dead	Dead										
138.20	7	7.03	42				3.30		3	3.30	1	1	3.10	1	0	3.00	0	0	Dead										
138.30	7	8.77	30				2.40		2	2.90	2	2	3.00	2	2	3.30	0	0	mia		mia	Dead							
138.40	7															3.10	0	0	Dead										

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.00	7					3.04	1	0	2.98	2	2	dead			discovered 3/01; green, good 3 & 5/01; one flower partly eaten, plant dull green, OK 2/02; green, OK 5/02; weevil chambers and exit hole, COD weevils 3/03
2.00	7					2.59	0	0	2.64	1	1	nd	0	0	discovered 3/01; hunkered in Selaginella, green, good 3 & 5/01, 2/02; green, OK 5/02; eaten below soil surface, dry, probably dead 3 & 5/03
3.00	7											2.29	0	0	discovered 3/03; measured around juniper-persimmon clump; green, good 3 & 5/03
4.00	7											2.12	2	1A	discovered 3/03; measured around juniper-persimmon clump; green, good 3 & 5/03
129.00	7														discovered 3/23/91; sickly 5/95; hollow 2/96
129.10	7														discovered 4/18/92, very sick 2/95; tag & flag mia also 2/96; Dead 5/96?
130.00	7														discovered 3/23/91; hunkered down in *Selaginella* 2/96; coming out of *Selaginella* 3/97; just spines left, COD unknown 2/98
130.10	7	0	1.35	0	0	1.68	0	0	1.79	1	0	1.88	1	0	discovered 3/97; measured in one direction only 2/98; plant & tag covered by rock 2/99; green, OK, hunkering 5/99, 3 & 5/00, 3/01; popping out, green, good 5/01, 2/02; green, OK 5/02, 3 & 5/03
131.00	7														discovered 3/23/91, rock atop, removed 3/20/92, very sick 8/93; 1 fruit ripped on top & ants swarming seeds 5/96; stem hollow with insect exit holes 3/97
132.00	7														discovered 3/23/91; Dead 95
132.10	7														Dead 96
132.20	7														uprooted 2/96
133.00	7														discovered 3/23/91; 2 seedlings 3/92; pup with 133.1; auto-self Spr. 1993; seedling 5/95; completely hollow 2/96
133.10	7														discovered 3/23/91; pup with 133.00; seedling 5/95; completely hollow 2/96
134.10	7														discovered 4/27/91; COD - unknown; dead 3/21/92
135.00	7														discovered 3/23/91; sickly 8/92; very sickly 8/93 & 2/94; very, very sickly 2/95; hollow 2/96
136.00	7														discovered 3/23/91, 9 seedlings 3/92; sickly 8/92, auto-self sp. '93, very sickly 8/93; 9 seedlings remain 2/94; COD - grubs, dead 2/12/94
137.00	7														discovered 3/23/91; hunkered down 2/96; killed by grubs 5/96
138.00	7														discovered 3/23/91; only spines left 2/96
138.10	7														discovered 4/17/92; auto-self sp. 1993; sickly 2/95; only spines left 2/96
138.11	7														discovered 3/13/93; only spines left 2/96
138.20	7														discovered 4/17/92; 2 unmapped seedlings 4/92; sick 2/93; seedlings tagged, needs tag 4/94; larval exit holes 2/96
138.30	7														discovered 4/17/92; not seen 8/92; tag mia also 2/96; COD unknown; only spines left 3/97
138.40	7														9.1 cm E of 138.11; hollow, larvae gone 2/96

Ancictrocactus tobuschii Data for
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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
139.00	7	3.65	55	4.20		3	4.80	2		4.70	2	2	Dead																
140.00	7	4.13	64	3.80	nd	2	3.60	1	1	3.30	1	1	3.00	0	0	3.00	0	Dead	mia										
140.10	7	3.80	66													1.40	0	0	1.10	0	mia	mia			mia			mia	
141.00	7	4.49	68	1.20	nd	0	2.20	1	0	2.40	1	1	nd	nd	nd	2.00	0	Dead	mia										
142.00	7	4.49	68	1.30	nd	0	2.30	0	0	2.30	1	1	2.40	0	0	1.90	0	Dead	mia										
143.00	7	4.49	68	1.20	nd	0	1.40	0	0	1.70	0	0	2.20	0	0	2.40	1	Dead	mia										
143.10	7	4.45	69	na			2.20	1	1	2.80	2	1	2.60	1	1	mia	mia	mia	mia			mia							
144.00	7	2.71	72	5.60	nd	7	5.30	2	1	5.50	0	0	4.70	0	0	4.20	0	0	3.00	0	Dead								
145.00	7	5.73	76	3.20		1	3.00	1	1	3.00	0	Dead																	
146.00	7	5.73	76	2.10	nd	1	2.10	0	0	2.00	0	0	1.80	0	0	1.70	0	0	1.70	0	0	1.70	0	0	1.90	1	0	1.84	1
147.00	7	5.73	76	1.30	nd	0	1.70	0	0	1.30	0	0	1.70	0	0	1.50	0	0	1.10	0	0	mia			mia			mia	
148.00	7	5.42	78	3.30	nd	1	3.60	1	0	3.50	2	2	3.40	0	0	3.60	0	0	2.80	0	0	Dead							
149.00	7	5.64	78	2.20		0	2.10	0		1.50	0	Dead																	
150.00	7	5.87	91	3.20		3	2.70	2	2	2.20	0	Dead																	
151.00	7	6.57	100	3.60		2	3.40	1	1	2.80	0	Dead																	
152.00	7	6.19	112	3.70	nd	1	4.10	1	0	3.70	0	0	3.70	0	0	Dead													
153.00	7	3.80	115																3.30		1	Dead							
Stake 8 = GPS7 R022723B																													
1.00	8	~47.75	~337																										
2.00	8	0.09	172																										
3.00	8	0.32	209																										

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
139.00	7														discovered 3/23/91, 57/71 seeds from 1992 CR fruits, plant nor tag seen 8/93; COD - unknown, dead 2/12/94
140.00	7														discovered 3/23/91, sick 8/92, very sick 8/93, Dead 95; tag mia also 2/96
140.10	7														ca. 1" from 140.00, mia 8/96, 97, 98, 99
141.00	7														discovered 3/23/91, mammal damage 8/93; pup from stump 4/94; no flag or tag 2/96, Dead 5/96?
142.00	7														discovered 3/23/91, needs tag 4/94, no flag nor tag 2/96, Dead 5/96?
143.00	7														discovered 3/23/91, needs tag 4/94, no flag nor tag 2/96, Dead 5/96?
143.10	7														discovered 3/21/92, fruit yellow at maturity 4/92, 4/94; mia 95; no flag nor tag 2/96; mia 97
144.00	7														discovered 3/23/91, needs tag 4/94, spines gray at base, tubercles still green, plant loose in soil 2/96; killed by larvae 5/96
145.00	7														discovered 3/23/91, fruit half eaten 4/18/92; plant damaged? but recovering 8/92; COD - M, dead 8/19/93
146.00	7	1	2.27	0	0	2.88	0	0	2.81	1	1	dead			discovered 3/23/91, one tubercle brownish-purple 3/97, dull green 5/97; hunkered down in Selaginella, dull green, OK 2 & 5/99, green, good 3 & 5/00, 3 & 5/01, green, good, flower bud had already opened 2/02, olive, OK 5/02, dry, solid, COD unknown 3/03
147.00	7														discovered 3/23/91, mia 8/96, mia 97, tag mia 2/98, tag relocated 5/98, tag almost covered by Selaginella 2/99
148.00	7														basal spines gray, tubercles, green 2/96; new spine growth, ants swarming, no fruits 5/96; stem hollow with insect exit holes 3/97
149.00	7														discovered 3/23/91, damaged/eaten?, pup forming ?/91, recovering 8/92, sickly 2/93; COD - unknown, dead 8/19/93
150.00	7														discovered 3/23/91, sickly appearance 3/92, 8/92, 2/93; COD - M, dead 8/19/93
151.00	7														discovered 3/23/91,4 seedlings 3/92, sickly 8/92, 2/93; COD -grubs, dead 8/19/93, 2 seedlings remain 4/94
152.00	7														discovered 3/23/91, 8 seedlings 3/92 & 2/94, 6 sick seedlings, parent grub-infested, 2/95; Dead 95
153.00	7														discovered 5/96, shrunk away from *Selaginella* 8/96; stem hollow with insect exit holes 3/97
Stake 8 = GPS7															
1.00	8											2.67	2	2	discovered 3/03; green, good 3 & 5/03
2.00	8											1.23	0	0	discovered 3/03; green, good 3 & 5/03
3.00	8											2.71	2	1+1A	discovered 3/03; green with some red tubercle tips, good 3 & 5/03

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
3.01	8	0.29	209																										
153.00	8	?	?	2.90		3	4.30	3	3	4.20	2	2	3.50	0	Dead														
154.00	8	13.88	264	3.90	nd	6	5.50	11	11	6.00	8	8	6.00	5	2	5.80	7	9	3.10	0	Dead								
155.00	8	5.53	55	2.20		0	2.90	1	1	3.10	2	1	Dead																
156.00	8	5.93	90	3.90		3	Dead																						
156.10	8	6.13	90				2.50	nd	0	2.50	1	1	2.40	0	0	Dead													
Stake 9 = GPS7 plant R022723C; reshot rebar R022319B in a cluster of prickly pear, Texas persimmon, juniper and agarita																													
1.00	9	~80.83	~259																									2.36	
2.00	9	~80.83	~259																										
3.00	9	~53.8	~259																										
4.00	9	~83.5	~260																										
5.00	9	~56.3	253																										
8.00	9	~82.90	~260																										
Stake 15 = GPS8 R022318B																													
157.00	15	8.01	132	4.40		2	4.70		4																				
157.10	15	7.61	132				3.40	nd	2	2.70	0	0	3.20	0	0	Dead													
158.00	15	4.47	132	3.50		0	3.20	2		3.40	0	Dead																	
158.10	15	4.47	132	3.10		0	3.10	0		3.20	0	Dead																	
158.20	15	4.47	132	2.70		0			0	3.10	0	Dead																	
161.00	15	8.80	134	3.30	nd	2	3.60	nd	3	3.10	2	1	3.20	2	nd	3.20	0	nd	2.60	3	1+1fl	3.20	3	Dead					
162.00	15	8.86	134	3.20		1	3.50	3	3	3.70	2	2	Dead																
163.00	15	4.73	138	3.30		1	4.00	1		3.60	2	2	Dead																
163.10	15	4.93	138				5.40		3	4.80	2	1																	
164.00	15	4.93	138	5.30		4	Dead																						
165.00	15	8.02	156	3.20		3	3.40		2	3.20	2	Dead																	
166.00	15	4.78	160	3.10	nd	1	3.00	2	2	3.00	0	0	3.10	2	0	1.70	0	Dead	Dead										

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
3.01	8											0.91	0	0	discovered 3/03; hunkered, green, OK 3 & 5/03
153.00	8														discovered 3/23/91; COD - grubs, dead 4/29/94
154.00	8														discovered 3/23/91; very light colored flowers 3/92, 2 fruit collected (68 & 61 seeds) 5/93; '93 seed germination 70% & 80%; only loose spines & hole left, spines scattered in a 1' radius 5/96
155.00	8														discovered 3/23/91; ant mound near 8/93; COD - M, dead 2/12/94
156.00	8														discovered 3/23/91; COD - grubs, dead 3/21/92
156.10	8														discovered 4/18/92, Dead 95
Stake 9 = GPS7															
1.00	9	1	mia			mia			mia						on old road , about midway down; orangish, OK 5/99; one spine cluster in vicinity, plant mia 3 & 5/00; 3 & 5/01; 2 & 5/02
2.00	9		1.26	0	0	1.76	0	0	2.02	0	0	dead			discovered 3/00; green, good 3 & 5/00; reddish-green, OK 3/01; pale reddish-green, poor 5/01; slightly reddish-green, OK 2/02; green, OK 5/02; large chamber and exit hole, COD Moneilema 3/03
3.00	9											2.60	2	2	discovered 3/03; olive, OK 3/03; green, good 5/03
4.00	9											3.00	4	4	discovered 3/03; green, good 3/03; green, OK 5/03
5.00	9											3.95	3	3	discovered 3/03; green, good 3 & 5/03
8.00	9											1.24		0	discovered 5/03; green, OK 5/03
Stake 15 = GPS8															
157.00	15														discovered 3/3/0/91; COD unknown, 8/12/92
157.10	15														discovered 4/17/92; appears damaged 4/92; pup forming 2/93; Dead 95
158.00	15														discovered 3/30/91; pup with 158.1 & 158.2; COD - grubs, dead 8/19/93
158.10	15														discovered 3/3/0/91; pup with 158.0 and 158.2; COD - grubs, dead 8/19/93
158.20	15														discovered 3/30/91; pup with 158.00 & 158.10; COD - grubs, dead 8/19/93
161.00	15														discovered 3/30/91; growing from under rock; orange & mushy inside; fruit not formed; tag & flag removed 5/97
162.00	15														discovered 3/3/0/91; two fruit, 53/30 seeds (42 avg) 4/92; sickly appearance 8/92; very sickly 8/93; COD - unknown, dead 2/12/94
163.00	15														discovered 3/30/91; COD - grubs, dead 2/12/94
163.10	15														discovered 4/17/92; COD - grubs, dead 8/19/93
164.00	15														discovered 3/30/91; COD - unknown, dead 2/29/92
165.00	15														discovered 3/30/91; partly eaten? ?/92; COD - M, dead 8/19/93
166.00	15														discovered 3/30/91; 2 fruit with 23 & 17 seeds 4/92; sick 8/92; very sick 8/93; looks dead 5/95; only spines left 2/96

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
167.00	15	4.56	164	1.60		0	1.90		0	2.10	1	0	Dead																
168.00	15	7.88	162	1.30		0	1.50		0	Dead																			
168.10	15	7.90	160							0.70	0		Dead																
169.00	15	4.22	176	1.70	nd	0	2.10	nd	0	2.10	0	0	2.60	1	0	mia			Dead										
170.00	15	4.55	175	2.10	nd	0	2.30	nd	1	2.20	1	0	2.30	0	0	mia	mia	mia	mia			mia							
171.00	15	6.66	172	1.60	nd	0	1.90	nd	0	1.90	0	0	2.10	1	0	mia	mia	mia	mia			mia							
171.10	15	6.69	172																										
171.20	15	6.71	173																										
172.00	15	6.88	170	1.10	nd	0	1.70	nd	0	1.90	0	0	nd	0	0	mia			Dead										
173.00	15	6.63	174	3.60		3	3.70	1		3.30	1	1	3.30	1	0														
173.10	15	6.77	172				0.60		0	0.60	0		Dead																
174.00	15	6.88	176	3.00	nd	3	nd	0	0	1.60	0	0	2.20	0	0	Dead													
175.00	15	7.86	172	2.30		1	3.20		2	Dead																			
176.00	15	10.45	171	5.20		9	Dead																						
177.00	15	9.85	174	2.40	nd	0	nd	0	0	1.90	1	1	2.30	1	0	Dead													
178.00	15	9.27	174	0.60	nd	0	1.90	nd	0	1.80	0	nd	nd	nd	0	Dead													
178.10	15	9.27	174				0.70	nd	0	mia		nd	0.80	0	0	0.80	0	0	1.40	0	Dead								
178.20	15	9.27	174				0.80	nd	0	1.10	0	0	1.80	0	0	Dead													
179.00	15	10.36	176	3.50		3		0		Dead																			
179.10	15	7.82	177				2.00		0	2.00	0	Dead																	
180.00	15	6.10	184	1.10	nd	0	1.60	nd	0	1.10	0	0	1.40	0	0	mia	mia	mia	mia			mia							
180.10	15	6.10	184	1.00	nd	0	1.30	nd	0	1.00	0	nd	0.90	0	nd	mia	mia	mia	mia			mia							
182.00	15	6.18	184	2.60		2	2.10		0	1.10	0	Dead																	
183.00	15	6.40	190	1.30	nd	0	1.50	nd	0	1.40	0	nd	1.40	0	nd	mia	mia	mia	mia			mia							
183.10	15	6.40	190	1.30		0	1.40		0	1.30	0		1.40	0	Dead														
185.00	15	11.45	186	1.20	nd	0	1.40	nd	0	1.80	0	nd	2.20	0	nd	Dead	Dead												
185.10	15	12.31	185				5.60		4																				

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
167.00	15														discovered 3/30/91; COD - unknown; dead 2/12/94
168.00	15														discovered 3/30/91; COD - uknown; dead 2/13/93
168.10	15														discovered 3/13/93; not seen 8/93; COD - unknown; dead 2/12/94
169.00	15														discovered 3/30/91; Dead 96
170.00	15														discovered 3/30/91; mia 95, 8/96, 97
171.00	15														discovered 3/30/91; not seen 8/93; mia 95; tag missing; tag & flag missing also 2/96; mia 97
171.10	15					1.39	0	0	1.59	0	0	1.28	0	0	possibly 171.00; discovered 3/01; hunkered, green, OK 2 & 5/01; reddish-green, OK 2/02; olive, OK 5/02; hunkered, green, OK 3/03; very hunkered, poor 5/03
171.20	15					1.04		0	1.33	0	0	1.16	0	0	discovered 5/01; green, OK 5/01, 2/02; olive, OK 5/02; hunkered, green, OK 3/03; green, good 5/03
172.00	15														discovered 3/30/91; not censused 2/94; refound 4/94; Dead 96
173.00	15														discovered 3/30/91; bag knowcked off after flowering senesc. 3/92 (OK); COD - grubs; dead 4/29/94
173.10	15														discovered 4/17/92; not seen 8/93; Cod - unknown; dead 2/12/94
174.00	15														discovered 3/30/91; eaten, pup forming 3/92; Dead 95
175.00	15														discovered 3/30/91; COD - grubs; dead 2/13/93
176.00	15														discovered 3/30/91; several fruit partially eaten 4/91; COD - M; dead 2/22/92
177.00	15														discovered 3/30/91; eaten, 2 pups forming 3/92; only 1 pup measured 2/93; Dead 95
178.00	15														discovered 3/30/91; pup from stump 3/91; not censused 2/94; refound 4/94; Dead 95
178.10	15														discovered 4/17/92; not seen in 1993; between 2 rocks 2/95; hollow, killed by larvae 5/96
178.20	15														discovered 4/17/92; Dead 95
179.00	15														discovered 3/30/91; eaten, 2 pups forming 3/92; COD - M; dead 2/13/93
179.10	15														discovered 4/17/92; COD - unknown; dead 8/19/93
180.00	15														discovered 3/30/91; pup with 180.1; mia 95, 8/96, 97
180.10	15														discovered 3/30/91; pup w/180.00 (formerly 181.00); mia 95 & 96; tag mia 3/97
182.00	15														discovered 3/30/91; damaged (stepped on?) 3/92; pup forming but sickly 8/92; COD - H; dead 8/19/93
183.00	15														discovered 3/30/91; pup with 183.1; 183.1 dead but 183.00 still alive 4/94; mia 95, 96, 97
183.10	15														discovered 3/30/91; pup with 183.00; COD - unknown; dead; 183.00 still alive 4/29/94
185.00	15														discovered 3/30/91; Dead 95
185.10	15														discovered 4/17/92; collected carcass (part still green), numerous seedlings around remnants; COD - gurbs; dead 8/12/92

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
186.00	15	11.10	192	3.10	nd	4	2.80	nd	2	3.10	2	2	3.20	1	nd	2.80	2	1+1A	2.30	2	0	Dead							
186.10	15	12.33	190																										
187.00	15	8.85	192	3.20		3	4.00		4																				
188.00	15	9.93	194	3.20		0	4.50		4																				
188.10	15	8.95	185							1.10	0	nd	1.60	0	nd	1.60	0	0	1.60	0	0	1.90	0	Dead					
189.00	15	9.82	195	3.30		0			Dead																				
189.10	15	9.82	195	3.00		0			Dead																				
189.20	15	9.82	195	0.40		0			Dead																				
190.00	15	10.24	198	4.40		5	Dead																						
190.10	15	13.64	198				4.90	nd	3	4.50	2	2	4.30	1	nd	4.30	2	2	4.20	3	2+1fl	Dead							
190.20	15	10.21	197																										
190.30	15	10.43	195																										
190.40	15	10.44	195																										
191.00	15	12.43	203	4.40		3	4.80		4																				
191.01	15	12.43	203	3.40		1	4.30		3																				
191.02	15	12.43	203	2.00		0	2.20		1																				
191.10	15	12.43	203				0.90	nd	0	0.90	0	nd	0.90	0	nd	1.70	0	0	2.30	0	0	2.30	0	Dead					
191.20 R.E.'s data	15	12.43	203				0.80		0																				
191.20	15	~12.44	~204																1.60		0	Dead?	0	Dead					
194.00	15	12.48	206	4.80	nd	7	4.80	5	3	5.10	4	4	4.70	3	nd	4.90	7	7	4.00	8	8	Dead							
194.01	15	12.48	206																			0.80	0	mia	mia			mia	
194.02	15	12.48	206																			0.40	0	mia	mia			mia	
194.03	15	12.48	206																			0.40	0	mia	mia			mia	
194.04	15	12.48	206																			0.40	0	mia	mia			mia	
194.10	15	12.66	204				2.40	nd	2	2.20	0	nd	2.60	1	nd	3.40	3	3	2.50	2	2	Dead							
194.20	15	12.20	200																										
195.00	15	9.87	264	4.30		5	Dead																						
195.10	15	9.87	264				2.00		Dead																				
196.00	15	9.87	264	3.70		4	Dead																						

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
186.00	15														discovered 3/30/91, COD unknown, stem hollow inside & filled with granular substance 3/97
186.10	15											3.22	3	2+1A	discovered 3/03; purplish green, good 3/03; looks dead 5/03
187.00	15														discovered 3/30/91, plant dug and eaten, COD - M, dead 8/12/92
188.00	15														discovered 3/30/91, two fruits 26/72 seeds 4/92, plant duag and partly eaten, collected remains, COD - M, dead 8/12/92
188.10	15														discovered 3/13/93, COD unknown, stem hollow 5/97
189.00	15														discovered 3/30/91, pup with 189.1 and 189.2, COD - M, 4/17/92
189.10	15														discovered 3/30/91, pup with 189.00 & 189.20, COD - M, dead 4/17/92
189.20	15														discovered 3/30/91, pup with 189.00 & 189.10, COD - M, dead 4/17/92
190.00	15														discovered 3/30/91, COD - grubs, dead 2/22/92
190.10	15														discovered 4/17/92; 3 seedlings 4/92, 2 seedlings 2/95, seedlings mia 2/96, COD unknown, stem hollow, filled with yellow granular matter 3/97
190.20	15											2.98	2	2	discovered 3/03; in grass clump; green, good 3 & 5/03
190.30	15											1.70	0	0	discovered 3/03; green, good 3 & 5/03
190.40	15											1.56	0	0	discovered 3/03; green, good 3 & 5/03
191.00	15														discovered 3/30/91, pup with 191.01 and 191.02, COD - unknown, dead 8/12/92
191.01	15														discovered 3/30/91, pup with 191.00 & 191.02, COD - unknown, dead 8/12/92
191.02	15														discovered 3/30/91, pup with 191.00 & 191.01, COD - unknown, dead 8/12/92
191.10	15														discovered 4/17/92, not seen 8/93, COD unknown, stem tissue solid but granular 5/97
191.20 R.E.'s data	15														discovered 4/17/92, new seedling near tag and remains, COD - unknown, dead 8/12/92
191.20	15														discovered 5/96; looks dead, but check again 3/97, COD unknown, only loose spines left 5/97
194.00	15														discovered 3/30/91,1 seedling at base by tag 5/96, COD unknown, only spines left 3/97
194.01	15														discovered 3/97, mia 5/97, 98, one tag for all, uprooted & chewed, nail mia 2/99
194.02	15														discovered 3/97, mia 5/97, 98, 99
194.03	15														discovered 3/97; uprooted with parent, replanted 3/97, mia 5/97, 98, 99
194.04	15														discovered 3/97; green pup off similar size stem 3/97, mia 5/97, 98, 99
194.10	15														discovered 4/17/92, COD unknown, small hole, perhaps weevil exit hole 3/97
194.20	15					2.48	0	0	2.50	2	1+1A	2.87	2	1+1A	discovered 3/01; green, good 3 & 5/01, 2/02; green, good 5/02 & 3/03; green, OK 5/03
195.00	15														discovered 3/30/91, COD - grubs, dead 2/22/92
195.10	15														discovered 2/22/92; needs tag; not seen, COD - unknown, dead 8/12/92
196.00	15														discovered 3/30/91, COD - grubs, dead 2/22/92

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
197.00	15	9.87	264	2.20	nd	1	1.90	nd	0	2.00	1	1	2.10	0	nd	2.10	0	1	1.90	1	disp	Dead							
197.01	15	~9.84	~264																1.00		0	1.20	0	0	Dead				
197.02	15	10.05	265																			1.30	0	0	mia			mia	
197.03	15	10.07	265																			3.60	4	2+1A	Dead				
197.04	15	9.96	267																										
197.05	15	10.00	266																										
197.06	15	9.89	266																										
197.10	15	6.45	265							2.00	0	0	nd	0	0	1.50	0	0	1.60	0	0	3.00	0	0	Dead				
197.20	15	6.45	265													2.00	0	0	2.30	2	0	2.20	0	0	2.10	1	nd	Dead	
198.00	15	12.53	261	3.60		4	4.30	4		3.50	0	Dead																	
198.01	15	12.53	261	2.20		2	2.50	1	1	2.50	0	Dead																	
198.02	15	12.53	261	2.20		1	2.50	1	1	2.00	1	0																	
198.03	15	12.53	261	1.60		0	2.20	0		1.70	0	Dead																	
198.10	15	16.59	260				3.70		2	2.70	0	Dead																	
198.20	15	15.25	256				2.00		0	Dead																			
202.00	15	13	263	4.60		8	4.80		3																				
202.10	15	9.95	264				2.20		0	Dead																			
202.20	15	9.95	264				1.60	nd	0	1.60	0	0	1.90	0	nd	1.90	0	0	1.70	2	disp	2.20	1	0	mia			mia	
202.30	15	13.34	265													2.50	2	2	2.10	0	0	Dead							
203.00	15	13.28	262	3.20		2	3.20		2	2.20	0	Dead																	
203.01	15	?	?							0.70	0	nd	0.80	0	nd	1.10	0	0	0.80	0	0	mia			mia			mia	
203.10	15	13.83	276				4.10	nd	4	3.70	3	3	4.60	3	nd	5.60	9	6	4.80	5	4+4A	Dead							
203.11	15	14.05	282													2.50	2	2	1.90	1	1A	mia			mia			mia	
203.12	15	14.74	280													1.80	0	0	1.60	1	1	Dead							
203.20	15	13.37	274				3.70	nd	3	2.80	0	nd	3.40	3	3	3.00	0	0	3.20	4	3+1A	Dead							
203.21	15	13.37	274															0	1.20	0	0	Dead							
203.211	15	13.37	274																			1.30		0	Dead				
203.22	15	13.37	274																1.40		0	1.30	0	Dead					
203.30	15	13.23	274				1.00	nd	0	1.00	0	nd	1.00	0	nd	mia		0	1.50	0	0	2.10	1	0	1.90	0	0	1.20	0

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
197.00	15														discovered 3/30/91, eaten, pup forming 3/92, sick 8/92 & 8/93, very sick 2/95, much better 2/96, COD unknown, only spines left 3/97
197.01	15														found 5/96, base of grass clump 3/97, just spines left, COD unknown 2/98
197.02	15		mia			mia			mia						discovered 3/97, tag & nail loose 2/99, plant mia 3 & 5/00, 3 & 5/01, 2 & 5/02
197.03	15														discovered 3/97, hollow, just spines left, weevils? 2/98
197.04	15					2.57		0	dead						discovered 5/01, green, good 5/01, dead, dry, corky inside, COD unknown 2/02
197.05	15					2.56		0	2.50	5	mia	mia			discovered 5/01; green, OK 5/01; green, good 2/02; plant mia 5/02, 3 & 5/03
197.06	15											1.23	0	0	discovered 3/03; green, OK 3 & 5/03
197.10	15														discovered 3/13/93, partly eaten 2/94, 2 pups forming 4/94, a few spines left, COD unknown 2/98
197.20	15														small larva inside, larva killed by calipers 2/99
198.00	15														discovered 3/30/91, pup with 198.01, 198.02, 198.03, COD - grubs, dead 4/30/93
198.01	15														discovered 3/30/91, pup with 198.00, 198.02, & 198.03; COD - grubs, dead 4/30/93
198.02	15														discovered 3/30/91, pup with 198.00, 198.01, & 198.03; COD - grubs, dead 4/30/93
198.03	15														discovered 3/30/91, pup with 198.00, 198.01, & 198.02, COD - grubs, dead 4/30/93
198.10	15														discovered 4/17/92, sickly appearance 8/92, 2/93, COD - grubs, dead 4/30/93
198.20	15														discovered 4/17/92, sickly 8/93, not seen 3 & 8/93, COD - unknown, dead 2/13/93
202.00	15														discovered 3/30/91, collected carcass, containing lots of seeds, COD - unknown, dead 8/12/92
202.10	15														discovered 4/17/92, COD - grubs, dead 2/13/93
202.20	15		mia												discovered 4/17/92, plant mia 98, 99, and 2000
202.30	15														in rock, COD unknown, stem hollow, no insects 3/97
203.00	15														discovered 3/30/91, sickly 2/93, COD - grubs, dead 4/30/93
203.01	15														55 cm W of 203.00, base of grass clump, mia 8/96, tag & flag also mia, mia 97, 98, 99
203.10	15														discovered 4/17/92, COD unknown, stem solid 3/97
203.11	15														very loose in soil, green, 1 seedling underneath 2/96, Dead 8/96, hole in stem, no insects, seedling still alive, seedling mia 3 & 5/97, 98, 99
203.12	15														in solution pocket in rock, COD unknown, drought?, stem solid 3/97
203.20	15														discovered 4/17/92, 5 seedlings 4/92, seedling by tag 5/95, numbered as 203.21 2/96, COD unknown, stem hollow, no insects 3/97
203.21	15														discovered 5/95, COD unknown, stem hollow, no insects 3/97
203.211	15														seedling or pup of 203.21, discovered 5/97, just spines left, COD unknown 2/98
203.22	15														discovered 5/96, stem hollow, with weevil holes 3/97
203.30	15	Dead													discovered 4/17/92, not seen 8/92, refound 5/95, looks poor, yellow green 2/99, COD unknown, collected by WHC 5/99

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
203.40	15	13.00	297				2.60	nd	nd	2.70	0	0	2.70	0	nd	2.60	0	0	2.20	2	mia	Dead							
203.41	15	13.51	297																0.50		1								
204.00	15	13.51	297	4.50	nd	6	4.50	7	5	4.60	6	6	3.90	2	nd	4.20	5	1A	Dead										
204.10	15	13.66	297																0.80		0	0.90	0	Dead					
204.20	15	13.67	297														0.6					0.50	0	0	0.70	0	0	0.61	mia
205.00	15	13.67	296	2.90		4	2.90		4	2.60	1	1	3.30	0	nd	2.60	2	2	2.30	4	1	Dead							
205.10	15	11.92	312				2.30	nd	1	2.50	2	nd	3.00	2	nd	3.40	4	4	2.80	2	2	Dead							
206.00	15	11.20	319													3.00	3	1+1S	1.50	0	Dead							
206.10	15	12.02	321																2.10	2	1	Dead							
206.20	15	9.94	328				3.70	4	2	4.10	3	3											0		2.10		Dead		
206.30	15	10.38	328																									0.66	
206.31	15	10.40	328																									0.81	
207.00	15	13.22	332																										
208.00	15	12.17	335																										
Stake 0A = R022722C; nothing, no live plants																													
206.00	0A	0.70	155	4.70		4	Dead																						
206.10	0A	1.23	335				3.60	2	2																				
206.20	0A	2.26	275				3.70					Dead																	
206.30	0A	2.90	240				2.90	3	2	2.60	1	1	Dead																
206.31	0A	2.90	240				2.00	0		1.80	0		Dead																

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
203.40	15														discovered 4/17/92; recently dead plant nearby (actually closer to 205 & 204.1), not hollow, no insects 5/96; relocated 8/96, COD unknown, stem hollow, no insects 3/97
203.41	15														found 5/96, Dead, tag removed, cause of death unknown 8/96
204.00	15														discovered 3/30/91, 3 self fruit, 50/0/1 seeds (17 average) 4/92; also collected unmanipulated fruit with 37 seeds 4/92; damaged & sick 8/92, 2 yellow & black-spotted beetles feeding on tepals 2/20/93; very sick 8/93; stem hollow, weevils gone 2/96
204.10	15														smaller seedling (204.20) below 8/96; in grass clump, very loosely rooted 3/97; stem hollow, weevil larvae collected 5/97
204.20	15	0	0.70	0	0	mia			mia			mia			discovered 3/97; measured in one direction only 2/98; pl mia 2/99; hunkered, green, good 5/99 & 3/00; very hunkered, green, OK 5/00; plant mia 3 & 5/01, 2 & 5/02, 3 & 5/03
205.00	15														discovered 3/30/91, COD unknown, stem hollow, no insects 3/97
205.10	15														found 4/17/92; needs tag, very sick 8/93; COD unknown, stem filled with granular material 3/97
206.00	15														looks dead but firmly rooted 2/96; dead, killed by weevils 8/96
206.10	15														COD unknown, stem filled with granular material 3/97
206.20	15														discovered 2/98; may have grub 4/18/92; ants surrounding 2/93, dug and eaten... maybe after grub??? 8/93; hollow with weevil exit hole 5/98
206.30	15	0	0.68	0	0	1.02	0	0	0.55	0	0	1.83	0	0	right beside orange pin with blue dot, in seed ring, discovered 5/99; one measurement only, hunkered, green, OK 3 & 5/00; very hunkered, green, OK 3/01; popping out green, OK 5/01; green, OK 2/02, green, OK 5/02; green, good 3 & 5/03
206.31	15	0	0.83	0	0	1.41	0	0	1.35	0	0	3.26	4	3	~1cm from orange pin w/ blue dot in seed ring, discovered 5/99; one measurement only, hunkered, green, OK 3 & 5/00; green, OK 3/01; green, good 5/01; green, good, 2/02, green, good 5/02; purple, good 3/03; green, OK 5/03
207.00	15					2.25		0	1.86	1	dead				discovered 5/01, green, good 5/01, hunkered, 2/02, dead, COD fungus 5/02
208.00	15					1.85		0	1.06	0	dead				discovered 5/01, popping out of crustose lichen, green, good 5/01, very hunkered 2/02, hollow, COD weevils 5/02
Stake 0A = R022															
206.00	0A														discovered 4/27/91, COD - grubs, dead 3/20/92
206.10	0A														discovered 3/20/92, signs of grub infestation 4/18/92, collected carcass with seeds, COD - grubs, dead 8/12/92
206.20	0A														discovered 3/20/92, COD - M, dead 8/19/93
206.30	0A														discovered 3/20/92, pup with 206.31, COD - unknown, dead 2/12/94
206.31	0A														discovered 3/20/92, pup with 206.30, COD - unknown, dead 2/12/94

Ancictrocactus tobuschii Data for
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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
206.40	0A	4.95	250				1.40	0		1.40	0	Dead																	
207.00	0A	0.70	155	3.50			Dead																						
208.00	0A	1.00	153				3.80	0	Dead																				
208.10	0A	1.00	153				3.30	0	Dead																				
209.00	0A	0.82	150	3.60		0	3.00	1	0																				
209.10	0A	0.82	150				0.70	0	Dead																				
210.00	0A	0.92	143			1	1.50	0	Dead																				
211.00	0A	0.93	148	3.70					Dead																				
212.00	0A	0.97	124	3.80		6			Dead																				
213.00	0A	2.32	112	1.50	nd	0	1.90	0	nd	1.90	0	nd	2.30	1	1	2.50	1	0	1.50	0	Dead								
214.00	0A	2.40	99	4.90		5			Dead																				
215.00	0A	2.51	88	3.00		2			Dead																				
216.00	0A	2.95	71	1.10		0	1.60	0	Dead																				
217.00	0A	1.86	62	4.00		3	4.50	2	1																				
218.00	0A	1.86	62	2.50		1	2.80	2	1																				
219.00	0A	1.86	62	2.70	nd	0	2.80	2	2	2.00	0	nd	2.40	2	1	Dead		0											
220.00	0A	1.86	62	3.10		3	3.60	2	2																				
221.00	0A	1.86	62	3.10		3	4.00	4	4																				
222.00	0A	5.20	53	2.40	nd	0	2.30	1	1	2.40	0	nd	2.00	0	nd	1.80	0	nd	1.50	0	Dead								
223.00	0A	8.53	109	3.90		3	4.60	5	4	4.60	5	5																	
Stake 16 = GPS9 R022721A																													
223.00	16	4.22	120																2.70		0	2.80	0	0	nd	0	0	1.56	
224.00	16	4.35	120																3.20		0	4.40	5	3	5.40	6	4+1A	3.94	
Plot 17 stake = R022720C; 0.3 mi from the road junction																													
	15 dead Ancistrocactus tobuschii were observed within this plot in 5/97, and one weevil was collected.																												
1.00	17	5.36	356																			0.90		0	1.10	0	0	Dead	

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
206.40	0A														discovered 3/20/92; dug and eaten... check to see if pups, COD - M, dead 8/19/93
207.00	0A														discovered 4/27/91; fruit eaten by animal 91, COD - grubs, dead 3/20/92
208.00	0A														discovered 4/27/91; pup with 208.1, fruit apparently eaten by animal 91, COD - grubs, dead 4/18/92
208.10	0A														discovered 4/27/91; pup with 208.00, COD - grubs, dead 4/18/92
209.00	0A														discovered 4/27/91; grub infestation apparent 4/92, COD - grubs, dead 8/12/92
209.10	0A														discovered 3/20/92, COD - grubs, dead 4/18/92
210.00	0A														discovered 4/27/91, partly eaten 4/18?, COD - grubs, dead 8/12/92
211.00	0A														discovered 4/27/91; fruit eaten by animal 91, COD - unknown, dead 3/20/92
212.00	0A														discovered 4/27/91, COD - unknown, dead 3/20/92
213.00	0A														discovered 4/27/91; hunkered down 2 & 5/96; looks dead 5/95; just spines left, dead 8/96
214.00	0A														discovered 4/27/91, COD - unknown, dead 3/20/92
215.00	0A														discovered 4/27/91; COD - unknown, dead 3/20/92
216.00	0A														discovered 4/27/91; COD - grubs, dead 8/12/92
217.00	0A														discovered 4/27/92, COD - grubs, dead 8/12/92
218.00	0A														discovered 4/27/91; collected carcass, COD - grubs, dead 8/12/92
219.00	0A														discovered 4/27/91; new pup from stump 2/93; needs tag 4/94, Dead 95
220.00	0A														discovered 4/27/91; COD - grubs, dead 8/12/92
221.00	0A														discovered 4/27/91; COD - grubs, dead 8/12/92
222.00	0A														discovered 4/27/91; hunkered down 2 & 5/96; tem hollow in center, but no insects, dead 8/96
223.00	0A														discovered 4/27/91; damaged? But recovering 8/92, COD - M, dead 7/15/93
Stake 16 = GPS															
223.00	16	0	2.51	2	2A	mia			mia			mia			found 5/96, eaten or run over, only one tubercle left 2/98; new spine growth 5/98; hunkered down, green, good 2/99, 5/99 & 3/00; tubercle tips slightly purplish, otherwise green, OK 5/00, plant mia 3 & 5/01, 2 & 5/02, 3 & 5/03
224.00	16	0	mia			mia			dead						found 5/96; dull green 5/97, bright green 2/98; hunkered down 5/98 & 2/99, visited by 2 honeybees; top totally eaten off 5/99; plant mia 3 & 5/00, 3 & 5/01; root relocated, dead, weevil exit holes, COD weevils 2/02
Plot 17 stake = F															
	15 dead														
1.00	17														measured in one direction only 2/98; dry & solid, COD unknown 2/99

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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
2.00	17	1.37	65																			2.60		0	Dead				
3.00	17	9.46	68																			2.60		1A	Dead				
4.00	17	7.40	72																			1.6,0.9		0	2.00	0	0	0.80	0
5.00	17	7.46	72																			1.00		0	1.30	0	Dead		
6.00	17	6.94	75																			0.90		0	Dead				
7.00	17	3.33	284																			2.10		0	1.10	0	Dead		
8.00	17	2.75	288																			1.00		0	Dead				
9.00	17	2.81	292																			2.60		0	Dead				
Stake 18 is 0.2 miles from the road junction. Stake 18 = R022720B; no live plants																													
	One dead Ancistrocactus tobuschii found within the plot in 5/97																												
1.00	18	14.44	79																			1.50		0	1.40	0	Dead		
2.00	18	14.45	79																			2.30		0	Dead				
3.00	18	14.35	79																			2.50		0	Dead				
4.00	18	14.35	80																			2.30		0	Dead				
4.10	18	14.40	81																										
5.00	18	11.19	274																			3.30		0	2.50	0	0	Dead	
6.00	18	12.14	277																			3.90		2+2A	Dead				
6.01	18	12.09	277																			0.90		0	Dead				
6.02	18	12.13	277																			0.60		0	Dead				
6.03	18	12.10	277																			1.00		0	Dead				
6.04	18	12.11	277																			0.60		0	Dead				
6.05	18	12.14	277																			0.60		0	Dead				
Plot 19 has no stake. R022720A. The plant is in a shin oak grove across from some old barb wire, 0.1 mi straight from road																													
	junction, ca 0.5 m W of prickly pear.																												
19.00	19	nd	nd																			4.30		4+2A	4.80	4	3+1A	4.11	1
Plot 20 stake = R022716A; 0.2 miles left from road intersection. Four dead TFC were found within the plot when it was established in 5/97.																													
1.00	20	72.39	133																			2.30		3A	Dead				

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.00	17														between rocks, a little reddish 5/97, hollow, weevils? 2/98
3.00	17														very squishy & loose, green 5/97, hollow, weevils? 2/98
4.00	17	Dead													two-headed plant in rock 5/97, measured as one 2/98, two separate plants, one dead (not hollow), other green, OK 2/99; no weevil evidence, COD unknown, WHC collected 5/99
5.00	17														in rock, measured in one direction only 2/98; hollow with exit holes 5/98
6.00	17														in rock, just spines, COD unknown 2/98
7.00	17														measured in one direction only 2/98, hard and solid, COD unknown 5/98
8.00	17														in rock, tag chewed and uprooted, plant hard and dry, COD unknown 2/98
9.00	17														in rock, tag chewed and uprooted, plant hard and dry, COD unknown 2/98
Stake 18 is 0.2 m															
	One de														
1.00	18														measured in one direction only, bad, tightly rooted 2/98; hollow with weevil exit hole 5/98
2.00	18														one larva collected 2/98
3.00	18														just spines, COD unknown 2/98
4.00	18														exit holes 2/98
4.10	18					2.51	0	0	dead						discovered 3/01, green, good 3 & 5/01; dead, weevil chamber, COD weevils 2/02
5.00	18														between rocks, loose spines, somehow damaged, green, with new growth 5/97, green, OK 5/98; hollow with weevil chambers 2/99
6.00	18														tubercle tips red 5/97, COD unknown 2/98
6.01	18														root exposed, barely rooted 5/97; COD unknown 2/98
6.02	18														barely rooted, root out of ground 5/97; COD unknown 2/98
6.03	18														to the right of 6.04 and 6.05; COD unknown 2/98
6.04	18														between 6.03 and 6.05; COD unknown 2/98
6.05	18														to the left of 6.03 and 6.04; COD unknown 2/98
Plot 19 has no st															
	junction														
19.00	19	1	4.64	1+2fr	3	dead									green, good 5/99, 3 & 5/00; chambers and galleries, COD weevils 3/01
Plot 20 stake = F															
1.00	20														reddish 5/97; larva collected 2/98

Ancictrocactus tobuschii Data for
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PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
2.00	20	72.80	133																			1.20		0	mia			2.04	mia
3.00	20	72.78	133																			1.80		0	mia	mia	Dead		
3.10	20	72.76	135																										
3.20	20	72.77	134																										
4.00	20	73.02	133																			2.10		0	2.70	0	0	2.70	1
5.00	20	73.01	133																			2.10		0	2.80	0	0	2.78	1+2fr
6.00	20	72.80	133																			2.50		1	1.90	0	0	1.79	0
7.00	20	7.69	189																			2.60		0	2.10	0	Dead		
8.00	20	7.74	190																			1.30		0	1.40	0	0	1.89	mia
9.00	20	7.82	190																			0.90		0	Dead				
10.00	20	51.15	175																			2.60		0	Dead				
11.00	20	51.20	175																			1.60		0	Dead				
12.00	20	51.58	174																			1.50		0	1.20	0	0	mia	
13.00	20	51.65	173																			2.10		0	Dead				
14.00	20	51.70	173																			2.50		0	1.90	0	Dead		
15.00	20	23.77	254																			1.90		0	1.50	0	mia	mia	
16.00	20	23.90	254																			3.90		1	2.60	0	Dead		
16.01	20	23.92	254																			0.50		0	mia			mia	
17.00	20	13.65	258																			0.70		0	0.80	0	Dead		
18.00	20	13.71	258																			1.30		0	Dead				
19.00	20	13.73	258																			1.80		0	Dead				

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.00	20	0	1.50	0	0	mia			mia			mia			green, good 5/99; almost totally buried, only spines out, covered by ant litter, green, OK 3/00; no litter, very hunkered, may be dead 5/00; plant mia 3 & 5/01; tag and plant mia 2 & 5/02; 3 & 5/03
3.00	20														tag & plant mia 2/98; plant found, hollow, with weevil exit holes 5/98
3.10	20					0.45		0	mia			mia			discovered 5/01; uprooted, replaced, green, OK 5/01; plant and tag mia 2 & 5/02, 3 & 5/03
3.20	20					0.72		0	0.73	0	0	1.06	0	0	discovered 5/01; green, good 5/01; olive, OK 2/02; tag mia, replaced, green, good 5/02; popping out of soil, green, good 3/03; hunkered, green, OK 5/03
4.00	20	1	3.02	0	0	mia			dead						Plants 4.00 & 5.00 may represent two heads of one plant; right of 5; green, good 5/99; covered by ant litter except spines, green, OK 3/00; litter gone, reddish-green, hunkered, OK 5/00, plant mia 3 & 5/01, relocated, dead, just spines left, COD ants 2/02
5.00	20	2+1A		0	0	mia			dead						Plants 4.00 & 5.00 may represent two heads of one plant; left of 4; green, good 5/99; covered by ant litter, except spines, green, OK 3/00; litter gone, reddish-green, hunkered, OK 5/00; tag loose, replaced, plant mia 3 & 5/01; relocated, dead, COD ants 2/02
6.00	20	0	Dead												in grass clump; covered with dirt and duff 2/98; new spine growth 5/98, green, good 2 & 5/99; weevil larvae, collected by Bill Calvert
7.00	20														turning reddish, spines gray 2/98; hollow with weevil exit holes 5/98
8.00	20	0	mia			dead									measured in one direction only 2/98, loose spines in area and lots of tossed around rocks 2/99; under rock, green, good 5/99, plant mia 3 & 5/00, relocated but dead, just spines, COD unknown 3/01
9.00	20														root exposed, barely rooted 5/97; COD unknown 2/98
10.00	20														center of stem eaten, two tubercles resprouting spines, plant reddish 5/97; COD unknown 2/98
11.00	20														severely damaged, three tubercles resprouting spines 5/97; COD unknown 2/98
12.00	20		mia			mia			mia						center of stem eaten, one tubercle resprouting spines 5/97; measured in one direction only, may be a seedling, mia 99, plant mia 3 & 5/00, 3 & 5/01, 2/02
13.00	20														center of stem eaten, two tubercles resprouting spines 5/97; COD unknown 98
14.00	20														edge of grass clump; spines gray 2/98; hollow with weevil exit holes 5/98
15.00	20		mia			mia			mia						looks bad, covered with dirt 2/98; mia 5/98, 2/99, 5/99, 3/00 & 5/00, 3 & 5/01, 2/02
16.00	20														bad, collapsed, mushy, loose spines 2/98; hollow with weevil exit holes 5/98
16.01	20		mia			mia			mia						seedling of 16.00; plant & tag mia 2/99, 5/99, 3/00 & 5/00, 3 & 5/01, 2/02
17.00	20														solid and dry, COD unknown 2/98
18.00	20														COD unknown 2/98
19.00	20														COD unknown 2/98

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
20.00	20	11.43	257																			1.90		0	1.60	0	0	Dead	
21.00	20	11.38	257																			1.00		0	1.50	0	0	mia	mia
22.00	20	11.64	257																			3.40		0	0.70	0	Dead		
22.01	20	11.64	257																			1.10		0	0.90	0	0	Dead	
22.10	20	12.86	256																										
22.20	20	13.00	258																										
22.30	20	12.83	261																										
23.00	20	11.50	258																			1.70		0	1.80	0	0	Dead	
23.10	20	35.05	258																						1.30	0	0	1.29	C
23.20	20	34.15	258																										
24.00	20	33.18	266																			1.60		0	Dead				
25.00	20	32.95	267																			2.00		1A	2.40	0	0	1.99	C
26.00	20	33.12	267																			1.20		0	mia			Dead	
27.00	20	33.29	268																			1.20		0	1.30	0	0	0.95	C
28.00	20	33.77	267																			3.30		1A	mia			Dead	
28.01	20	33.79	267																			0.80		0	Dead				
28.02	20	33.88	267																			0.90		0	1.30	0	0	mia	
29.00	20	33.86	266																			0.60		0	1.00	0	0	0.71	C
30.00	20	33.25	268																			0.50		0	0.40	mia	0	0.61	C
31.00	20	22.84	295																			1.10		0	Dead				
32.00	20	22.83	310																			1.80		0	mia			mia	
33.00	20	22.77	311																			0.70		0	Dead				
34.00	20	35.89	335																			1.40		0	Dead				
35.00	20	35.86	335																			0.90		0	Dead				

Ancictrocactus tobuschii Data for Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
20.00	20														edge of rock; measured in one direction only 2/98; body dry & solid, COD unknown 2/99
21.00	20	Dead													measured in one direction only 2/98; just spines left, COD unknown 5/98
22.00	20														in rock, center of stem eaten, many loose spines 5/97; only a tubercle, measured in one direction only 2/98; only spines left, COD unknown 5/98
22.01	20														in rock, seedling of 22.00; measured in one direction only 2/98; just spines left, COD unknown 2/99
22.10	20								4.30	7	2+3A	5.79	10	8+3A	disc 2/02; green, good 2 & 5/02, 3 & 5/03
22.20	20								1.27	0	0	1.27	0	0	disc 2/02, green, good 2/02; hunkered, green, OK 5/02, 3 & 5/03
22.30	20								1.13		0	1.75	0	0	disc 5/02; green, good 5/02, 3 & 5/03
23.00	20														in grass clump; dry and hollow, probably weevils 2/99
23.10	20	0	1.72			1.82	0	0	dead						discovered 2/98; bad, gray spines & body, squishy, firmly rooted 2/99, new spine growth, green, OK 5/99; dull light green, OK 3/00; green, OK 5/00, 2/01; armadillo rooting in area covered plant and tag with dirt, uncovered, green, OK 5/01; dead, COD soil disturbance 2/02
23.20	20					0.98		0	mia			mia			discovered 5/01; green, good 5/01; plant mia 2 & 5/02, 3 & 5/03
24.00	20														just spines, COD unknown 2/98
25.00	20	Dead													plant maroonish 5/97; greenish, but looks bad 2/98; OK, new spine growth 5/98; bad, spines gray, body yellow 2/99; COD unknown, collected by WHC 5/99
26.00	20														relocated, but dead, hollow, probably weevils 2/99
27.00	20	0	Dead												half a plant; only four tubercles 2/98, small, OK, new spine growth, green 5/98; almost buried 2/99, popping out, green, good 5/99, may be weevil gallery 3/00
28.00	20														under rock; just spines left, COD unknown 2/99
28.01	20														killed by a larva 2/98
28.02	20		mia			mia			mia						measured on one direction only 2/98; mia 99, spine cluster in area 3/00; plant mia 3 & 5/00, 3 & 5/01; plant mia 2 & 5/02
29.00	20	0	0.83	0	0	0.85	0	0	mia			mia			seedling; measured in one direction only 2/98; bad, dull gray spines, yellow-green body 2/99; under rock, maroonish green, OK 5/99 & 3/00; green, OK 5/00 & 3/01; hunkered, poor 5/01; plant mia 2 & 5/02, 3 & 5/03
30.00	20	0	mia			mia			mia						seedling; mia in 2/98; refound 5/98; almost buried 2/99; popping out by tag, green, good 5/99; plant mia 3 & 5/00, 3 & 5/01, 2 & 5/02
31.00	20														orangish 5/97; COD unknown 98
32.00	20	Dead													tag covered by flipped rock 2/99; COD unknown, collected by WHC 5/99
33.00	20														roots exposed, plant on its side 5/97; COD unknown 2/98
34.00	20														uprooted, only spines left 2/98
35.00	20														uprooted, only spines left 2/98

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	DIST	ANGLE	91DM	91FL	91FR	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL
36.00	20	35.57	337																			0.70		0	Dead				
Data taken and recorded by Jackie Poole 5/7/98, 2/23/99, 5/3/00, 3/08/01, 5/08/01, 5/4/99 & 3/2/00 with Bill Calvert,																													
	2/27/02, 5/2/02, 3/12/03, 5/2/03 with Randy Rosales																												
Data taken by Gena Janssen and recorded by Jackie Poole 2/25/98																													

Ancictrocactus tobuschii Data for
Devil's Sinkhole State Natural Area

PL#	STAKE	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
36.00	20														uprooted by researcher but replanted 5/97; COD unknown 2/98
Data taken and r															
	2/27/0														
Data taken by Ge															

Ancistrocactus tobuschii Data for Dobb's Run

PL #	STAKE	DIST.	ANGLE	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
GPS = 3280942N 364496E; From main house go 1.5 miles, take left fork. From triangle turnaround 0.1 miles.																
1.00				6.06	7	8	5.00	7	1+6A	5.435	4	4	dead			most spines & tubercle tips burned off in fire of fall 1999; northwest plant; green, OK, but 3 flowers appear withered (fire? past anthesis?) 2/00; plant reddish, OK 4/00; burned tubercle tips still evident, plant maroon, OK 2/01; caving in on one side, maroon, poor 4/01; same but OK 2/02; caved in on one side, purplish green, OK 4/02; dead 2/03, COD unknown
1.01				0.68	0	0	0.98	0	0	0.989	0	0	dead			seedling on N side of 1.00; not burned, green, OK 2 & 4/00; green, good 2/01; hunkered, green, OK 4/01; green, OK 2 & 4/02; dead 2/03
1.02							1.04		0	1.157	0	0	dead			south side of 1.00, discovered 4/01; green, good 4/01, 2 & 4/02; dead 2/03
2.00				7.84	9	0 (disp.?)	6.85	13	3+9A	7.467	8	3+5A	dead			all spines & tubercle tips burned in fire of fall 1999; southeast plant, 1 flower withered (fire? past anthesis?), green, OK 2/00; reddish on one side, otherwise OK 4/00; burned tubercle tips still evident, plant dark olive, OK 2/01 & 4/01; pale reddish green, OK 2/02; dull green, OK 4/02; dead - collected for weevil study, COD unknown 2/03
2.01				0.80	0	0	0.49	0	mia	mia					mia	seedling on northwest side of 2.00; red (scorched?), spines intact, poor 2 & 4/00; poor 2/01; plant mia 4/01, 2 & 4/02, 4/03
2.02				0.87	0	0	0.88	0	0	1.045	0	0	dead			seedling on southwest side of 2.00; olive green (scorched?), OK 2 & 4/00; olive, OK 2 & 4/01; green, good 2 & 4/02; dead, COD unknown 2/03
2.03				0.50		0	mia			mia			dead			discovered 4/00, OK 4/00; plant mia 2 & 4/01, 2 & 4/02; dead, COD unknown 2/03
2.04							0.77		0	1.256	0	0	dead			east side of 2.00, discovered 4/01; green, good 4/01, 2 & 4/02; dead, COD unknown 2/03
2.05							0.69		0	1.004	0	0	dead			southeast side of 2.00, discovered 4/01; green, good 4/01; hunkered, green, OK 2 & 4/02; dead, COD unknown 2/03
3.00				1.47	0	0	1.90	0	0	2.15	0	0	2.58	1	1	east of 1.00 & 2.00, between rocks; not burned, green, good 2 & 4/00, 2 & 4/01, 2 & 4/02; green with grayish tubercle tips, OK 2/03; green, good 4/03
Data taken and recorded by Jackie Poole 2/16/00, 4/26/00, 2/16/01, 4/26/01, 2/14/02 with Sandy Birnbaum, 4/22/02,																
	2/7/03 with Sandy Birnbaum, 4/23/03															

Ancistrocactus tobushii Data for
Frank Robert's Ranch

PL#	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Reference point #1 is surrounded by 2 Texas persimmons and one Texas mountain laurel clump, 26 JMP paces at 74 degrees																												
	from a Texas mountain laurel and a silk tassel on the bluff edge; stake 1 = GPS2 R021516B																											
1.00	1	7.07	183	3.10	1	0	3.30	3	3	2.70	0	0	2.66	0	0	4.35	3fr	1	4.66	7	7	4.83	6	4+1A	4.05	0	0	misshapen 3/98; orange 5/98; collapsed on one side, OK 3/99; green, good 4/99; tag mia, replaced 2 & 5/00; green, good 2 & 4/01; green,good 2 & 4/02; green, OK 2/03; green, good 4/03
1.10	1	6.30	181							5.90	7	7	6.16	4fr	4	6.30	8	8	6.18	3	6	5.15	5	3	5.98	5	8	discovered 3/98; good 3 & 4/99, 2/00; green, good 5/00, 2 & 4/01; green, good 2 & 4/02, 2 & 4/03
1.20	1	6.95	182							3.00	1	0	2.49	1fr	0	3.60	3	2+1disp	3.73	1	3	3.74	3	4	4.03	3	4	discovered 3/98; good 3 & 4/99, 2/00; green, good 5/00, 2 & 4/01; green, good 2 & 4/02, 4/03
2.00	1	7.04	181	1.90	0	0	1.70	0	0	2.00	0	0	1.93	0	0	2.11	0	0	2.63	0	0	2.75	2	0	3.00	1	2	good 3 & 4/99, 2/00; green, good 5/00, 2 & 4/01; green, good 2 & 4/02, 2 & 4/03
2.10	1	6.87	182				1.40	0	0	1.50	0	0	1.24	0	0	1.49	0	0	1.61	0	0	1.31	0	0	0.97	0	0	discovered 2/97; kind of loose, good 3/99; green, good 2 & 5/00; hunkered, green, OK 2/01; popped out, green, good 4/01;green, OK 2 & 4/02, 2 & 4/03
2.20	1	6.79	181										1.20		0	0.94	0	0	dead									reddish, OK, discovered 4/99, green, good 2 & 5/00; just spines left, COD unknown 2/01
3.00	1	7.38	181	4.40	3	3	5.30	1	1	4.60	5	5	4.80	3fr	1A	5.38	1fr	1disp	5.90	5	8	6.72	7	1+3A	6.00	5	2+4A	good 3 & 4/99; good, partially buried in old fire ant mound, tag mia, replaced; pale green, good 5/00; green, good 2 & 4/01; green, good 2 & 4/02, 2/03; partly in fire ant mound, plant green, good 4/03
3.01	1	7.17	181																0.50		0	mia			0.71	mia	0	discovered 4/01; green, good 4/01; mia 2 & 4/02; mia 2/03; green, OK 4/03
3.10	1	7.32	180				2.40	0	0	2.30	0	0	2.04	0	0	2.56	0	0	mia			mia			mia			discovered 2/97; good 3 & 4/99; partially buried in old fire ant mound, green, good 2 & 5/00; plant mia 2 & 4/01, mia 2 & 4/02, 2 & 4/03
3.20	1	7.56	180										1.01		0	1.70	0	0	2.37	1	1	2.58	2	0	2.20	0	0	discovered 4/99; green, good, under pebbles 4/99; green, good 2 & 5/00, 2 & 4/01; green, good 2 & 4/02 misshapen, green, OK 2 & 4/03
4.00	1	7.33	180	2.50	1 fr	1	3.00	2	2	3.10	1	1	2.97	3fr	0	3.01	0	0	2.58	0	0	3.58	3	2	dead			1 fruit partially eaten 4/96; against rock, good, fire ants nearby 3/99 & 4/99; partially buried in old fire ant mound, green, good 2 & 5/00; mound gone, plant pale green, OK 2/01; green, good 4/01, 2 & 4/02, dead collected for weevil study 2/03, COD weevils 3/03
5.00	1	8.02	189	3.40	2	0	3.80	2	3	3.80	4	4	4.09	3fr	3	3.99	3+2fr	5	4.55	3	4	4.21	4	2+2A	4.85	3	4	rock fallen on top, removed, good 3 & 4/99; slightly reddish, OK 2/00; olive, OK 5/00; green with a few tan tubercle tips, OK 2/01; edge of fire ant mound, tag mia, replaced, plant green, good 4/01;green, good 2 & 4/02, 2 & 4/03
5.01	1	7.88	189							1.60	0	0	1.05	0	0	2.30	0	0	2.60	0	0	2.25	0	0	2.38	0	0	discovered 3/98; good 3 & 4/99; green, good 2 & 5/00, 2/01; sticking out of edge of fire ant mound, green, good 4/01; green, practically spineless, OK, mound gone, tag mia, replaced 2/02; new spine growth, green, good 4/02, 2 & 4/03
5.02	1	8.00	189										1.03		0	1.25	0	0	mia			mia			mia			discovered 4/99; green, good 4/99; 2 & 5/00; plant mia 2 & 4/01, 2 & 4/02; tag and plant mia 2 & 4/03

Ancistrocactus tobushii Data for
Frank Robert's Ranch

PL#	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
5.10	1	6.10	187				5.20		5	5.60	5	5	5.46	6fr	5+1A	5.28	4fr	4	4.12	0	0	4.41	4	3A	dead			one tubercle eaten, discovered 5/97; good 3 & 4/99; tag mia, replaced, green, good 2/00; orangish, OK 5/00; green, good 2 & 4/01; blue-green good 2/02; olive, OK 4/02; dead, COD unknown 2/03
5.00	1	11.50	184	1.60	0	0	1.50	0	0	1.30	0	0	0.90	0	0	0.95	0	0	1.03	0	0		mia	dead				between two juniper clumps, hunkering, some loose spines, under grass 3/99; dull green, some loose spines, OK 4/99; tubercle sprout off spineless, gray base, gray-green, poor 2/00; root becoming exposed, gray-green, poor 5/00; gray-green, poor 2/01; root partly exposed, body tan with one reddish tubercle left, very poor 4/01; mia 2/02; body hollow with 2 weevil exit holes, COD weevils 4/02
7.00	1	9.20	193	3.60	1	0	3.60	0	0	Dead																		hollow, weevils?, dead 3/98
8.00	1	11.41	196	3.00	0	0	2.80	0	0	2.60	0	0	Dead															cow hoofprint beside 2/97; solid, dry, COD unknown 3/99
8.10	1	9.81	195							3.00	2	2	3.09	1fr	1	3.57	1	1	3.90	0	0	3.28	3	0	dead			discovered 3/98; good 3 & 4/99, green, good 2/00; olive, OK 5/00; green good 2 & 4/01; misshapen, reddish green, OK 2/02; olive, OK 4/02, dead, collected for weevil study 2/03; COD weevils 3/03
8.11	1	9.84	195							1.30	1	0	1.81	0	0	2.15	0	0	2.40	1	1	2.03	0	0	dead			discovered 3/98; good 3 & 4/99; green, good 2 & 5/00, 2 & 4/01; green with reddish tubercles, OK 2 & 4/02; dead, collected for weevil study 2/03; COD unknown 3/03
8.20	1	10.71	196							4.10	3	3	4.21	4fr	4	4.71	1+2fr	3	4.48	0	0	4.30	0	0	2.93	0	0	discovered 3/98; good 3 & 4/99; green, good 2 & 5/00; green with a few tan tubercle tips, OK 2/01; maroonish, OK 4/01; partially covered with dirt, green OK 2/02; green, OK 4/02; lop-sided, green, OK 2/03; yellowish green, OK 4/03
8.21	1	10.72	196																0.49		0	0.45	mia	0	mia			discovered 4/01; green OK 4/01;mia 2/02: olive,OK 4/02, mia 2 & 4/03
8.30	1	11.23	197													5.44	2	2	5.83	0	0	mia			dead			buried in grass clump, discovered 2/00; green, good 2/00; reddish, OK 5/00; body green, tubercle tips maroon, OK 2 & 4/01;plant mia 2 & 4/02, dead, just spines left, COD unknown 2/03
9.00	1	12.39	195	4.50	4	4	4.30	2	2	Dead																		exit hole in top, probably weevils, dead 3/98
10.00	1	12.69	195	3.80	3	2	4.30	3	3+2A	Dead																		just spines, hole where root was, COD unknown 3/98
10.01	1	12.58	195							0.80	0	0	1.63	0	0	2.19	0	0	1.90	0	0	mia			mia			discovered 3/98; good 3 & 4/99; green, good 2 & 5/00; very hunkered, almost spineless, green, OK 2/01; coming out, new spine growth, green, OK 4/01; plant mia 2 & 4/02, 2 & 4/03
11.00	1	12.61	195	1.80	0	0	1.80	0	0	Dead																		spines almost eaten off 2/97; body flown away 3/98
12.00	1	12.92	195	0.70	0	0	0.70	0	0	Dead																		root mostly out of ground, photographed 2/97, just one spine left, COD unknown 3/98
12.10	1	13.32	197				1.80	0	0	Dead?		Dead																discovered 2/97, looks dead, but check again 3/98; dried up, COD unknown 5/98

Ancistrocactus tobushii Data for
Frank Robert's Ranch

PL#	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
12.20	1	14.30	195				3.00		1	3.50	0	0	3.20	0	0	3.73	1	1	dead									discovered 5/97; good 3 & 4/99; green, good 2 & 5/00; dead, large larval (Monellema?) inside, collected 2/01
12.30	1	12.80	197							1.00	0	0	1.30	0	0	Dead												discovered 3/98; dull green, OK 3/99 & 4/99; just spines left, COD unknown 2/00
12.40	1	9.44	199							1.40	0	0	1.35	0	0	1.28	0	0	mia			mia			mia			reddish at base, discovered 3/98; orangish 5/98; dull green, OK 3/99 & 4/99; green, OK 2/00; covered by leaf; hunkered, green, OK 5/00; plant mia; loose spines in vicinity 2/01; mia 4/01, 2 & 4/02, 2 & 4/03
12.50	1	9.58	202	3.50		0	3.20	0	0	3.20	0	0	3.16	0	0	3.85	0	0	3.38	0	0	3.45	0	0	dead			found 4/96, covered by a detached prickly pear pad 5/97; originally tagged as 48; good 3 & 4/99; slightly reddish, OK 2 & 5/00; olive, OK 2/01; green, yellowish at base, OK 4/01; green with a brownish tubercle tip, tag mia, replaced 2 & 4/02, dead, collected for weevil study 2/03; COD probably weevils 3/03
12.60	1	8.94	204	3.00		0	3.60	2	1	3.40	1	1	3.03	1fr	0	3.02	0	0	2.90	0	0	3.07	0	0	dead			found 4/96, trampled by cattle, 2 flowers badly damaged 2/97, good 5/97 & 3/98; orangish 5/98; originally tagged as 50; tag mia, replaced, dull green yellow, OK 3/99, reddish 4/99, reddish, shrunken, poor 2/00, goldish, poor 5/00; green with orange tubercle tips, OK 2/01, green, OK 4/01, reddish-green, OK 2/02; olive, OK 4/02, dead, collected for weevil study 2/03, COD probably weevils 3/03
12.70	1	9.12	201							3.90	1	1	3.59	1fr	1	4.15	0	0	dead									discovered 3/98; reddish, OK 4/99, 2 & 5/00; dead, COD weevils (galleries, chambers, exit holes) 2/01
12.71	1	9.08	200										0.34		0	0.54	0	0	mia			mia			mia			right of 12.72, OK, discovered 4/99, green, OK 2 & 5/00; plant mia 2 & 4/01, 2 & 4/02, 2 & 4/03
12.72	1	9.08	200										0.49		0	0.46	0	0	mia			mia			mia			discovered 4/99, reddish, poor 2 & 5/00; plant mia 2 & 4/01, 2 & 4/02, 2 & 4/03
12.73	1	9.22	201																1.25	0	0	dead						discovered 2/01, hunkered in moss, green, OK 2 & 4/01; COD unknown, just spines left 2/02
12.80	1	6.24	202							9.40	8	7	Dead															largest plant so far, discovered 3/98, somewhat hollow, granular, roach-like insect inside, pillbug near by, no larvae, COD unknown 3/99
13.00	1	7.99	236	4.00	1	0	nd	0	Dead																			trampled 3/98, orangish 4/98, new growth from 1996 but severly trampled by cattle, photographed 2/97, only shell left, death by trampling 5/97
13.10	1	9.27	237				2.70	0	0	3.00	2	2	2.91	1fr	0	3.19	2	2A	3.40	0	0	3.15	1	0	3.33	2	2A	discovered 2/97; dull green, OK 3/99; reddish, OK 4/99, 2 & 5/00; green with a few tan tubercle tips, OK 2/01; dark green, OK 4/01; dark green, OK 2 & 4/02; green, OK 2 & 4/03
14.00	1	11.05	230	3.20	1	0	3.20	0	0	Dead																		looks bad, grayish 5/97, stem solid, COD unknown 3/98
15.00	1	12.18	231	4.20	2	0	3.50	1	1	4.10	2	2	Dead															tag chewed, retagged 98, solid, granular, very small millipede-like creature inside, COD unknown 3/99

PL#	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
15.10	1	11.99	234				2.50		0	2.50	0	0	Dead															trampled by cattle, discovered 5/97; looks OK, gravis green 98; solid, moist, COD unknown 3/99
15.20	1	12.48	232				3.00		0	3.50	0	0	3.47	0	0	3.72	1	1	3.16	0	0	2.82	0	0	mia			discovered 5/97; buried in grass 98; good 3 & 4/99; green, good 2 & 5/00; almost spineless, yellowish-green, OK 2/01; new spine growth, some orange tubercle tips, OK 4/01;green, good 2/02; goldish green, OK 4/02; plant mia 2 & 4/03
15.30	1	12.30	229							2.10		0	2.06	mia	0	mia	mia	Dead										discovered 5/98; plant & tag mia 3/99; green, good 4/99; plant and tag mia 2/00; COD unknown; tag removed 5/00
15.31	1	12.29	229										0.57		0	mia			mia			mia						green, good; not tagged, seedling of 15.30, discovered 4/99; plant mia 2 & 5/00, 2 & 4/01, 2 & 4/02
15.40	1	12.40	233										2.27	0	0	2.08	0	0	2.63	0	0	3.24	0	0	3.00	0	0	good, loosely rooted 3 & 4/99; green, good 2 & 5/00, & 4/01; green, good 2 & 4/02, 2 & 4/03
16.00	1	14.50	230	4.70	3	0	nd	0	0	5.00	4	3+1A	4.53	3fr	3	5.38	4+1fr	5	4.30	0	dead							severely trampled or eaten by cattle, photographed 2/97; coming back, green, healthy; new apical stem growth, 3 pups or seedlings (16.02-16.04) 5/97; good 3/98; 3 & 4/99, dark green 2/00; reddish, OK 5/00; green with reddish tubercle tips 2/01; dead, collected for weevil study 4/01
16.01	1	14.35	230				2.50	2	2	2.60	1	1	2.90	1fr	0	3.25	1	1	2.85	1	1	2.90	1	0	2.68	1	1	discovered 2/97; good 3 & 4/99; good, green 2 & 5/00; lots of loose spines, maroonish green, OK 2/01; partly covered with ant dirt, green, good 4/01; blue-green, good 2/02; green, good 4/02 & 2/03; by ant mound 2/03; green, OK 4/03
16.02	1	14.53	230				0.70		0	0.80	0	0	1.06	0	0	1.17	0	0	1.53	0	0	1.76	0	0	1.20	0	0	behind 16.03, discovered 5/97; good 3 & 4/99; green, good 2 & 5/00, 2 & 4/01; maroonish, OK 2/02; green, OK 4/02; in fire ant mound, OK 2 & 4/03
16.03	1	14.52	230				1.10		0	1.20	0	0	1.15	0	0	1.25	0	0	2.30	0	0	2.52	1	1A	2.43	0	0	discovered 5/97; good 3 & 4/99; green, good 2 & 5/00, 2 & 4/01;green, good 2 & 4/02; in fire ant mound, OK 2 & 4/03
16.04	1	14.50	230				1.30		0	1.30	0	0	1.52	0	0	2.13	0	0	dead									discovered 5/97; good 3 & 4/99; green, good 2 & 5/00, dead, just spines left; COD unknown 4/01
16.05	1	14.54	230				0.40		0	0.50	0	0	mia			0.65	0	0	mia	mia	dead							discovered 5/97, between 16.02 and 16.03 and 16.00 mia 3/99; measured in one direction only, green, good 2/00, hunkered, OK 5/00; mia 2/01; just spines left 4/01
17.00	1	15.29	234	3.40	3	3	4.50	4	3	4.20	2	1	4.39	1fr	1A	4.42	2	2	4.90	2	2A	3.98	3	1	4.30	1	1	at base of Texas persimmon; dull green, OK 3/99; green, good 4/99; reddish, OK 2/00; dull green, OK 5/00; covered by spider web and leaves, green, good 2/01; green, good 4/01; green, good 2 &4/02, 2 & 4/03
17.10	1	12.68	234				3.70		1	3.30	1	1A	Dead															in grass clump; discovered 5/97; somewhat hollow, but no larvae; COD unknown 3/99

Ancistrocactus tobushii Data for
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PL#	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
17.101	1	15.29	234							0.80	0	mia	mia			mia			mia									discovered 3/98; mia 5/98; mia 99; tag and plant mia 2 & 5/00, 2 & 4/01
17.20	1	13.33	238				1.30		0	1.70	0	0	1.92	0	0	2.59	0	0	2.63	1	1	2.71	0	0	2.73	1	0	discovered 5/97; good 3 & 4/99; green, good 2 & 5/00, 2 & 4/01; green OK 2/02; green, good 4/02 & 2/03; covered with soil and litter, only spines showing, may be dead, firmly rooted 4/03
18.00	1	15.02	238	3.30	1	3	Dead																					COD unknown, red, mushy-granular inside, tag removed, dead 2/97
19.00	1	10.45	236	2.90	0	0	2.90	0	0	1.70	0	Dead																looks dead, gray, still rooted 3/98; dead, hard & solid, COD unknown 5/98
19.10	1	10.63	232				3.00	2	1	3.00	2	0	3.04	0	0	3.01	1	1A	removed									discovered 2/97, good, one orange tubercle 3 & 4/99, 2/00, green, good 5/00, next to dead plant, collected for weevil study 2/01
19.20	1	10.65	232				1.60	0	0	1.70	0	0	1.72	0	0	1.90	0	0	dead									to the east of 19.1, may be a offshoot, discovered 2/97, good 3/99 & 4/99, epidermal abrasion, green, good 2 & 5/00, dead, large cavity in plant (Monellema?) 2/01
19.30	1	10.45	235				2.20	0	0	2.40	0	0	2.22	0	0	2.39	0	0	2.10	0	0	1.52	0	0	1.48	0	0	discovered 2/97; good 3/99; olive, OK 4/99; green, good 2/00; olive, OK 5/00; olive, poor 2 & 4/01; green OK 2 & 4/02, 2 & 4/03
19.40	1	11.13	236							3.10	2	2A	2.23	0	0	2.37	0	0	2.43	0	0	2.00	0	0	mia			discovered 3/98; dark dull green, OK 3/99; green, good 4/99; hunkered, green, a few purplish tubercles, OK 2/00; green, OK 5/00, 2 & 4/01;reddish-purple, OK 2/02; reddish-green, OK 4/02; plant mia 2 & 4/03
19.50	1	10.31	237																						2.57	1	1	discovered 2/03; green, OK 2/03; maroonish green, OK 4/03
20.00	1	9.99	239	4.20	1+1 fr	0	4.30	2	3	4.30	2	1+1A	4.62	3fr	1, rest disp?	4.47	2	2A	3.95	1	1	3.88	1	1A	3.55	2	2A	good 3/99 & 4/99; green, good 2 & 5/00; tag mia, replaced, plant dark green; good 2/01; maroonish, OK 4/01;green, good 2 & 4/02, 2 & 4/03
21.00	1	11.74	241	2.60	0	0	2.60	mia	0	2.10	0	0	mia			mia			mia									dark orange, bad 4/96, plant & tag mia 2/97, refound 5/97, plant still looks very bad, although green, very shaded by little bluestem; green, shaded, OK 3/98, hunkered down in moss 5/98; plant & tag mia 3 & 4/99, 2 & 5/00, 2 & 4/01
22.00	1	9.63	241	2.90	1	0	2.70	1	1	2.60	0	0	3.20	0	0	3.08	1	1	3.15	0	0	3.27	1	1	2.90	2	1A	good 3/99 & 4/99; green, good 2 & 5/00, 2 & 4/01, 2 & 4/02, 2 & 4/03
23.00	1	9.41	241	3.50	2 fr	1	3.80	3	1	3.60	3	3	3.80	1fr	1	3.95	1fr	1	dead									orangish 4/96, slightly orange on tubercle tips; OK 2 & 5/97; green & good, ~ 5 cm tall 3/98; good 3/99; some reddish tubercle tips, OK 4/99, 2 & 5/00, dead, body solid, no evidence of weevils or Monellema, COD unknown 2/01
24.00	1	9.60	241	2.70	0	0	3.00	1	0	2.90	1	1A	2.86	0	0	3.09	0	0	3.05	0	0	2.84	0	0	2.72	0	0	good 3/99 & 4/99; green, good 2 & 5/00; green, OK 2/01; green, good 4/01; green OK 2/02, green, good 4/02; green, OK 2 & 4/03

PL#	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
24.10	1	9.50	240				3.00	0	0	2.90	1	1	2.56	0	0	2.60	0	nd	2.53	0	0	2.03	0	0	mia			discovered 2/97; good 3/99 & 4/99; green, good 2/00 tag mia, replaced, orangish-maroon and green, poor & 4/01; green OK 2/02; almost spineless, green, OK 4/02; plant mia 2 & 4/03
25.00	1	9.65	241	3.00	1	0	3.40	2	1A	3.10	2	2A	2.85	1fr	1	2.89	1	1A	dead									grayish looking 2/98, OK 3/99, hunkering 4/99; hunkering, reddish, OK 2 & 5/00; dead, hollow, COD unknown 2/01
26.00	1	9.99	241	2.50	0	0	mia			mia			mia															mia 3/97, 5/97, 3/98, 5/98 & 3/99
27.00	1	10.14	242	3.30	0	0	mia			mia			mia															mia 3/97, 5/97, 3/98, 5/98 & 3/99
28.00	1	10.20	242	1.70	0	0	2.10	0	0	2.10	0	0	mia			mia			mia									gone without a trace 3/99; tag and plant, mia 2 & 5/00, 2 & 4/01
29.00	1	10.48	241	3.00	1	1	2.70	0	0	2.40	0	0	Dead															hollow, COD weevils?, dead 3/99
30.00	1	9.18	241	3.70	1+1fr	1	4.10	2	3	4.00	3	3	4.30	3fr	1+1A	4.73	2	1+1A	3.65	0	0	3.80	2	2A		mia	dead	good 3/99 & 4/99; green, good 2 & 5/00; green, with some tan tubercle tips, OK; tag mia; replaced 2/01, a few reddish tubercle tips, OK 4/01 dark green, Ok 2/02, dull green OK 4/02; plant mia 2/03, just spines left, COD unknown 4/03
31.00	1	8.85	239	2.60	0	0	2.40	0	0	2.50	1	0	2.43	0	0	2.11	0	0	2.95	0	0	2.29	0	0	2.30	0	0	at edge of grass clump, accidentally stepped on by researcher 5/98; green, good 3/99 & 4/99; green, good, loose 2 & 5/00; small holes near apex, green, OK 2/01;green, OK 2/02; yellowish-green, OK 4/02; olive, OK 2/03; green, OK 4/03
32.00	1	9.19	246	2.70	0	0	Dead																					orangish 4/96, COD unknown, only a few spines left 2/97
32.01	1	9.19	246				0.50	0	0	1.00	mia	0	0.89	mia	0	0.80	0	0	0.80	0	0	0.77	0	0	mia			seedling of 32, discovered 2/97; popping up through moss, stem mostly pink & spineless, tag mia, retagged 5/98; green, good 4/99, 2 & 5/00; hunkered in moss, green, OK 2 & 4/01;hunkered, green, OK 2 & 4/02; plant mia 2 & 4/03
33.00	1	9.34	242	3.90	1	1	3.90	2	1+1A	3.50	0	0	3.16	0	0	2.97	0	0	3.13	0	0	3.17	0	0	3.13	0	0	buried in grass, grayish-green 98; tag uprooted, good green 3/99; good, green 4/99, 2 & 5/00, 2 & 4/01; green, OK 2/02; green, good 4/02; green, OK 2/03; green, good 4/03
33.10	1	9.32	243							1.00		0	1.04	mia	0	1.07	0	0	1.00	mia	0	1.06	mia	0	1.02	mia	0	discovered 5/98; tag uprooted and several meters away 3/99; tag replaced almost on top of plant, plant green, good 4/99, 2 & 5/00; plant mia 2/01; green, good 4/01; mia 2/02; green , OK 4/02; plant mia 2/03; almost spineless, green, OK 4/03
33.20	1	9.27	243							1.20		0	1.50	0	0	1.24	0	0	1.50	0	0	1.27	0	0	1.09	mia	0	discovered 5/98; good 3/99; olive, OK 4/99; green, good 2 & 5/00; hunkered in moss, green, OK 2 & 4/01;hunkered in moss, green, OK 2 & 4/02; plant mia 2/03; green, OK 4/03
34.00	1	9.52	244	2.40	2	0	1.70	0	0	Dead																		looks bad, slightly loose in ground 2/97, looks dead, but firmly rooted 5/97, only one spine cluster left, COD unknown 3/98
35.00	1	9.85	246	1.30	0	0	1.40	0	0	1.60	0	0	1.96	0	0	2.30	0	0	2.48	0	0	2.70	3	0	2.26	0	0	good 3/99 & 4/99; green, good 2 & 5/00, 2 & 4/01; green, good 2 & 4/02; some stem damage, green, OK 2 & 4/03

Ancistrocactus tobushii Data for
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PL#	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
35.10	1	10.04	246																2.53	0	0	2.35	1	0	mia			discovered 2/01; reddish-green, OK 2 & 4/01; purplish green, OK, tag mia, replaced 2/02; reddish-green, OK 4/02; plant mia 2 & 4/03
36.00	1	9.96	247	2.60	0	0	2.60	0	0	Dead																		totally red 5/97; stem solid; COD unknown 3/98
36.10	1	9.96	250				1.70		0	1.70	0	0	1.62	0	0	1.71	0	0	2.30	0	0	2.10	1	0	dead			slightly reddish, discovered 5/97, purplish 3/98, reddish, OK 3/99 & 4/99, green, OK 2/00, green, good 5/00, 2/01, dull green, OK 4/01, olive OK 2/02, green OK 4/02, dead, COD unknown 2/03
36.20	1	10.21	251				1.50		0	1.50	0	0	2.14	0	0	2.63	0	0	2.83	1	1	2.70	1	0	2.01	0	dead	discovered 5/97; good 3/99 & 4/99, green, good 2 & 5/00, 2 & 4/01, 2 & 4/02; may be dead 2/03, hard, dry, solid, COD unknown 4/03
37.00	1	7.73	251	2.80	2	2	Dead																					COD unknown, stem hollow, no insects, tag removed 2/97
38.00	1	7.90	250	2.50	0	0	Dead																					orangish 4/96; COD unknown, hollow around a central core, no insects, tag removed 2/97
39.00	1	8.09	252	2.80	1	1	3.60	2	3	3.40	1	1	3.48	2fr	2	3.40	1	1	3.45	0	dead							green, good 3 & 4/99, 2 & 5/00, reddish, poor 2/01; dead, collected for weevil study 4/01
39.01	1	8.10	252																0.50		0	0.51	0	0	0.50	0	0	seedling of 39.00; discovered 4/01; green, OK 4/01; under moss, green, OK 2 & 4/02; olive, OK 2 & 4/03
39.02	1	8.11	252																0.50		0	mia			mia			seedling of 39.00; discovered 4/01; green, OK 4/01; mia 2 & 4/02, 2 & 4/03
48.00	1	16.82	267				3.70		1	3.20	2	2	3.31	1fr	0	3.60	2	2disp	3.83	1	1	3.34	2	0	3.33	2	2	discovered 5/97; originally tagged as 53; good 3/99; maroonish, OK 4/99 & 2/00; ants swarming fruits, plant olive, OK 5/00; maroonish, OK 2/01; green with some maroonish tubercle tips 4/01; maroon, OK 2/02 red-tan, OK 4/02; given new tag, green, OK 2/03; hunkered, dull purple, poor 4/03
49.00	1	9.45	202	1.10		0	1.30	0	0	Dead																		found 4/96, yellowish, cattle hoofprint beside 2/97; hollow shell, COD unknown 3/98
50.00	1	10.36	47							7.50	9	8	8.22	8fr	8	9.24	2+8fr	11	9.43	6	8+1A	9.15	7	2+2A	7.21	8	8	measured around mountain laurel; discovered by Frank Roberts 3/98; photographed 5/98; great 3 & 4/99; great, green 2 & 5/00, 2 & 4/01 (measurement 109.43 & 106.65 for diameter of 10.80 4/01); green good 2 & 4/02, 2 & 4/03
51.00	1	9.41	201	3.50	na	1A	Dead																					found 4/96, orangish; 51 and 52 were actually two heads on one stem/root; stem was hollow, and heads were filled with dark yellow mush, cattle hoofprints on top of plants, but plants probably died previously 2/97 tag removed 5/97
52.00	1	9.36	201	3.70	na	1A	Dead																					found 4/96; see comments on 51
54.00	1	17.17	265				3.00		2	Dead																		discovered 5/97; stem hollow, with weevil exit holes; dead 3/98
Number skip due to using numbers 40-47 at the second stake. This will be corrected through time.																												
Reference point 2 is ~70 JMP paces at ~75 degrees from reference point 1, or ~50 JMP paces more or less NE from utility pole; stake 2 = GPS3 R021518A																												

Ancistrocactus tobushii Data for
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PL#	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
40.00	2	2.36	21	3.00	2	2	3.40	3	2+1A	3.40	1	Dead																purplish 3/98; weevils; dead 5/98
41.00	2	1.63	164	2.00	0	0	2.80	2	2	3.20	2	1	3.60	2fr	1	3.31	1fr	disp	3.25	0	0	3.23	0	0	dead			good 3/99 & 4/99; green, good 2 & 5/00; slightly maroonish-green, OK 2/01; new apical green growth, good 4/01; covered with ant dirt 2 & 4/02; only spines left, COD unknown 2/03
42.00	2	2.53	161	2.70	1	1	Dead																					COD unknown, inside red and liquid; tag removed 2/97
43.00	2	2.45	175	2.80	0	0	Dead																					stem hollow, insect exit holes; tag removed 2/97
43.10	2	26.26	185							3.30	0	0	Dead															uprooted by armadillo or squirrel, replanted 3/98; yellow, bad 5/98; death by uprooting 3/99
43.20	2	26.47	185							3.90	0	0	Dead							1								uprooted by armadillo or squirrel, replanted 3/98; yellow, poor 5/98; old dead piece of plant left; COD uprooting 3/99
43.30	2	26.20	185							nd	0	0	mia			mia			mia									small seedling without roots, replanted 3/98, still here but spineless 5/98; needs to be tagged; mia 3/99, 2 & 5/00, 2 & 4/01
44.00	2	2.59	196	2.70	1	1	3.00	0	0	3.10	1	1	3.27	1fr	1	3.58	1fr	1	3.20	0	0	2.60	0	0	3.66	3	1+1A	good 3/99 & 4/99; green, good 2 & 5/00; nibbled on one side, green, OK 2/01; green, good 4/01; green, OK, spines falling off 2/02; new spine growth, green, good 4/02; green with 1 orange tubercle 2/03; accidentally stepped on, green, OK 4/03
44.01	2	2.61	196																0.65	0	0	0.99	0	0	0.99	0	0	seedling of 44, not tagged, discovered 2/01; green, OK 2 & 4/01; green, OK 2 & 4/02, 2 & 4/03
44.10	2	24.10	218							3.60	4	4	3.68	4fr	3+1A	4.23	1+4fr	5disp	5.30	3	3	4.48	3	0	3.93	0	0	measured over agarita & mountain laurel; discovered 3/98; good 3 & 4/99, 2 & 5/00; nibbled on one side, green, OK 2/01; green, good 4/01; green, good 2 & 4/02; bite out of side, green, OK 2/03; green, good 4/03
44.20	2	24.24	218							1.90		2	2.96	1fr	1	3.09	1fr	disp	3.15	0	0	3.48	2	0	dead			measured over agarita & mountain laurel; discovered 5/98; good 3/99 & 4/99 but almost covered by ant dirt ants under nearby rock, tag mia; replaced, green, good 2 & 5/00; rock on top, removed, plant green, OK 2/01; green, good 4/01; green, good 2 & 4/02; dead, collected for weevil study 2/03; COD probably weevils 3/03
45.00	2	4.32	219	4.00	3	0	5.20	6(7?)	5+1A	5.60	6	5	6.34	2+7fr	6+2A	6.46	9	8+1disp	7.30	5	8+1A	6.84	5	10	dead			good 3 & 4/99, green, good 2 & 5/00, 2 & 4/01, dark green, good 2/02, green, good 4/02, dead, just spines left 2/03
45.01	2	4.30	219																						0.64	0	0	seedling of 45.00; discovered 2/03; green, OK 2 & 4/03
46.00	2	4.59	223	3.60	1+3fr	2	4.80	6	5+1A	4.70	6	7	5.14	6fr	3+disp +2A	5.29	1+6fr	6+1disp	5.85	4	5+1A	5.29	8	4A	dead			good, accidently stepped on 3/99, green, good 4/99, & 5/00, green with some maroonish tubercle tips, good 2/01, green with some maroonish tubercle tips, OK 4/01; maroonish-green, OK 2 & 4/02, dead, body solid, COD unknown 2/03

Ancistrocactus tobushii Data for
Frank Robert's Ranch

PL#	STAKE	DIST.	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
46.01	2	4.62	223													1.40		0	1.10	0	0	1.04	0	0	1.20	0	0	at 6 o'clock on 46/00, discovered 5/00; green, good 5/00; green, OK 2 & 4/01 (one measurement only 2/01); green, OK 2/02; hunkered, olive, OK 4/02; green, OK 2/03; covered in fire ant dirt, 2 tubercles exposed, green, OK 4/03
46.02	2	4.50	223																0.85		0	0.99	0	0	mia			discovered 4/01; green, OK 4/01;pale maroonish, OK 2/02; green, OK 4/02; fire ant mound, plant mia 2/03; mound moved, tag and plant mia 4/03
46.03	2	4.62	223																1.03		0	dead						discovered 4/01; under rock, green, good 4/01;dead, dry cork, COD unknown 2/02
46.10	2	5.03	224																			2.01		0	2.09	0	0	discovered 4/02; green, good 4/02; green, OK 2 & 4/03
47.00	2	4.50	245	4.50	0	0	Dead													1								orangish 4/96; COD unknown, husk of stem and root left, spines dried and gray, tag removed 2/97
48.00	2	3.72	251							2.40	0	0	2.33	0	0	2.83	1	1	2.93	2	2	2.85	0	0	3.23	3	3	discovered 3/98; good 3 & 4/99; green, good 2 & 5/00, 2 & 4/01; small chunk eaten out of side, green, OK 2 & 4/02; green, good 2 & 4/03
48.10	2	3.62	232																4.58	0	0	4.12	3	0	dead			discovered 2/01, green, good 2 & 4/01; green, good 2 & 4/02; dead, collected for weevil study 2/03; COD Monellema 3/03
49.00	2	3.85	269							3.10	1	1	3.03	0	0	3.25	1+1fr	2disp	3.15	0	0	3.50	2	0	3.79	3	1+2A	discovered 3/98; a few orangish tubercle tips, OK 3/99 & 4/99; green with reddish tubercle tips, OK 2/00; yellowish, OK 5/00; yellowish-green, with tan tubercle tips, OK 2/01; green with reddish tubercle tips, OK 4/01; green, OK 2 & 4/02, 2 & 4/03
50.00	2	24.40	225													4.57		2+2disp	5.08	6	6	5.21	7	0	5.31	4	4	measured around mountain laurel and persimmon, discovered 5/00; green, good 5/00, 4/01, 2 & 4/02, 2 & 4/03
51.00	2	~24.7	~225																4.15	3	2	3.71	0	0	dead			measured over agarita, around mountain laurel and persimmon; discovered 2/01; green, good 2 & 4/01; reddish-olive, OK 2 & 4/02; dead; collected for weevil study 2/03; COD probably Monellama 3/03
52.00	2	~24.5	~225																4.40	3	3	dead						measured over agarita, around mountain laurel and persimmon; discovered 2/01; green, good 2 & 4/01; COD Monellema; collected for weevil study 2/02
53.00	2	26.30	~225																4.28	2	3	4.42	3	3	4.79	4	3+2A	measured over agarita, around mountain laurel and persimmon, discovered 2/01; green, good 2 & 4/01, 2 & 4/02, 2 & 4/03
Monitoring plot set up by Jackie Poole on 3/12/96; fruiting data collected by Poole on 4/29/96																												
Data collected by Jackie Poole on 2/27/97, 5/8/97; 3/4/98, 5/6/98; 3/9/99, 4/21/99, 2/29/00, 5/1/00, 2/13/01, 4/27/01, 2/15/02 with Sandy Bimbaum, 4/29/02																												
	2/13/03 with Bea Harrison, 4/28/03																											

Ancistrocactus tobuschii Data for Garner State Park

PL#	STK#	DIST	ANGLE	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 1 = GPS10 R021516A; rebar removed, replaced 2/01																						
1.00	1	6.33	75	7.30	7	7	6.22	5fr	Dead													tag mia, replaced 5/98; spines dull gray, poor 3/99; dead, weevil damage, riddled with galleries 4/99; collected by WHC 5/5/99
2.00	1	12.75	264	4.90	6	6	4.52	6fr	7	5.73	1+5fr	4+2disp	6.44	8	10	7.05	12	8+3A	6.21	2	1	good 3/99 & 4/99, only 2 m from road edge; green, good 2 & 5/00; slightly reddish-green, good 2/01; green, good 4/01; reddish green, good 2/02, green, good 4/02; green, good 2/03; green, OK 4/03
2.01	1	12.71	264							1.04	0	0	1.38	0	0	1.85	1	1	2.79	2	2	green, good 2 & 5/00, 2 & 4/01; maroonish green, good 2/02, green, good 4/02, 2 & 4/03
3.00	1	4.64	6							6.19	0	0	mia	mia	dead							spines gray, body reddish, OK poor, 2/00; spines gray, body reddish, poor 5/00; tag uprooted, plant mia 2/01, tag mia, pieces of dead plant in vicinity, weevil chambers and galleries 4/01
Stake 2 = R042918A, 3273283N 429066E																						
1.00	2	5.20	49																3.31		4	closest to stake, green, good 4/03
1.01	2	5.22	49																3.79		4	behind 1.00, left of 1.02; green, good 4/03
1.02	2	5.22	48																4.04		4	behind 1.00, right of 1.01; green, good 4/03
2.00	2	1.72	336																3.01		4	hunkered, green, OK 4/03
3.00	2	2.03	325																2.52		0	green, good 4/03
4.00	2	2.56	287																3.49		6	green, OK 4/03
5.00	2	2.57	294																3.49		6	farthest from stake, right of 5.01; green, OK 4/03
5.01	2	2.56	296																3.15		2	in front and left of 5.00, behind and left of 5.02; green, OK 4/03
5.02	2	2.54	294																1.99		2	closest to stake, green, OK 4/03
6.00	2	2.75	287																1.51		0	green, good 4/03
7.00	2	3.43	280																4.07		9	green, good 4/03
8.00	2	3.73	278																4.93		7+3A	some loose spines, green, OK 4/03
9.00	2	3.51	275																3.23		5	green, good 4/03
10.00	2	3.67	289																0.99		0	green, good 4/03
11.00	2	3.70	294																3.18		4	green, good 4/03
12.00	2	4.51	303																3.10		4	green, good 4/03
12.10	2	4.10	300																3.99		6	green, OK 4/03
12.20	2	3.99	298																1.16		0	green, good 4/03
12.30	2	3.85	301																0.43		0	green, OK 4/03

Ancistrocactus tobuschii Data for Garner State Park

PL#	STK#	DIST	ANGLE	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
12.40	2	4.20	298																0.62		0	green, OK 4/03
13.00	2	4.83	308																3.76		4	green, OK 4/03
13.01	2	4.80	308																0.55		0	one o'clock on 13.00; green, OK 4/03
14.00	2	4.77	302																2.40		2	green, OK 4/03
14.10	2	4.51	296																2.82		6	green, OK 4/03
15.00	2	4.85	304																1.55		1	green, OK 4/03
16.00	2	5.05	303																4.80		6	leftmost of entire clump; green, good 4/03
16.01	2	5.02	302																3.01		3	behind 16.02, 16.03, & 16.04, in front of 16.00 and 16.05; green, good 4/03
16.02	2	5.00	303																2.48		1	in front and left of 16.01, behind and right of 16.03; green, good 4/03
16.03	2	4.99	302																2.59		2	closest to stake; purplish green OK 4/03
16.04	2	5.01	302																2.22		1A	behind and to right 16.03, in front and to right of 16.01; misshapen, purplish green 4/03
16.05	2	5.04	302																3.43		4	right of 16.00, in front and left of 16.06; green, good 4/03
16.06	2	5.08	302																2.98		4	farthest from stake, green with orangish tubercle tips, OK 4/03
17.00	2	5.35	301																2.04		1	hunkered, green, OK 4/03
18.00	2	5.37	304																1.04		0	hunkered, green, OK 4/03
19.00	2	5.43	302																2.25		1	green, good 4/03
20.00	2	5.56	303																3.79		5	purplish green, OK 4/03
20.01	2	5.55	302																0.45		0	green, OK 4/03
20.02	2	5.55	302																0.32		0	left of 20.01; pinkish green, OK 4/03
20.03	2	5.54	301																0.62		0	right of 20.00 ~4cm; purplish green, OK 4/03
20.04	2	5.59	303																0.83		0	at 6 o'clock on 20.00; green, good 4/03
21.00	2	5.57	303																3.47		5	green, good 4/03
22.00	2	5.59	302																2.82		2	green, good 4/03
22.01	2	5.62	302																0.69		0	behind and between 20.00 & 22.00; hunkered, green 4/03
23.00	2	5.95	302																4.45		9	green, good 4/03
24.00	2	6.23	305																1.97		2	green, good 4/03
25.00	2	6.20	306																1.82		0	green, good 4/03
26.00	2	6.03	309																1.38		0	green, good 4/03
27.00	2	5.00	312																1.89		0	hunkered, green, OK 4/03
28.00	2	5.08	310																1.04		0	green, OK 4/03
29.00	2	5.15	312																1.05		0	green, OK 4/03
30.00	2	5.14	309																0.91		0	left of 31.00; green, OK 4/03

Ancistrocactus tobuschii Data for
Garner State Park

PL#	STK#	DIST	ANGLE	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
31.00	2	5.14	309																1.03		0	right of 30.00; green, OK 4/03
32.00	2	5.18	309																0.94		0	green, good 4/03
33.00	2	5.20	309																1.61		0	green, OK 4/03
34.00	2	5.23	309																2.50		1	green, OK 4/03
35.00	2	5.38	311																1.47		0	green, good 4/03
36.00	2	5.19	316																2.36		1	green, OK 4/03
37.00	2	7.10	322																3.51		4+1A	green, good 4/03
38.00	2	7.89	322																2.10		0	green, good 4/03
39.00	2	8.13	322																2.30		1	green, good 4/03
40.00	2	8.12	322																3.48		4	green, good 4/03
41.00	2	8.95	314																3.62		5	green with some orange tubercle tips 4/03
42.00	2	7.22	308																3.02		1	green, good 4/03
43.00	2	7.48	308																4.48		6	green, good 4/03
44.00	2	7.45	311																1.79		0	green, good 4/03
45.00	2	7.74	307																2.25		1	closest to stake; olive, OK 4/03
45.01	2	7.76	307																1.43		0	leftmost of cluster; green, good 4/03
45.02	2	7.77	307																0.67		0	behind 45.01, left of 45.04; green, OK 4/03
45.03	2	7.76	307																1.61		0	rightmost of cluster; olive, OK 4/03
45.04	2	7.77	307																1.88		0	behind 45.03; green, good 4/03
46.00	2	8.51	308																2.46		4	green, OK 4/03
47.00	2	9.56	308																4.01		5	green, OK 4/03
48.00	2	9.67	308																3.40		8	green, OK 4/03
49.00	2	8.00	307																2.92		3	green, good 4/03
50.00	2	8.27	305																3.26		5+1A	green, OK 4/03
51.00	2	6.89	306																3.97		5	purplish green, good 4/03
52.00	2	7.50	301																2.17		0	green, good 4/03
52.01	2	7.48	301																0.99		0	11 o'clock on 51.00; green, OK 4/03
53.00	2	7.77	299																1.59		0	green, OK 4/03
54.00	2	7.82	299																2.47		1	right of 55.00; green, good 4/03
55.00	2	7.82	299																2.05		2	left of 54.00; green, OK 4/03
56.00	2	7.87	299																4.02		6	green, good 4/03
56.01	2	7.85	299																1.02		0	2 o'clock on 56.00; green, OK 4/03
57.00	2	7.89	298																1.05		0	green, OK 4/03
58.00	2	7.86	300																1.97		2A	one orange tubercle, green, good 4/03
59.00	2	8.63	304																0.73		0	green, OK 4/03
60.00	2	8.78	304																0.93		0	green, OK 4/03
61.00	2	8.70	303																1.99		0	green, good 4/03

Ancistrocactus tobuschii Data for Garner State Park

PL#	STK#	DIST	ANGLE	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
62.00	2	8.67	303																2.27		0	green, good 4/03
63.00	2	9.20	303																3.14		4	reddish green, OK 4/03
64.00	2	9.09	302																1.35		0	left of 65.00; goldish, poor 4/03
65.00	2	9.10	302																1.61		0	right of 64.00; reddish green, OK 4/03
66.00	2	9.31	300																1.96		0	green, OK 4/03
67.00	2	9.33	297																1.94		0	green, good 4/03
68.00	2	9.97	312																1.44		0	green, OK 4/03
69.00	2	10.36	303																3.38		5	green, good 4/03
70.00	2	7.64	295																1.85		0	green, OK 4/03
71.00	2	7.56	296																1.35		0	green, good 4/03
72.00	2	5.69	289																3.05		6	green, OK 4/03
73.00	2	5.87	290																1.56		0	green, good 4/03
74.00	2	6.14	288																2.25		2	left of 74.00-76.00; green, OK 4/03
75.00	2	6.15	288																3.86		4	middle of 74.00-76.00; green, OK 4/03
76.00	2	6.12	288																1.69		2	right of 74.00-76.00; green, OK 4/03
77.00	2	6.08	287																1.48		1	left of 78.00; green, OK 4/03
78.00	2	6.08	287																1.87		0	right of 77.00; green, OK 4/03
79.00	2	6.07	284																2.82		3	green, OK 4/03
80.00	2	6.57	280																1.52		1A	green, OK 4/03
81.00	2	6.79	288																1.63		0	green, OK 4/03
82.00	2	7.79	291																2.13		1	green, good 4/03
83.00	2	7.93	290																0.65		0	green, OK 4/03
84.00	2	8.07	289																1.78		0	green, good 4/03
85.00	2	9.52	290																2.77		0	green, good 4/03
86.00	2	9.74	289																1.48		0	in front of 87.00; green, good 4/03
87.00	2	9.76	289																1.19		0	behind 86.00; purplish, OK 4/03
88.00	2	10.69	269																1.50		0	left of 89.00, right of persimmon; green, OK 4/03
89.00	2	10.70	269																2.23		0	right of 88.00; green, good 4/03
90.00	2	12.23	252																3.83		2	green, OK 4/03
91.00	2	12.29	252																1.19		0	green, OK 4/03
92.00	2	11.91	257																2.20		0	green, good 4/03
93.00	2	8.25	232																4.96		7	green, OK 4/03
94.00	2	8.61	230																2.77		3	green, OK 4/03
95.00	2	8.33	230																1.72		1	green, OK 4/03
95.01	2	8.31	230																1.36		0	at 1 o'clock on 95.00; green, OK 4/03
96.00	2	8.51	228																3.28		3	green, OK 4/03

Ancistrocactus tobuschii Data for Garner State Park

PL#	STK#	DIST	ANGLE	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
97.00	2	6.82	223																1.86		0	leftmost of 97.00-99.00; green, good 4/03
98.00	2	6.81	223																1.86		0	center of 97.00-99.00; green, good 4/03
99.00	2	6.80	223																2.02		3	rightmost of 97.00-99.00; green, good 4/03
100.00	2	6.95	225																3.69		5	green, good 4/03
101.00	2	7.43	224																4.30		1+2A	reddish green, OK 4/03
102.00	2	7.40	224																4.05		6+2A	green with a few red tubercle tips 4/03
103.00	2	8.15	219																2.79		5	green, OK 4/03
104.00	2	7.99	215																4.44		13	green, OK 4/03
105.00	2	9.34	219																1.59		0	green, OK 4/03
106.00	2	7.13	43																4.11		4	green, OK 4/03
107.00	2	6.62	40																1.78		1	green, good 4/03
108.00	2	6.58	39																0.85		0	green, OK 4/03
109.00	2	6.46	38																1.55		0	green, OK 4/03
110.00	2	6.44	37																0.59		0	green, OK 4/03
111.00	2	6.49	37																0.92		0	green, OK 4/03
112.00	2	6.31	36																0.70		0	green, OK 4/03
113.00	2	6.38	36																4.22		4	green, good 4/03
113.01	2	6.37	36																0.85		0	at 10 o'clock on 113.00; green, OK 4/03
113.02	2	6.39	36																0.71		0	at 8:00 on 113.00; green, OK 4/03
114.00	2	6.43	36																0.65		0	green, OK 4/03
115.00	2	6.42	36																1.60		0	green, good 4/03
116.00	2	6.59	38																0.85		0	green, OK 4/03
117.00	2	6.62	36																1.46		0	green, OK 4/03
118.00	2	6.76	35																0.80		0	green, OK 4/03
119.00	2	6.77	35																0.82		0	green, OK 4/03
120.00	2	6.99	37																2.84		2	green, good 4/03
121.00	2	5.70	40																2.32		1	green, OK 4/03
122.00	2	5.74	39																2.61		2	green, OK 4/03
123.00	2	5.68	39																2.59		0	in front of 124.00; green, OK 4/03
124.00	2	5.71	39																2.32		1	green, OK 4/03
125.00	2	6.81	37																1.25		0	green, good 4/03
126.00	2	5.58	36																0.97		0	green, OK 4/03
127.00	2	6.62	36																0.97		0	green, OK 4/03
128.00	2	5.64	36																1.86		0	green, good 4/03
129.00	2	8.12	33																3.53		3A	green, OK 4/03
130.00	2	8.23	33																2.47		0	green, good 4/03

Ancistrocactus tobuschii Data for Garner State Park

PL#	STK#	DIST	ANGLE	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 3 = R043016A, 3279277N 429015E																						
1.00	3	3.80	307																1.74		0	green, good 4/03
2.00	3	3.82	307																2.36		1	green, good 4/03
3.00	3	12.45	345																2.04		1	green, OK 4/03
4.00	3	12.53	345																1.29		0	green, good 4/03
5.00	3	14.22	343																3.29		2	green, good 4/03
6.00	3	14.26	343																1.87		1	green, good 4/03
7.00	3	14.95	343																2.11		0	green, good 4/03
8.00	3	14.99	343																3.54		1+1A	green, good 4/03
9.00	3	14.37	345																2.18		0	purplish, OK 4/03
10.00	3	14.63	347																1.91		1	green, good 4/03
11.00	3	15.08	347																1.31		0	green, OK 4/03
12.00	3	16.00	349																1.56		0	purplish green, good 4/03
13.00	3	16.01	349																2.68		2	green, good 4/03
14.00	3	16.10	349																1.77		1A	green, good 4/03
Stake 4 = R043017A, 3273332N 429069E																						
1.00	4	4.35	202																4.88		0	green, good with some loose spines 4/03
Data collected by Jackie Poole 3/4/99, 4/21/99, 2/29/00, 5/1/00, 2/13/01, 4/27/01, 2/15/02, 4/26/02, 2/13/03 with Bea Harrison,																						
	4/29-30/03 with Wendy Connally																					

Ancistrocactus tobuschii Data for Hwy 674 Right-of-Way

PL#	STAKE	DIST.	ANGLE	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL
1.00	1	-7.15	nd	4.00	1+4fr	nd	4.00	0	nd	3.50	1	nd	Dead										
Stake 2 is the reflector post on E side of highway in Acacia rigidula																							
2.00	2	6.48	134	5.00	1+9fr	nd	5.00	1	nd	4.00	9	nd	5.00	5	nd	5.60	7fr	3,rest disp.	5.60	6	7	6.00	7
2.01	2	7.22	134																				
2.02	2	7.19	134																				
2.03	2	7.20	134																				
2.04	2	7.25	134																				
2.05	2	7.25	134																				
2.06	2	7.23	134																				
2.07	2	7.24	134																				
2.08	2	7.25	134																				

Ancistrocactus tobuschii Data for
Hwy 674 Right-of-Way

PL#	STAKE	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.00	1																	
Stake 2 is the r																		
2.00	2	2+5A	5.28	5	5	5.32	3	2+ 1disp?	5.34	3	1+2A	dead						1 seedling (~ 1 cm) at base 2/94, seedling (=2a) 4 cm to W 2/95, seedling mia 3/96; reddish, shrunken 2/99 and 4/99; very poor, reddish 2 & 4/00, 2/01, stem damaged, loose spines, dull green, poor 4/01, dead, COD motd? (fungus?), collected for weevil study 2/02
2.01	2		1.09		0	1.56	mia	0	1.91	0	0	dead						discovered 4/99; mia 2/00; relocated 10cm West of 2.00 4/00; green, good 4/00, 2 & 4/01; just spines left, COD unknown 2/02
2.02	2		0.82		0	0.81	mia	0	1.26	0	0	dead						discovered 4/99; mia 2/00; relocated 12cm West/Northwest of 2.00 4/00; green, good 4/00, 2 & 4/01; large hole in stem, COD weevils 2/02
2.03	2		0.78		0	0.79	mia	0	0.82	0	0	mia			mia			discovered 4/99; mia 2/00; relocated 10cm West/Northwest of 2.00 4/00; green, good 4/00, 2 & 4/01; plant mia 2 and 4/02, 2 & 4/03
2.04	2		0.38		0	mia			mia			mia						discovered 4/99; mia 2 & 4/00, 2 & 4/01, 2 & 4/02
2.05	2		0.28		0	mia			mia			mia						discovered 4/99; mia 2 & 4/00, 2 & 4/01, 2 & 4/02
2.06	2		0.50		0	mia			mia			mia						discovered 4/99; mia 2 & 4/00, 2 & 4/01, 2 & 4/02
2.07	2		0.79		0	0.91	mia	0	0.94	0	0	0.56	0	0	0.50	0	mia	discovered 4/99; mia 2/00; relocated 6.5cm West/Northwest of 2.00 under rock 4/00; green, good 4/00; hunkered under rocks, green, OK 2/01, 2 & 4/02; green, OK 2/03; mia 4/03
2.08	2		0.28		0	mia			0.53	mia	0	mia			mia			discovered 4/99; mia 2 & 4/00, 2/01; relocated behind 2.07 4/01; plant mia 2 & 4/02; loose spines in vicinity, plant mia 2 & 4/03

Ancistrocactus tobuschii Data for
Hwy 674 Right-of-Way

PL#	STAKE	DIST.	ANGLE	92DM	92FL	92FR	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL
3.00	2	12.13	154																2.20		0	3.40	5
4.00	2	~11.00	139																2.20		0	3.50	3
5.00	2	10.82	154																				
6.00	2	~10.8	150																				
Data taken and recorded by Jackie Poole 1992; 7/22/93; 2/28/94; 1996; 2/13/97; 5/4/98; 2/15/99; 4/20/99, 2/7/00, 4/25/00, 2/15/01, 4/25/01,																							
2/10/02, 4/26/02, 2/3/03 with Sandy Birnbaum, 4/21/03																							
Data taken by Jackie Poole and recorded by Gena Janssen 2/14/95																							
Data taken by Gena Janssen and recorded by Jackie Poole 2/17/98																							

Ancistrocactus tobuschii Data for
Hwy 674 Right-of-Way

PL#	STAKE	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
3.00	2	2A, rest disp?	3.36	6	3	4.49	5	5disp	6.00	8+1fr	11+1A	4.93	6	6A	dead			discovered 5/97; distance is around Acacia rigidula; flowers pinkish, stigma yellow, very shrunken 2/99; flowers pinkish yellow, stigma yellow green, body dark olive, OK 2/00; reddish, OK 4/00; flowers pinkish-yellow, stigma yellow, body maroonish-green, OK 2 & 4/01; green, OK 2 & 4/02; just spines, COD unknown 2/03
4.00	2	1A, rest disp?	3.54	3+1fr	3	4.34	3	disp?		4	3+1A	4.37	4	4A	4.86	3	4A	discovered 5/97; distance is over Acacia rigidula; flowers pinkish, stigma yellow, olive, shrunken 2/99; flowers dusky yellow-pink, stigma yellow, plant dark purplish-green, OK 2 & 4/00; flowers pinkish-yellow, stigma orange-yellow, plant orangish-green, OK-poor 2/01; orange, poor 4/01; basal tubercules yellowish, upper ones green, OK 2 & 4/02; green with reddish yellowish tubercle tips, OK 2 & 4/03
5.00	2					3.37	2	2	mia			mia			mia			discovered 2/00; flower and stigma yellow, body reddish-green, OK 2 & 4/00; mia 2/01; mia 2 & 4/02; 2 & 4/03
6.00	2											1.27	0	mia	mia			discovered 2/02; green, good 2/02; plant mia 4/02, 2 & 4/03
Data taken and																		
	2/10/02,																	
Data taken by																		
Data taken by (																		

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
Reference Point 1 is a rebar stake ~18m at 195 degrees from the south leg of the "Caution Crosswind" sign on th																					
	south side of I-10 West: ID#1 R031314A																				
1.00	1	11.69	145	med	6	3.30	1	0	4.00	2fr	1A	3.50	1fr	1	4.43	0	0	4.42	3fr	3	5.12
1.01	1	11.71	145																		
1.10	1	14.53	144						2.70	3	1	3.50	1A	1A	4.28	0	0	4.59	3	3	5.92
1.20	1	14.64	145						1.80	1	1A	mia		mia	2.21	1A	1A	2.21	2fr	2	3.75
2.00	1	13.40	145												2.26	0	0	2.97	2fr	2	3.96
2.01	1	13.42	145																		
2.02	1	13.40	145																		
2.03	1	13.39	145																		
2.04	1	13.38	145																		
3.00	1	11.04	150															2.01	1	1	2.65
3.01	1	11.03	150																		0.76
4.00	1	9.53	148																		
Reference Point 2 is a rebar stake in a clearing; ID#2 R031315A																					
1.00	2	~19.49	~352												3.65	3A	0	4.52	3	2A	5.58
1.10	2	~21.20	~352												5.54		0	5.89	7fr	1+3 dispersed	dead
1.20	2	~22.2	~352																		4.14
2.00	2	7.90	216	med-lg	7	4.20	2+4fr	0	4.20	4fr	2+1A	4.60	5	4	4.62	6fr	4A	Dead			

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Reference Poin										
	south sid									
1.00	1	3	2A	4.76	5	5	dead			feels "squishy" 3 & 5/96, tubercles orange at base, looks bad 3 & 5/97, maroonish, with a few orange tubercles, OK 3 & 5/99, maroonish, lots of loose spines at base, OK 3/00 maroonish green, OK 5/00, dark olive, OK 3/01, maroonish dark green, OK 5/01, purplish green, OK 3/02, orange, OK 5/02, small chambers and exit holes, COD weevils 3/03
1.01	1						0.42	0	0	seedling of 1.00, discovered 3/03; green, OK 3 & 5/03
1.10	1	5	1+2A	5.45	7	7+1A	5.15	0	0	discovered 3/97; maroonish, with a few orange tubercles, OK 3 & 5/99; olive, OK 3 & 5/00; greenish-purple, OK 3/01; dark green, good 5/01; purplish, OK 3 & 5/02; red, poor 3/03; orangish, poor 5/03
1.20	1	3	2A	3.52	5	4	4.50	5	4+1A	tag & plant mia 3 & 5/98; relocated, tag buried, plant hunkered in gravel, dark green, OK 3 & 5/99, 3 & 5/00; purplish-green, good 3/01; dark green, good 5/01; purplish, OK 3 & 5/02, 3 & 5/03
2.00	1	2	1+1A	3.97	5	3+1A	dead			discovered 3/99; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; purplish, OK 3/02; olive, OK 5/02; collected for weevil study, COD Moneilema 3/03
2.01	1						0.48	0	0	seedling of 2.00, farthest from stake, discovered 3/03; green, OK 3 & 5/03
2.02	1						0.48	0	0	seedling of 2.00, left of 2.01, 2.02, 2.03, discovered 3/03; green, OK 3 & 5/03
2.03	1						0.33	0	0	seedling of 2.00, behind 2.04 and right of 2.01 & 2.02, discovered 3/03; green, OK 3 & 5/03
2.04	1						0.46	0	0	seedling of 2.00, closest to stake, discovered 3/03; green, OK 3 & 5/03
3.00	1	1	1A	2.80	4	2	3.72	4	3+1A	discovered 3/00; olive, OK 3 & 5/00; light green, OK 3/01; green, OK 3 & 5/02, 3 & 5/03
3.01	1		0	0.80	0	0	0.99	0	0	discovered 5/01; green, OK 5/01; hunkered, green, OK 3 & 5/02; popped out, green, OK 3/03; hunkered, green, OK 5/03
4.00	1			1.72		0	2.15	0	0	discovered 5/02; green, OK 5/02, 3 & 5/03
Reference Poin										
1.00	2	1	1A	5.52	0	0	mia			green, good, discovered 3 & 5/99; green, good 3 & 5/00; some apical meristem damage, meristem slightly shifted, plant green, good 3/01; pale green, good 5/01; green but lots of surface area visible, OK 3/02; few spined, green, good 5/02; a few scattered spine clusters, plant mia 3 & 5/03
1.10	2									olive, good, discovered 5/99, green, good 3 & 5/00, chambers, galleries and exit holes, COD weevils 3/01
1.20	2	2	2A	4.12	3	4	4.95	3	3	discovered 3/01; green, good 3 & 5/01; purplish green, OK, with a little yellow beetle with black spots, 3 spots across 3-4 spots length, cucumber (?) beetle 3/02; purplish green, OK 5/02; green, good 3 & 5/03
2.00	2									fruit eaten 5/96, all fruit partially eaten 5/97, green, good 3 & 5/99, dead, collected for weevil study 3/00, large exit hole and one large gallery, COD *Moneilma*

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
2.01	2	7.28	209												1.53	0	0	1.71	0	0	2.65
2.10	2	6.89	202																		2.59
2.20	2	7.30	197																		
3.00	2	3.20	300	sm-med	3	Dead															
3.10	2	1.47	312																		1.26
4.00	2	3.45	7	small	2	Dead															
5.00	2	3.48	7	small	0	2.30	0	Dead													
6.00	2	3.57	7	v. small	0	2.40	0	0													
7.00	2	3.91	11	v. small	0	2.40	0	0													
7.10	2	6.00	355						2.20	0	0	2.40	1	1	3.15	0	0	3.57	1+1fr	1A+ 1 dispersed?	4.87
7.20	2	6.13	357						2.70	2fr	2A	3.60	2	2	2.05	0	dead				
7.30	2	5.24	344																		4.09
7.31	2	5.24	344																		
7.32	2	5.24	344																		
7.40	2	5.84	344																		3.22
8.00	2	12.00	330	small	1	2.90	2fr	0	1.80	0	0	2.40	2fr	2A	3.56	4fr	0	4.03	1+3fr	2 dispersed?	5.81
8.10	2	12.91	329			3.40		0	1.60	0	0	2.40	0	0	3.11	3A	1	3.35	1+2fr	1+1 dispersed?	3.39
8.20	2	~12.9	~315			2.70		3A	3.40	4fr	2A	3.70	3fr	2+1A	3.95	3A+3fr	2A,rest disp?	4.34	6	2+4A	5.13
9.00	2	11.95	335	small	5	Dead															
9.10	2	11.84	335			1.90		0	2.30	1	1	2.80	1+2fr	3	3.14	4fr	1A	3.69	2+3fr	4dispersed +1A	dead
9.20	2	11.71	343			2.00		0	Dead												

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.01	2	0	0	2.89	2	2	4.26	1	1	green, good 3/99; slightly maroonish 5/99; slightly hunkered, green, good 3 & 5/00; popped out, green, good 3 & 5/01; purplish green, good 3/02; green, good 5/02, 3 & 5/03
2.10	2	0	0	2.65	2	2	3.53	0	0	discovered 3/01; green, good 3 & 5/01; green, good 3 & 5/02; center eaten, plant reddish olive, poor 3/03; new growth, olive, OK 5/03
2.20	2						2.35	0	0	discovered 3/03; green with some tan tubercle tips, OK 3/03; eaten to soil surface, two tubercles left, green, poor 5/03
3.00	2									only spines left 3/96, tag mia
3.10	2	0	0	1.56	0	0	2.69	0	0	discovered 3/01; green, good 3/01; olive, OK 5/01; green, OK 3 & 5/02; green, good 3 & 5/03
4.00	2									only spines left 3/96, tag mia
5.00	2									root eaten, but tubercles still green, plant replaced 3/96, Dead 5/9
6.00	2									not Ancistrocactus tobuschii, probably Coryphantha sulcata, tag removed
7.00	2									not Ancistrocactus tobuschii, probably Coryphantha sulcata, tag removed
7.10	2	3	1A	2.39	0	0	mia			green, good 3/99; purplish, OK 5/99; olive, good 3/00; maroonish, OK 5/00; maroonish-green, good 3 & 5/01; green, OK 3/02; green, good 5/02; scattered spine clusters, plant mia 3 & 5/03
7.20	2									some loose spines 3/97, looks good 5/97, 3/98; very hunkered, loose, squishy, maroo poor, but lots of new spine growth 3/99; dead, COD unknown 5/99
7.30	2	3	3A	3.50	5	4				discovered 3/01; green, good 3 & 5/01; purplish green, good 3/02; green, good 5/02; eaten, formed two heads - 7.31 and 7.32 3/03
7.31	2						1.61	0	0	left head of 7.30; green, good 3 & 5/03
7.32	2						1.49	0	0	right head of 7.30; green, good 3 & 5/03
7.40	2	0	0	mia			mia			discovered 3/01; wedged between two rocks, center eaten, 2 tubercles with new spine growth, green, OK 3/01; forming 2 heads, green, good OK 5/01; loose spines in area, plant mia 3 & 5/02, 3 & 5/03
8.00	2	4	1+2A	mia			mia			green, good 3/99; yellowish, OK, dispersed? 5/99; dull green, good 3 & 5/00; yellowish-purplish-green, good 3 & 5/01; loose spines present, but no plant 3 & 5/02, 3 & 5/03
8.10	2	0	0	3.27	5	2	0.97	0	0	discovered 5/96, under evergreen sumacs; green, good 3 & 5/99; one flower partly eaten, plant green, good 3/00; green, good 5/00; hunkering, green with maroonish tubercle tips, OK 3 & 5/01; green, good 3 & 5/02; eaten below soil surface, one tubercle resprouted, green, good 3/03; green, OK 5/03
8.20	2	2	2	4.69	10	10	5.40	7	7	originally tagged as 43.00 from Stake 7; discovered 5/96; fruit mostly eaten 3/97; orangish 5/99; green, good 3 & 5/00; maroonish-green, OK 3 & 5/01; reddish green, OK 3/02; olive, OK 5/02; reddish dull purple, OK 3 & 5/03
9.00	2									only spines left 3/96, tag mia
9.10	2									discovered 5/96, green, good 3 & 5/99; 3 & 5/00; chambers, galleries, and exit holes, COD weevils 3/01
9.20	2									discovered 5/96; COD unknown, only spines left, tag removed 3/97

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
9.30	2	11.85	347			2.70		1	3.50	0	0	Dead									
9.31	2	11.75	344												2.79	0	0	2.78	0	0	2.81
9.40	2	13.19	335						3.50	1	1	3.10	2	2	3.44	0	0	3.25	1fr	1	3.83
10.00	2	12.05	1	med	3	Dead															
10.10	2	~16	~350						2.40		0	2.30	0	0	2.80	2A+1fr	1disp	3.10	2+1fr	1+2A	1.38
10.20	2	~16.35	~351																		1.44
11.00	2	11.80	0	small	1	1.70	0	0	2.10	1	1A	Dead									
11.10	2	~16.35	~17						4.90	7fr	5+1A	5.00	5	5	5.07	1A+3fr	1A,rest disp?	3.88	2fr	2	dead
11.20	2	~15.65	~20																		3.35
12.00	2	11.73	0	small	0	1.80	0	0	2.30	2	2	2.30	0	0	dead						
13.00	2	11.70	1	small	0	1.40	0	0	2.40	1	1	2.40	0	0	1.34	0	dead				
14.00	2	11.82	1	small	nd	0.90	0	0	1.60	0	0	1.90	0	0	Dead						
15.00	2	11.86	1	small	nd	0.60	0	0	Dead												
16.00	2	11.86	2	small	nd	0.80	0	0	mia			mia			Dead						
17.00	2	11.86	2	small	nd	1.00	0	0	mia			mia			Dead						
17.10	2	12.10	5						2.00	0	0	1.40	0	Dead							
18.00	2	8.18	40	nd	6	5.60	7fr	2	7.30	3+6fr	2+6A	7.70	9fr	2A+disp	8.10	8fr	7+1A	7.94	6fr	6	dead
19.00	2	11.89	5																		
20.00	2	~13.3	~25																		
21.00	2	~14.40	~25																		

Reference Point 2A is ~52.9m at 21 degrees from Stake 3, around west side of juniper. R0313140

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
9.30	2									discovered 5/96; tag mia, just spines left, COD unknown 3/98
9.31	2	0	0	2.21	0	0	1.74	0	0	olive, OK, discovered 5/99; shaded by juniper, OK 3/00; green, good 5/00; almost covered by juniper litter, green, OK 3/01; new green apical growth, good 5/01; new green spiral growth 3 & 5/02; center eaten, olive, poor 3/03; new growth, olive, OK 5/03
9.40	2	0	0	3.26	1	1	dead			between evergreen sumac and female juniper; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; green, good 3 & 5/02; large hole in root, COD Monellema 3/03
10.00	2									only spines left 3/96, tag mia
10.10	2	0	0	mia			mia			measured over junipers; discovered 5/97; maroonish, OK 5/99, 3 & 5/00; just a few tubercles left, reddish, one with new spine growth, poor 3/01; new green apex formed, OK 5/01; loose spine clusters in vicinity 3/02; plant mia 3 & 5/02, 3 & 5/03
10.20	2	0	0	1.67	0	0	2.65	1	1	discovered 3/01; green, good 3 & 5/01; green, good 3 & 5/02, 3 & 5/03
11.00	2									spines falling off, but stem still green 3/96, new growth 5/96, loose spines beside, looks good 3/97, just spines left, COD unknown 3/98
11.10	2									measured around oaks & juniper, between side by side juniper & kidneywood; ants swarming fruit 5/98, green, good 3 & 5/99, apical meristem shifted to NE side of plant, damaged?, green, good 3/00; dull green with a few yellow tubercle tips, OK 5/00; large larva inside, COD Monellema 3/01
11.20	2	1	1A	mia			mia			discovered 3/01; green, good 3 & 5/01;loose spine clusters 3/02; plant mia 3 & 5/02, 3 & 5/03
12.00	2									just loose spines, COD unknown 3/99
13.00	2									very hunkered, loose, maybe dead 3/99; dead, collected by WHC 5/99; COD unknown
14.00	2									just spines left, COD unknown 3/99
15.00	2									of the cluster 15-17, 15 is closer to 14 and in front of and between 16 & 17, may be pups of a former, larger plant; COD unknown, just spines left 3/97
16.00	2									of the cluster 15-17, 16 is behind 15, and to the right of 17, may be pups of a former, larger plant; loose spine clusters, COD unknown 3/99
17.00	2									of the cluster 15-17, 17 is behind 15, and to the left of 16, may be pups of a former, larger plant; loose spine clusters, COD unknown 3/99
17.10	2									dry, hard, & solid, COD unknown 5/98
18.00	2									one fruit about 10 cm from plant, both fruit with small holes (ca. 1 cm) 5/96, tops of flowers & fruit eaten 3/97; green, incredible! 3 & 5/99; green, good 3 & 5/00; galleries, chambers, exit holes; COD weevils 3/01
19.00	2						2.49		0	discovered 5/03; green, good 5/03
20.00	2						2.90		3	measured around junipers and oaks, discovered 5/03; green, good 5/03
21.00	2						1.57		0	discovered 5/03; green, good 5/03
Reference Poin										

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
1.00	2A	7.76	14																		5.10
2.00	2A	21.96	41																		3.69
2.10	2A	22.38	41																		2.03
3.00	2A	6.83	78																		6.55
4.00	2A	8.75	88																		4.96
5.00	2A	19.54	18																		1.85
6.00	2A	20.21	18																		2.90
6.01	2A	20.22	18																		
7.00	2A	9.48	4																		
8.00	2A	9.45	4																		
9.00	2A	9.48	4																		
10.00	2A	25.93	359																		
11.00	2A	14.56	357																		
12.00	2A	12.82	339																		
13.00	2A	17.48	325																		
13.01	2A	17.48	325																		
14.00	2A	16.53	340																		
15.00	2A	24.18	12																		
16.00	2A	24.16	12																		
17.00	2A	~10.95	262																		
18.00	2A	23.40	8																		
19.00	2A	22.47	7																		
Reference Point 3 was a pointy rock painted pink, at southern edge of opening on top of hill; in 3/00 switched to rebar on gravel p																					
	in rock and caliche pile 11.8m at 126 degrees from original reference point; ID #3 R032416A, R031316A																				
1.00	3	27.30	13												4.11			3A	4.03	4fr	1A dead

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.00	2A	3	3A	5.55	10	3+6A	dead			discovered 3/01, green with purplish tubercles, OK 3/01; green, good 5/01; purplish, OK 3/02; olive, OK 5/02; eaten below soil level, COD herbivory 3/03
2.00	2A	4	4	3.15	5	2+3A	dead			discovered 3/01, green, good 3 & 5/01; olive, OK 3 & 5/02; eaten below soil level, COD herbivory 3/03
2.10	2A		0	2.05	2	1+1A	3.11	1	1	discovered 5/01; green, good 5/01; green, good 3/02; purplish green, good 5/02, 3/03; green, good 5/03
3.00	2A	5	1+4A	dead						discovered 3/01, green, good 3 & 5/01; COD unknown, collected for weevil study 3/02
4.00	2A	3	3A	4.83	4	2+2A	dead			discovered 3/01, green, good 3 & 5/01; green, good 3 & 5/02, eaten to soil level, COD herbivory 3/03
5.00	2A		0	1.89	2	2	mia			discovered 5/01; green, good 5/01; purplish OK 3 & 5/02; a few loose spine clusters, plant mia 3 & 5/03
6.00	2A		0	2.82	3	2+1A	mia			discovered 5/01; green, good 5/01; reddish green OK 3/02; green, OK 5/02; a few loose spine clusters, plant mia 3 & 5/03
6.01	2A						1.25	0	0	a seedling or tubercle sprout of 6.00, discovered 3/03; green, good 3/03; green, OK 5/03
7.00	2A			5.21	10	5+4A	dead			discovered 3/02, purplish olive, OK 3/02; olive, OK 5/02; uprooted, mostly eaten, COD herbivory 3/03
8.00	2A			1.36	0	0	1.88	0	0	discovered 3/02; green, OK 3 & 5/02, 3 & 5/03
9.00	2A			2.60	3	2	dead			to the right of 7.00, discovered 3/02, green, OK 3 & 5/02, uprooted, partly eaten, COD herbivory 3/03
10.00	2A			5.17	9	1	mia			green, good ants are building mound on it 3 & 5/02; plant and tag mia 3/03; tag relocated, a few spine clusters in vicinity, plant mia 5/03
11.00	2A			2.03	2	2	2.17	0	0	discovered 3/02; purplish OK 3/02;olive, OK 5/02, 3/03; reddish green, OK 5/03
12.00	2A			4.97	8	6	5.16	10	7+2A	discovered 3/02; green, good 3/02; green, OK 5/02, 3/02; squishy, olive, poor 5/03
13.00	2A			4.39	8	5+1A	dead			discovered 3/02, green, good 3/02, green with a few tan tubercle tips, good 5/02, partly eaten, COD herbivory 3/03
13.01	2A						0.50	0	0	seedling of 13.00, discovered 3/03; olive, OK 3/03; root exposed, olive, poor 5/03
14.00	2A			3.38	7	2+1A	mia			discovered 3/02; green, OK 3/02; olive, OK 5/02; a few loose spine clusters, plant mia 3 & 5/03
15.00	2A						1.76	0	0	discovered 3/03; green, good 3 & 5/03
16.00	2A						0.91	0	0	discovered 3/03; green, good 3/03; green, OK 5/03
17.00	2A						2.42	0	0	discovered 3/03; green, good 3 & 5/03
18.00	2A						3.08		2	discovered 5/03; green, good 5/03
19.00	2A						1.68		0	discovered 5/03; green, good 5/03
Reference Poin										
	in rock a									
1.00	3									discovered 5/99, a few orange tubercles, OK 5/99, 3 & 5/00, just spine clusters left, COD unknown 3/01

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
2.00	3	27.18	13												2.22		0	2.29	1A	0	3.15
3.00	3	26.83	13												4.31		0	Dead			
3.01	3	26.84	13															0.75	0	0	mia
3.10	3	25.90	14																		
3.20	3	26.11	14																		
4.00	3	24.05	9												5.73		5A	6.19	4+4fr	2A, rest dispersed?	dead
5.00	3	23.87	9												5.24		0	5.60	6fr	4A	dead
6.00	3	25.40	8												3.87		1A	4.24	2+1fr	1+1A	3.69
6.10	3	25.40	8																		
6.20	3	25.38	8																		
7.00	3	25.35	9															1.20	0	0	1.58
8.00	3	14.42	20															2.75	0	0	2.80
8.01	3	14.42	20																		
8.10	3	14.42	21																		1.37
9.00	3	14.48	20															3.94	3fr	3 dispersed	4.07
9.01	3	14.51	22																		0.67
10.00	3	14.42	20															2.19	2fr	2	3.40
11.00	3	13.74	28															2.16	0	0	3.39
12.00	3	~11.1	~292															4.07	2fr	2	4.66
19.00	3	1.42	120	med	4	mia		Dead													

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.00	3	0	0	3.21	4	2	4.55	4	3+1A	discovered 5/99; green, good 5/99, 3 & 5/00, 2 & 5/01; green, OK 3/02; green, good 5/02, 3 & 5/03
3.00	3									discovered 5/99; olive, OK 5/99; dead, removed for weevil study 3/00; no evidence of weevils, COD unknown
3.01	3			mia			mia			discovered 3/00; hunkered, green, OK 3 & 5/00; plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03
3.10	3			3.61	4	4	4.51	4	3+1A	discovered 3/02; green, good, in grass clump 3 & 5/02, 3 & 5/03
3.20	3						1.19	0	0	discovered 3/03; green, good 3/03; olive, OK 5/03
4.00	3									discovered 5/99; a few loose spines, maroonish 5/99; dark green, good 3/00; green with purplish tubercle tips, good 5/00; interior soft and fluffy, COD fungus? 3/01
5.00	3									discovered 5/99; green, good 5/99; 3/00; green with slightly purplish tubercle tips, good 5/00; one large chamber, COD Monellema 3/01
6.00	3	0	0	2.14	1	1	2.96	1	1	measured over junipers, discovered 5/99; green, good 5/99, 3 & 5/00; center eaten, outer tubercles left, green, scarred over, poor 3/01; 3 new apices forming, green, OK 5/01; split into 3 (6.00, 6.10, 6.20), green, OK 3 & 5/02; green, good 3 & 5/03
6.10	3			1.61	0	0	2.44	0	0	discovered 3/02; to the left of 6.0, green, OK 3 & 5/02; green, good 3 & 5/03
6.20	3			1.75	0	0	2.04	0	0	in front of 6.0 & 6.1, discovered 3/02; green, OK 3 & 5/02; green, good 3 & 5/03
7.00	3	0	0	1.66	0	0	2.46	0	0	measured over junipers, discovered 3/00; green, good 3 & 5/00, 3 & 5/01; purplish green, OK 3 & 5/02; green, good 3 & 5/03
8.00	3	0	0	1.52	2	0	2.27	1	1A	right of 9.00 & 10.00, discovered 3/00; green, good 3 & 5/00; center eaten, scarred over, tubercles reddish-green, poor 3/01; 3 new apices forming, green, OK 5/01; splitting to two heads, green, OK 3/02; green, good 5/02; green, OK 3 & 5/03
8.01	3			1.56	1	0	2.15	0	0	left of 8.00, discovered 3/02; green, OK 3/02; green, good 5/02; green, OK 3 & 5/03
8.10	3	0	0	1.36	0	0	1.44	0	0	discovered 3/01; green, good 3 & 5/01; green, OK 3 & 5/02; olive, OK 5/03
9.00	3	0	0	3.27	3	2	4.24	4	2+2A	left of 8.00 and behind 10.00; discovered 3/00; green, good 3 & 5/00; maroonish-green, OK 3/01; green with yellowish tubercles, OK 5/01; blackish green, OK 3 & 5/02 purplish olive, OK 3 & 5/03
9.01	3	0	0	mia			mia			behind 9.00 at 7 o'clock; discovered 3/01; green, good 3/01; poor 5/01; plant mia 3 & 5/02, 3 & 5/03
10.00	3	0	0	2.75	3	2	mia			left of 8.00 and in front of 9.00; discovered 3/00; green, good 3/00; green with some orange tubercle tips, OK 5/00; green, with red tubercle tips, OK 3 & 5/01; purplish green, OK 3/02; olive, OK 5/02; a few loose spine clusters, plant mia 3 & 5/03
11.00	3	1	1A	3.90	7	2+5A	dead			discovered 3/00; green, good 3 & 5/00, 3 & 5/01; purplish green, OK 3/02; green, good 5/02; hard, dry, solid, COD unknown 3/03
12.00	3	3	3A	4.47	3	3	4.76	3	3	discovered 3/00; green with a few orange tubercle tips, good 3/00; one fruit with hole, plant green with a few orange tubercle tips, OK 5/00; green, good 3 & 5/01; green, good 3 & 5/02, 3 & 5/03
19.00	3									spine cluster about 30 cm away, tag removed 5/96

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
19.10	3	13.40	143			2.70		0	3.50	0	0	3.70	3fr	2+1A	3.39	1A+1fr	1+1A	Dead			
19.20	3	13.44	141						1.50	0	0	Dead									
20.00	3	7.20	336	lg	6	5.70	2+3fr	3	6.30	1+2fr	1+2A	6.00	4	3+1A	6.30	0	0	5.74	4+2fr	4+2A	6.87
20.01	3	7.23	336	v. sm	0	0.80	0	0	1.20	0	0	1.80	0	0	1.36	0	0	1.73	0	0	2.19
20.02	3	6.26	352												2.51	0	0	3.61	3fr	3 dispersed?	5.03
20.03	3	6.08	350												1.97	0	0	2.53	1+1fr	1+2A	3.65
20.04	3	6.86	350															2.00	0	0	3.10
20.05	3	7.06	347															2.24	0	0	3.32
20.06	3	7.30	343															2.14	0	0	3.47
20.07	3	7.60	333															2.04	0	0	0.39
20.08	3	7.10	354																		
20.09	3	~7.05	342																		
20.50	3	29.05	100			2.40		0	Dead												
21.00	3	13.20	347	med	4	4.90	4 fr	0	Dead												
23.00	3 (original)	12.09	340	medium	6	3.60	4	0	Dead												
24.00	3 (original)	12.00	345	med-lg	4	3.60	1+2fr	1	Dead												
25.00	3	14.30	237	med-lg	3	4.70	3	3	5.20	4+2fr	2+2A	5.40	5	5	5.36	3fr	1+1A	5.22	5	2+3A	dead
25.10	3	10.64	240															2.40	0	0	4.13

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
19.10	3									discovered 5/96; tannish, shrunken at base, very loose, but rooted 3/97; 3 fruit partially eaten, plant reddish with gray spines 3 & 5/98; reddish with gray spines, OK 3 & 5/99; dead, collected for weevil study 3/00, no evidence of weevils, COD unknown
19.20	3									Jabba the Hut syndrome 3 & 5/97, hard & dry, COD unknown 3/98
20.00	3	1	1A	5.91	5	5	6.73	5	4+1A	tubercle tips orange, OK 3 & 5/99; becoming lop-sided, green with orange tubercle tips good 3 & 5/00; two tubercles eaten, scarred over, maroonish-green, OK 3/01; green, good 5/01, 3 & 5/02; two flowers eaten, green, good 3/03; green, good 5/03
20.01	3	0	0	1.83	0	0	2.25	0	0	pup of 20.00, not tagged 3/97; measured in one direction only 3/98; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01, 3 & 5/02, 3 & 5/03
20.02	3	4	2A	dead						misshapen, OK 3/99; green, good 5/99, 3 & 5/00, 3 & 5/01; dead, weevil chamber & exit holes, COD weevils 3/02
20.03	3	3	1A	3.47	4	0	dead			green, good 3 & 5/99; slightly reddish-green, OK 3/00; green, good 5/00, 3 & 5/01; green, OK 3/02; goldish at base, green above, OK 5/02; small exit holes, COD weevils 3/03
20.04	3	0	0	3.05	4	3+1A	4.17	3	2+1A	discovered 3/00; green, good 3 & 5/00, 3 & 5/01, 3 & 5/02; green with purplish tubercle tips, good 3 & 5/03
20.05	3	1	1A	3.47	3	2	4.96	4	4	discovered 3/00; green, good 3 & 5/00; a few tubercles eaten, scarred over, green, OK 3/01; apex slightly shifted, green, good 5/01; green, OK 3 & 5/02, 3 & 5/03
20.06	3	2	2A	mia			mia			measured over Acacia; discovered 3/00; green, good 3 & 5/00, 3 & 5/01; loose spines plant mia 3 & 5/02, 3 & 5/03
20.07	3	0	0	1.57	0	0	2.11	0	0	measured over Acacia and sumac; discovered 3/00; green, good 3 & 5/00; loose spines covering either tubercle tip or seedling, green, poor 3/01; green, good 5/01; green, good 3 & 5/02, 3 & 5/03
20.08	3			3.00	2	0	2.88	0	0	discovered 3/02; slightly purplish green, OK 3/02; olive, OK 5/02; red, poor 3 & 5/03
20.09	3						2.25	0	0	measured over Acacia, discovered 3/03; green, good 3 & 5/03
20.50	3									discovered 5/96, measured over evergreen sumac, originally tagged as 54, only a few loose spines left, tag removed 3/97
21.00	3									fruit may have already dispersed 5/96, COD unknown, only spines left, tag removed 3/97
23.00	3 (original)									fruit may have already dispersed 5/96; COD unknown, only spines left, tag removed 3/97
24.00	3 (original)									flower partially eaten 3/96; COD unknown, only a few loose spines left, tag removed 3/97
25.00	3									fruit partially eaten 3/97; dull green, OK 3/99; yellowish, OK 5/99; 3/00, green with some yellow tubercle tips, good 5/00; plant uprooted, dead, COD uprooting, agent unknown 3/01
25.10	3	1	1A	4.00	5	3	4.59	3	0	discovered between rocks 3/00; green, good 3 & 5/00; purplish-green, good 3 & 5/01; green, OK 3/02; green with some tan tubercle tips, good 5/02, 3 & 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
25.20	3	13.58	~231															1.92	0	0	3.07
25.30	3	5.55	258																		
25.40	3	5.52	261																		
25.50	3	11.53	238																		
26.00	3 (original)	15.86	194	med	4	4.00	3	0	Dead												
26.10	3	9.20	176			3.90	4	2	5.20	7+1fr	7+1A	5.10	5	5	5.48	2fr	2A	5.25	5	5	dead
26.11	3	9.28	176			1.50	0	0	2.30	1	1	2.10	0	0	2.50	2	2A	2.88	2	0	3.28
26.111	3	9.29	176																		
26.12	3	9.21	175															1.04	0	0	1.27
26.13	3	9.18	176															1.44		0	1.78
26.20	3	9.26	176			1.60	0	0	2.00	2	1	2.30	0	0	2.35	1A	0	2.36	2	0	ND
26.30	3 (original)	13.90	140			3.70	1+2fr	2	Dead												
26.40	3 (original)	16.81	194			2.70		1	Dead												
26.50	3	1.65	191						2.50	2fr	0	3.10	0	0	3.04	2A	0	4.01	4	dispersed?	5.23
26.60	3 (original)	22.56	134						4.60	2+2fr	4	Dead									
26.70	3	12.85	134						3.00	0	0	3.50	2	2	3.95	1+1fr	2	4.27	2	2	5.51
26.71	3 (original)	14.77	126						1.60	0	0	Dead									
26.80	3 (original)	27.78	126						4.90	3fr	2	Dead									
26.90	3	19.89	127						1.10	0	0	1.50	0	0	1.68	0	0	1.43	0	Dead	

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
25.20	3	1	1A	mia			mia			discovered 3/00; green, good 3 & 5/00, 3 & 5/01; loose spines, plant mia 3 & 5/02, 3 & 5/03
25.30	3			3.11	5	5	3.68	2	1+1A	discovered 3/02; reddish green, OK 3 & 5/02, 3 & 5/03
25.40	3			2.94	5	5	dead			discovered 3/02, slightly reddish green, OK 3 & 5/02; just spines left, COD unknown 3/03
25.50	3			2.39		0	3.06	0	0	discovered 5/02; green, good 5/02, 3 & 5/03
26.00	3 (original)									shaded, COD unknown, only loose scattered spines left, tag removed 3/97
26.10	3									discovered 3/96; holes in fruit 5/96; tubercle tips maroonish, plant OK 3/99; good 5/99; good, green 3 & 5/00, eaten below soil surface, COD herbivory 3/01
26.11	3	0	0	1.61	0	0	2.38	0	0	discovered 3/96; seedling or pup of 26.10; green, good 3 & 5/99, 3 & 5/00; center eaten, scarred over, plant green, poor 3/01; two new apices forming, green, OK 5/01;green, good 3 & 5/02, 3 & 5/03
26.111	3			1.56	0	0	2.63	1	1	behind 26.11, discovered 3/02; green, good 3 & 5/02, 3 & 5/03
26.12	3	0	0	1.50	0	0	2.58	2	0	discovered among rocks 3/00; one measurement only 3/00; tag mia, replaced 5/00; green, good 3 & 5/00, 3 & 5/01; green, OK 3/02; green, good 5/02, 3/03; green with some yellowish tubercle tips, OK 5/03
26.13	3	0	0	1.46	0	0	2.47	2	2	discovered 5/00; green, good 5/00, 3 & 5/01; green, OK 3/02; pale green, OK 5/02; green, good 3 & 5/03
26.20	3	0	0	mia			mia			discovered 3/96; green, good, hunkering 3/99; green, good, popping out 5/99; hunkering, green, good 3/00; very hunkered, center depressed, loose spines, eaten?, green, OK 5/00; one tubercle left, poor 3 & 5/01; scattered spines, plant mia 3 & 5/02, 3 & 5/03
26.30	3 (original)									discovered 3/96, edge of small juniper; originally tagged as 40; COD unknown, only spines left, tag removed 3/97
26.40	3 (original)									discovered 5/96, originally tagged as 49; COD unknown, only a few loose spines left, tag removed 3/97
26.50	3	3	1A	4.91	10	3+2A	6.61	7	5+2A	green, good, hunkered 3/99; green, good, popping out 5/99; accidentally stepped on, green, good 3 & 5/00, 3 & 5/01; green, good 3/02; olive, OK 5/02; green, good 3/03; green, OK 5/03
26.60	3 (original)									weevil chambers 3/98
26.70	3	4	2+1A	5.38	6	7+1A	6.01	5	4	dull green, OK 3/99; green 5/99; green, good 3 & 5/00, 3 & 5/01; green, good, 3 & 5/02, 3 & 5/03
26.71	3 (original)									Jabba the Hut syndrome 3 & 5/97; hard & dry, COD unknown 3/98
26.80	3 (original)									plant reddish 3/97; fruit badly eaten 5/97; COD unknown 3/98
26.90	3									Jabba the Hut syndrome 3 & 5/97; tagged as 29.3; retag; reddish 3/98; green, good 3/99; olive, OK 5/99; squishy, hunkered, green, OK 3/00, weevil inside, dead 5/00

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
40.10	3	~24.3	~71						4.20	2	1+1A	4.20	0	0	3.57	1+1A	1disp	3.94	0	0	4.11
42.00	3	22.34	~75			1.60		0	2.70	1	1	2.90	2	2	3.40	3A	3A	3.80	1+2fr	3 dispersed	5.35
42.10	3	17.26	57						2.60	3fr	3	2.30	0	0	2.60	0	0	2.86	1fr	1	dead
42.20	3	21.84	71															1.78	0	0	2.56
42.21	3	~22.3	~72																		
42.22	3	~20.85	~72																		
42.23	3	19.62	71																		
42.24	3	19.22	72																		
42.30	3	22.12	71																		2.20
42.40	3	20.01	77																		4.00
42.50	3	20.30	78																		2.04
42.51	3	18.88	74																		
42.60	3	20.41	78																		1.83
43.10	3	20.76	62						3.20	5fr	1+4A	3.80	3fr+1A	3+1A	4.42	6A+1	1	4.56	9fr	2+1A, rest dispersed?	6.34
43.20	3	20.80	65																		
44.00	3	27.78	28			2.40		0	3.00	0	0	3.60	0	0	3.50	2A	0	3.85	1A	0	dead
45.00	3	28.10	28			1.90		0	2.30	0	0	2.40	0	0	2.29	0	0	2.35	0	0	3.11

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
40.10	3	0	0	4.10	0	0	4.12	0	0	originally measured from Reference Point 7; under shin oak; squishy, poor 3/99; green, OK 5/99; almost buried in oak leaf litter, green, good 3 & 5/00; coming out, green with gold tubercles at base, OK 3/01; green, good 5/01; green, good 3/02; green, OK 5/02, 3 & 5/03
42.00	3	5	1+3A	4.94	6	5	4.60	mia	0	originally measured from Ref. Point 7, edge of grass clump, discovered 5/96; green, good 5/99, 3 & 5/00, 3 & 5/01, 3 & 5/02; plant and tag mia 3/03; apex shifting, green, good 5/03
42.10	3									originally shot from Reference Point 7; reddish, loose 3/97; pupping off side of apical meristem, green, OK 3/99; OK, green 5/99; no pup, green, good 3 & 5/00; just spines left, COD unknown 3/01
42.20	3	0	0	2.23	0	0	mia			measured through juniper on west side; discovered 3/00; green, good 3 & 5/00; green with some tan tubercle tips, OK 3/01; green, good 5/01; loose spines, new apical spine growth, green, OK 3/02; green, good 5/02; a few spine clusters, plant mia 3 & 5/03
42.21	3			1.41		0	2.40	0	0	measured around juniper, discovered 5/02; green, good 5/02, 3 & 5/03
42.22	3			2.73		0	2.14	0	0	measured around juniper, discovered 5/02; forming 2 apices, green, good 5/02; only one head left, green, good 3 & 5/03
42.23	3						0.83		0	discovered 5/03; green, OK 5/03
42.24	3						1.64		0	base of prickly pear, discovered 5/03; green, good 5/03
42.30	3	0	0	2.28	3	0	4.08	4	1+1A	measured through juniper on west side, discovered 3/01; green, good 3 & 5/01; purplish green, OK 3 & 5/02; green, good 3 & 5/03
42.40	3		0	dead						discovered 5/01; green, good 5/01; just spines left, COD unknown 3/02
42.50	3		0	1.68	0	0	1.79	0	0	discovered 5/01; green, good 5/01; green, hunkered OK 3/02; apex shifted, green, OK 5/02; green, good 3 & 5/03
42.51	3			1.54		0	2.43	3	2	discovered 5/02; hunkered, green, good 5/02; popped out, green, good 3 & 5/03
42.60	3		0	1.71	1	1	mia			discovered 5/01; olive, OK 5/01; green, OK 3 & 5/02; loose spine clusters, plant mia 3 & 5/03
43.10	3	5	1A	5.86	13	10+1A	5.17	5	1	originally measured from Reference Point 7; dark green, OK 3 & 5/99, 3/00; olive, OK 5/00; blue-green, good 3/01; maroonish, OK 5/01; dark bluish green, 3/02; dark green, good 5/02; almost every tubercle nibbled, scarred over, plant green, OK 3 & 5/03
43.20	3						1.21		0	rock sandwich, discovered 5/03; green, good 5/03
44.00	3									discovered 5/96; under juniper by Nolina; OK 3/99; green, good 5/99, 3 & 5/00; just spines left, COD unknown 3/01
45.00	3	0	0	2.72	0	0	3.16	1	1	discovered 5/96; under juniper by Nolina; green, good, getting buried 3/99; green, good, popping out 5/99, 3 & 5/00, 3 & 5/01; green, OK 3/02; green, good 5/02, 3 & 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
50.00	3	17.22	58			2.90		0	3.90	2+2fr	1+1A	4.50	3	3	4.67	1+2fr	1+1A	3.98	0	0	dead
50.10	3	13.89	50															3.79	1A+3fr	1 dispersed	5.42
51.00	3	17.14	59			1.30		0	1.80	0	0	1.90	0	0	2.71	1fr	1	3.02	1fr	1	3.73
51.01	3	15.61	58																		
51.02	3	15.62	58																		
51.03	3	15.65	57																		
51.04	3	15.95	56																		
51.05	3	15.97	55																		
51.06	3	16.11	55																		
51.07	3	16.06	54																		
52.00	3	17.57	60			2.80		0	3.50	2	1+1A	3.60	2	2	4.45	3+1fr	2	4.77	4	4	4.03
53.00	3	19.22	59			1.80		0	2.90	1+1fr	1+1A	3.70	1	1	3.74	2fr	0	4.50	1+2fr	2+1 dispersed	4.96
53.10	3	18.04	55																		
53.20	3	20.74	51																		
54.00	3	20.43	48																		4.51
54.10	3	19.43	49																		
55.00	3	19.86	87			1.30		0	1.90	0	0	2.10	0	1	2.88	2fr	1	2.54	3fr	dispersed	3.47
55.10	3	19.90	87									0.90	0	0	1.10	0	0	1.29	0	0	1.70
55.20	3	21.18	83												2.59	3A	0	2.80	2fr	2 dispersed	dead

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
50.00	3									discovered 5/96, originally recorded as 50 in 3/96, switched to 20.10 in 3/97, switched back to 50.00 in 3/00; fruit eaten 3/97, green, good 3/99, few orangish tubercle tips, OK 5/99, getting partially buried in juniper litter, green, OK 3 & 5/00; large cavity, COD Monellema 3/01
50.10	3	6	5A	5.38	9	4+1A	6.81	13	11+2A	discovered 3/00; green, good 3 & 5/00, 3 & 5/01; green, OK 3/02; green with some orange tubercle tips, OK 5/02; green, good 3 & 5/03
51.00	3	2	1+1A	3.36	2	2	3.61	2	2	discovered 5/96; originally tagged as 51 in 3/96, then recorded as 20.20 in 3/97, switched back to 54.00 in 3/00; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; green, OK 3 & 5/02; green with some red tubercle tips, OK 3/03; green, good 5/03
51.01	3			1.17		0	1.51	0	0	discovered 5/02; green, good 5/02, 3 & 5/03
51.02	3			1.12		0	1.78	0	0	discovered 5/02; green, good 5/02, 3 & 5/03
51.03	3			0.96		0	1.59	0	0	discovered 5/02; green, good 5/02, 3 & 5/03
51.04	3						1.43		0	discovered 5/03; green, good 5/03
51.05	3						1.32		0	discovered 5/03; green, good 5/03
51.06	3						1.63		0	discovered 5/03; green, good 5/03
51.07	3						1.03		0	discovered 5/03; green, good 5/03
52.00	3	2	1+1A	dead						discovered 5/96, originally tagged as 52 in 3/96, then recorded as 20.30 in 3/97, switched back to 52.00 in 3/00; petals partially eaten, green, good 3 & 5/99, 3/00; one fruit partially eaten, plant green, good 5/00; dark green, good 3/01; maroonish-green, OK 5/01; COD Monellema; plant collected for weevil study 3/02
53.00	3	1	1A	4.71	3	3	5.64	4	2+1A	discovered 5/96; originally tagged as 53 in 3/96, then recorded as 20.40 in 3/97, switched back to 53.00 in 3/00; green, good 3 & 5/99, 3 & 5/00; some damage.to apical tubercles, plant green, OK 3/01; pale maroonish-green, good 5/01; green, good 3 & 5/02, 3 & 5/03
53.10	3			2.43	2	2	mia			discovered 3/02; green, OK 3/02; hunkered, green, good 5/02; plant mia 3 & 5/03
53.20	3						2.86		0	discovered 5/03; green, good 5/03
54.00	3	4	2A	4.70	6	4+1A	5.91	6	7	measured over small juniper, discovered 3/01; green, good 3 & 5/01; olive, OK 3/02; green, good 5/02, 3/03; reddish green, OK 5/03
54.10	3			3.10		1A	dead			discovered 5/02; green with a few red tubercle tips, good 5/02; only spine cap, COD unknown 3/03
55.00	3	2	1+1A	3.58	6	6A	4.51	7	3A	in rock jam; discovered 5/96; originally tagged as 55 in 3/96, then recorded as 20.6 in 3/97, switched back to 55.00 in 3/00; measured in one direction only 3/98 & 3/99; a few orangish tubercles, OK 5/99; dull green, OK 3/00; orangish at base, otherwise green, OK 5/00; pale green, good 3/01; green, good 5/01, 3 & 5/02; green, OK 3 & 5/03
55.10	3	0	0	1.62	0	0	2.17	0	0	dead Ancistrocactus tobuschii beside, live plant measured in one direction only, discovered 3/98; originally tagged as 20.61, switched to 55.10 in 3/00; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01, 3 & 5/02, 3 & 5/03
55.20	3									originally tagged as 20.62, switched to 55.20 in 3/00, green, good, hunkering 3/99; olive, OK 5/99, 3 & 5/00, eaten to soil surface, COD herbivory 3/01

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
55.30	3	20.27	85												2.61	0	0	2.81	1fr	1 dispersed	3.86
55.40	3	20.84	78															4.48	5fr	3+2 dispersed	5.49
56.00	3	12.60	83			2.90		1+1A	3.10	2+2fr	2+2A	3.70	2	2	3.46	3fr	1	3.48	3fr	dispersed?	3.85
56.01	3	12.61	83												0.52	0	0	0.54	0	0	1.17
56.02	3	12.58	83															0.48	0	0	1.02
56.03	3	12.63	83																		0.77
57.00	3	15.23	85			3.00		1	2.80	3fr	3	2.80	0	0	2.67	0	0	2.56	1fr	1 dispersed	3.26
57.01	3	15.21	85												0.81	0	0	1.03	0	0	0.96
57.10	3	15.45	86																		2.50
58.00	3	15.90	87			2.30		0	2.70	2fr	2	2.40	0	0	2.84	1fr	1disp	2.60	1fr	1A	3.70
58.10	3	15.63	101															1.91	0	0	3.01
59.00	3	15.49	101																		1.68
60.00	3	15.44	101																		1.51
61.00	3 (original)	22.63	122												4.22	4fr	2+1A	Dead			
62.00	3	6.30	117						4.50	5fr	3	4.00	0	0	4.11	4fr	2	3.92	3+1fr	1 dispersed	5.35
62.01	3	6.28	117															0.34	0	0	mia

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
55.30	3	2	1A	3.75	3	2+1A	5.06	4	4	originally tagged as 20.63, swithced to 55.30 in 3/00; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; pale reddish green, OK 3/02; green, OK 5/02, 3 & 5/03
55.40	3	5	4A	dead						discovered at edge of shin oak 3/00; green, good 3 & 5/00, 3 & 5/01; large cavity, COD monelema 3/02
56.00	3	3	3A	3.84	5	3+1A	4.43	5	4+1A	discovered 5/96; measured over evergreen sumac; originally tagged as 56 in ??, then recorded as 20.70 in ??, swithced back to 56.00 in 3/00; a few orangish tubercle tips, OK 5/99, 3 & 5/00; green with a few tan tubercle tips, OK 3 & 5/01;purplish green, OK 3/02; green with some orange tubercle tips, OK 5/02, 3 & 5/03
56.01	3	0	0	1.10	0	0	2.03	0	0	originally tagged as 20.71, switched to 56.01 in 3/00; one measurement only 3/00; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; green, OK 3 & 5/02; green, good 3 & 5/03
56.02	3	0	0	0.86	0	0	1.49	0	0	discovered at base of 56.00 (~11 o'clock), not tagged 3/00; green, OK 3/00; green, good 5/00, 5/01; green, OK 3/02; green, good 5/02, 3 & 5/03
56.03	3		0	0.93	0	0	1.35	0	0	close to 56 at 4:30 o'clock; discovered 5/01; not tagged, green, good 5/01; green, good, covered by a rock 3/02; green, good 5/02, 3 & 5/03
57.00	3	2	2	3.09	4	2+2A	4.22	3	0	fruit eaten, discovered 5/96; measured over evergreen sumac; originally tagged as 57 in ??, then recorded as 20.80 in ??, swithced back to 57.00 in 3/00; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; green, OK 3 & 5/02, 3/03; green, good 5/03
57.01	3	0	0	0.99	0	0	1.81	0	0	originally tagged as 20.81, switched to 57.01 in 3/00; green, good 3/99, 5/99, 3 & 5/00 green, OK 3 & 5/01, 3/02; green, good 5/02, 3 & 5/03
57.10	3		0	2.71	3	2+1A	3.63	4	4	discovered 5/01; green, good 5/01; green, OK 3/02; hunkered, green, OK 5/02; popped out, green, OK 3 & 5/03
58.00	3	3	1A	3.03	3	2	dead			discovered 5/96; originally tagged as 58 in 3/96, then recorded as 20.90 in 3/97, swithced back to 58.00 in 3/00; green, good 3 & 5/99, hunkered, green, OK 3/00; popping out, green, OK 5/00, 5/01, 3 & 5/02; eaten below soil level, COD herbivory 3/03
58.10	3	3	3	3.18	5	2	dead			discovered 3/00; green, good 3 & 5/00, 3 & 5/01; reddish purplish-green, OK 3/02; green with some orange tubercle tips, OK 5/02; just spine cap left, COD unknown 3/03
59.00	3	0	0	2.16	1	1	2.68	1	1	discovered 3/01; green, good 3 & 5/01; green, OK 3 & 5/02, 3 & 5/03
60.00	3		0	1.51	0	0	1.81	1	1	discovered 5/01; green, good 5/01; hunkered, green, OK 3/02; green, good 5/02, 3 & 5/03
61.00	3 (original)									maroonish, OK 3 & 5/99, dead, weevil chambers 3/00
62.00	3	6	6A	4.26	7	6+1A	5.62	9	7+1A	fruit partially eaten 5/97; dull green, OK 3/99; orangish, OK, tiny seedling (62.01) in front 5/99; green with orangish tubercle tips, OK 3 & 5/00; olive with some missing tubercles (scarred over) and tan tips, OK 3/01; maroonish-olive, OK 5/01; green with goldish tubercle tips, OK 3 & 5/02; purplish green, OK 3/03; olive, OK 5/03
62.01	3			mia			mia			discovered 5/99, not tagged, OK 3 & 5/00, mia 3 & 5/01, 3 & 5/02, 3 & 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
62.02	3	6.26	117															0.48	0	0	0.86
62.10	3	7.81	113															1.53	0	0	2.09
62.20	3	7.85	111															1.58	0	0	2.36
62.21	3	7.78	109																		
62.22	3	7.78	111																		
62.23	3	7.97	111																		
62.24	3	7.99	110																		
62.25	3	7.00	113																		
62.26	3	6.98	112																		
62.30	3	8.72	113															2.59	0	0	4.36
62.40	3	7.58	123																		
62.41	3	7.06	128																		
62.42	3	7.08	128																		
62.43	3	7.48	129																		
62.44	3	7.66	129																		
62.45	3	7.33	126																		
62.50	3	9.07	117																		
62.60	3	9.33	121																		
63.00	3 (original)	18.64	118						3.40	4fr	3+1A	3.80	2	1+1A	dead						
64.00	3	8.50	107						2.10	1fr	1	2.60	2fr	2	2.83	3fr	3	Dead			
64.01	3	8.17	104												1.03	0	0	1.60	0	0	2.89
64.10	3	8.62	100															1.03	0	0	2.50
64.11	3	8.53	102																		
64.20	3	8.64	100															1.60	0	0	1.35
64.30	3	8.87	109																		2.98
64.40	3	8.44	104																		
64.50	3	8.03	103																		
64.60	3	8.31	100																		

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
62.02	3	0	dead							discovered 3/00, not tagged, OK 3 & 5/00, 3/01, just spines left, COD unknown 5/01
62.10	3	0	0	2.03	2	2	3.81	4	2+1A	discovered 3/00; green, good 3/00; dull green, OK 5/00; dark green, good 3/01; green, good 5/01; purplish green, OK 3/02; green, OK 5/02; one flower partly eaten, plant purplish green, OK 3 & 5/03
62.20	3	0	0	2.18	3	2+1A	3.34	3	3	discovered 3/00; green, good 3 & 5/00, 3/01; dull green, OK 5/01; olive, OK 3/02; green, OK 5/02, 3 & 5/03
62.21	3			0.95	0	0	1.37	0	0	discovered 3/02; green, OK 3 & 5/02, 3 & 5/03
62.22	3			1.29		0	2.08	1	1	discovered 5/02; green, good 5/02, 3/03; green, OK 5/03
62.23	3						0.66	0	0	discovered 3/03; green, OK 3 & 5/03
62.24	3						1.49	0	0	discovered 3/03; purplish green, OK 3 & 5/03
62.25	3						1.49	0	0	discovered 3/03; green, good 3 & 5/03
62.26	3						1.10	0	0	discovered 3/03; green, good 3 & 5/03
62.30	3	4	4A	4.67	7	6+2A	6.25	8	5+2A	discovered 3/00; green, good 3 & 5/00, 3 & 5/01; green, OK 3/02; green with a few tan tubercle tips, OK 5/02; two flowers partly eaten, plant green, good 3 & 5/03
62.40	3			1.24		0	1.85	0	0	discovered 5/02; green, good 5/02, 3 & 5/03
62.41	3						1.84		0	discovered 5/03; green, good 5/03
62.42	3						2.37		0	discovered 5/03; green, good 5/03
62.43	3						2.03		0	discovered 5/03; green, good 5/03
62.44	3						3.04		0	discovered 5/03; green, good 5/03
62.45	3						0.69		0	discovered 5/03; green, OK 5/03
62.50	3			1.98		0	2.71	3	2	discovered 5/02; green, good 5/02; purplish green, OK 3/03; olive, good 5/03
62.60	3			1.29		0	2.11	0	0	discovered 5/02; green, good 5/02, 3 & 5/03
63.00	3 (orginal)									2 weevils collected, tiny seedling replanted 3/99; seedling dead 5/99
64.00	3									dull green, OK 3 & 5/99; dead, weevil exit holes 3/00
64.01	3	0	0	3.09	5	5	5.08	5	5	green, good 3/99; hunkered, green, OK 5/99; hunkered, green, good 3/00; popping ou green, good 5/00; yellowish-green, good 3 & 5/01; green, OK 3/02; green, good 5/02, & 5/03
64.10	3	0	0	1.25	0	0	1.98	1	1	discovered 3/00; green, OK 3 & 5/00; green, good 3 & 5/01; green, OK 3 & 5/02; green, good 3 & 5/03
64.11	3						1.05		0	discovered 5/03; green, good 5/03
64.20	3	0	0	2.42	3	2	3.33	3	3	discovered 3/00; green, good 3 & 5/00, 3 & 5/01; green, OK 3 & 5/02; green, good 3 & 5/03
64.30	3	1	0	3.00	5	3+2A	4.59	7	7	discovered 3/01; pale olive with reddish tubercles, OK 3 & 5/01; purplish green, OK 3 & 5/02, 3/03; accidentally stepped on, green with some orange and red tubercle tips, OK 5/03
64.40	3						0.81	0	0	discovered 3/03; reddish, OK 3/03; green, good 5/03
64.50	3						0.72	0	0	discovered 3/03; purplish, OK 3/03; green, good 5/03
64.60	3						1.80		0	in rock sandwich, discovered 5/03; green, good 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
64.70	3	7.73	105																		
65.00	3 (original)	20.03	117						2.00	1fr	1A	2.40	1fr	1	2.69	2fr	2	Dead			
66.00	3	4.71	93						0.90	0	0	1.20	0	0	1.23	0	0	1.95	0	0	3.07
67.00	3	4.73	94						1.30	0	0	2.10	0	0	1.49	0	0	1.95	0	0	2.65
67.10	3	5.82	91																		
68.00	3 (original)	16.28	115						1.00	0	0	Dead									
69.00	3	4.71	87						1.60	1fr	1	2.10	0	0	2.55	1fr+1A	0	Dead			
69.01	3	4.77	88									0.70		0	0.84	0	0	0.82	0	0	mia
69.10	3	4.04	75												2.73	1fr	1disp	2.94	3	2	3.78
69.20	3	3.80	63												4.05	0	0	4.27	5fr	1+3 dispersed	5.23
69.30	3	4.59	80																		1.84
69.40	3	5.48	48																		
69.50	3	4.42	30																		
69.60	3	4.54	83																		
70.00	3 (original)	17.86	110						3.50	3fr	3	Dead	Dead	Dead							
71.00	3 (original)	17.80	110						1.30	0	0	0.70	0	Dead							
72.00	3	6.26	73						2.90	2fr	2	3.60	2fr	2	3.68	3A	0	3.99	4fr	dispersed?	dead
72.10	3	7.67	63															2.57	3fr	3	3.51
72.20	3	8.12	66															3.14	3fr	2+1A	4.08
72.30	3	6.77	71																		2.14
72.31	3	6.70	71																		
72.40	3	7.10	74																		1.35
72.50	3	7.14	74																		2.10

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
64.70	3						1.61		0	discovered 5/03; green, good 5/03
65.00	3 (original)									dull green, OK 3 & 5/99; just spines left, COD unknown 3/00
66.00	3	0	0	3.05	3	2A	4.68	4	2+1A+ 1disp	Jabba the Hut syndrome, barely rooted 3/97; measured in one direction only, gray 3/98; dull green, OK 3 & 5/99; hunkered, green, good 3/00; popping out, green, good 5/00, 3 & 5/01; green, OK 3 & 5/02; green, good 3 & 5/03
67.00	3	0	0	2.47	3	2+1A	3.32	3	3	measured in one direction only 3/98; dull green, OK 3 & 5/99; hunkered, green, OK 3 & 5/00, 3/01; popped out, green, good 5/01; purplish green, OK 3 & 5/02, 3/03; green with some red tubercle tips, OK 5/03
67.10	3						1.63	0	0	discovered 3/03; green, good 3 & 5/03
68.00	3 (original)									measured in one direction only, half buried horizontally, Jabba the Hut syndrome 3 & 5/97, hollow, weevils? 3/98
69.00	3									green, good 3/99; OK, squishy 5/99; dead, just spines left, COD unknown 3/00
69.01	3			1.30	0	0	1.64	0	0	discovered 3/98; almost spineless, dull green, poor 3/99; some spines, green, OK 5/99 hunkered, green, OK 3/00; popping out, green, OK 5/00; plant mia 3 & 5/01; green, OK 3 & 5/02, 3/03; green, good 5/03
69.10	3	2	0	3.30	5	4	4.23	5	5	green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; green, OK 3 & 5/02; green good 3 & 5/03
69.20	3	8	1+4A	4.63	9	6+3A	5.56	7	3+3A	dull green, OK 3/99; yellowish, OK 5/99, 3 & 5/00; light olive, OK 3/01; light green, good 5/01; reddish green, OK 3 & 5/02, 3 & 5/03
69.30	3	0	0	1.79	0	0	2.76	2	1	discovered 3/01; green, good 3 & 5/01; slightly blue-green, OK 3 & 5/02; purplish green, OK 3/03; green, good 5/03
69.40	3			2.27	3	0	3.30	2	2	discovered 3/02; green, OK 3 & 5/02, 3 & 5/03
69.50	3						3.31	1	1	discovered 3/03; green good 3 & 5/03
69.60	3						0.83	0	0	discovered 3/03; green, good 3 & 5/03
70.00	3 (original)									hollow with yellow mush, weevils? 3/98
71.00	3 (original)									measured in one direction only, bad 3/98, hard & dry, COD unknown 5/98
72.00	3									fruit partially eaten 3/97, tubercle tips orange & red, OK 3 & 5/99, 3/00, entire plant orange and red, OK 5/00, dry and fluffy inside, COD fungus? 3/01
72.10	3	4	3A	3.08	7	5+2A	mia			discovered 3/00; green, good 3 & 5/00; olive with tan tubercle tips, OK 3 & 5/01; green, OK 3 & 5/02; plant mia 3 & 5/03
72.20	3	4	3A	2.57	1	1	3.42	0	0	discovered 3/00; dull green, OK 3/00; orangish, OK 5/00; olive, OK 3 & 5/01; just spines showing, hunkered, poor 3/02; olive, OK 5/02; small chunk eaten, olive, poor 3/03; new growth, green, OK 5/03
72.30	3	0	0	2.19	3	2+1A	dead			discovered 3/01, green, good 3 & 5/01; green, OK 3/02; olive, OK 5/02; mostly eaten, COD herbivory 3/03
72.31	3			1.04		0	1.72	0	0	discovered 5/02; reddish green OK 3/03; green, good 5/03
72.40	3	0	0	1.59	0	0	2.26	0	0	discovered 3/01; green, good 3 & 5/01;green, OK 3/02; green, good 5/02, 3 & 5/03
72.50	3	0	0	1.95	1	0	2.86	2	1A	discovered 3/01; green, good 3 & 5/01; green, OK 3/02; green, good 5/02, 3 & 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
72.60	3	8.06	53																		3.63
73.00	3	14.23	87						2.10	1fr	0	2.60	0	0	2.67	0	0	2.86	0	0	4.17
74.00	3	17.30	81						4.90	1+5fr	6	4.20	0	0	4.30	0	0	Dead			
75.00	3 (original)	~24.11	~104						2.60		0	2.60	1	1	1.99	0	dead				
76.00	3	14.23	80									1.70		0	2.68	1fr	disp	2.96	1fr	0	3.43
76.10	3	11.80	71															2.02	0	0	2.49
76.20	3	11.99	76															0.98	0	0	1.31
76.30	3	11.82	76															2.02	1A+1fr	2A	2.70
76.31	3	11.81	76																		
76.40	3	10.55	67															2.76	3fr	1A+2 dispersed	4.38
76.41	3	9.89	67																		
76.50	3	14.35	75																		2.88
76.51	3	13.87	74																		2.86
76.60	3	14.42	73																		2.25
76.61	3	13.60	66																		
76.62	3	13.14	59																		
76.70	3	10.69	73																		2.96
76.71	3	10.20	70																		
76.80	3	14.86	73																		1.85
76.90	3	15.40	76																		2.86
77.00	3	22.79	90															3.70	3fr	dispersed	4.68
78.00	3	23.87	90															3.10	1fr	1	dead
79.00	3	23.64	91															3.91	1+3fr	dispersed	dead

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
72.60	3	3	1A	3.65	3	1+2A	4.11	4	3+1A	discovered 3/01; green, good 3 & 5/01; green, OK 3 & 5/02, 3 & 5/03
73.00	3	1	1A	3.68	5	4	4.72	6	2+2disp	in side oats grama clump; green, good 3 & 5/99, 3/00 & 5/00, 5/01, 3 & 5/02, 3 & 5/03
74.00	3									green, good 3 & 5/99, dead, removed for weevil study 3/00; COD weevils
75.00	3 (original)									discovered 5/97; dead, loose, shrunken spines gray 3/99; Dead?, collected by WHC 5/99, galleries; COD weevil
76.00	3	0	0	2.78	3	3A	4.20	3	2	discovered 5/98; green, good 3 & 5/99, 3/00; yellowish, OK 5/00; green with maroonis tubercle tips, OK 3 & 5/01; green with red tubercle tips, OK 3 & 5/02, 3/03; green with yellow tubercle tips, OK 5/03
76.10	3	2	2	2.65	2	1+1A	3.61	3	2	discovered 3/00; green, good 3 & 5/00, 3 & 5/01; green, OK 3 & 5/02; green, good 3/03; green with some orange tubercle tips, OK 5/03
76.20	3	0	0	1.31	0	0	2.09	1	1	discovered 3/00; green, good 3 & 5/00, 3 & 5/01; green, OK 3/02; green, good 5/02, 3 & 5/03
76.30	3	2	1A	2.94	4	3+1A	dead			discovered 3/00; hunkered, dark green, OK 3/00; popping out, green, good 5/00, 3 & 5/01; bluish-green, OK 3/02; olive, OK 5/02; plant uprooted and partly eaten, COD herbivory 3/03
76.31	3						0.58	0	0	seedling of 76.30, discovered 3/03; reddish olive, OK 3 & 5/03
76.40	3	6	6A	4.43	8	3	5.60	6	1+2A+ 2 disp	discovered 3/00; reddish, OK 3 & 5/00; maroonish-green, good 5/01; green, OK 3 & 5/02; purplish green, OK 3/03; olive, OK 5/03
76.41	3			2.44	2	3	3.58	3	3	discovered 3/02; green, OK 3 & 5/02; green, good 3 & 5/03
76.50	3	0	0	2.95	5	4	mia			discovered 3/01; apex on one side, stepped on in past?; green, OK 3 & 5/01; olive, OK 3 & 5/02; just a few loose spine clusters, plant mia 3 & 5/03
76.51	3		0	dead						discovered 5/01; under rock; green, good 5/01; COD Moneilema 3/02
76.60	3	0	0	1.76	2	0	3.06	3	1+2A	discovered 3/01; green, some tubercle damage, OK 3/01; green, good 5/01; hunkered green, OK 3/02; green, good 5/02; green, OK 3 & 5/03
76.61	3			2.87		1+1A	mia			discovered 5/02; green, good 5/02; a few loose spine clusters, plant mia 3 & 5/03
76.62	3						2.85		0	discovered 5/03; olive, OK 5/03
76.70	3	2	2A	2.93	2	1+1A	dead			discovered 3/01; green, good 3 & 5/01; reddish olive, OK 3 & 5/02; small chamber, COD weevils 3/03
76.71	3						1.66	0	0	discovered 3/03; green, good 3 & 5/03
76.80	3	0	0	1.52	1	1	dead			discovered 3/01; green, good 3 & 5/01; hunkered, green, OK 3/02; green, good 5/02; just spine cap left, COD unknown 3/03
76.90	3		0	2.48	3	1+1A	4.15	5	4+1A	discovered 5/01; green, OK 5/01; green, good 3/02; reddish green, OK 5/02; green, good 3 & 5/03
77.00	3	4	1+3A	4.18	5	3+2A	4.81	4	2+2A	discovered 3/00; green, good 3 & 5/00, 3 & 5/01; green, OK 3 & 5/02, 3 & 5/03
78.00	3									discovered 3/00; maroon and orange, poor 3/00; orangish-green, OK 5/00; dead, collected for weevil study 3/01
79.00	3									discovered 3/00; green, good 3 & 5/00; chambers, galleries, and exit holes, COD weevils 3/01

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
79.10	3	24.87	88																		3.33
80.00	3	28.56	96															2.20	1	1A	3.38
81.00	3	28.40	93															4.06	4	3A	dead
82.00	3	26.72	99															4.54	6fr	dispersed	5.33
83.00	3	30.06	107															4.33	4+1fr	2+1A+2 dispersed	5.78
83.10	3	31.00	106																		
84.00	3	25.52	111															3.26	1	0	4.33
85.00	3	18.89	101																		3.36
86.00	3	~73.63	~110																		4.52
87.00	3	23.00	109																		
88.00	3	18.44	116																		
89.00	3	19.65	118																		
90.00	3	24.90	114																		
Reference Point 3A = R031321A																					
1.00	3A	14.84	193															2.81	2	2	dead
2.00	3A	14.59	193															2.46	2	2	dead
3.00	3A	4.35	48																		2.82
4.00	3A	3.45	36																		1.23
5.00	3A	4.58	35																		
6.00	3A	4.68	216																		

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
79.10	3	1	1A	3.21	4	4	dead			discovered 3/01; green, good 3 & 5/01, 3 & 5/02, small exit holes, COD weevils 3/03
80.00	3	3	2A	3.15	4	disp	dead			discovered 3/00; hunkered, olive, OK 3 & 5/00, tag loose replaced, blue-green with some orange tubercles, OK 3/01; maroonish, OK 5/01; purplish OK 3/02; olive, OK 5/02; mostly eaten, COD herbivory 3/03
81.00	3									measured under edge of juniper, discovered 3/00; tag loose, replaced 5/00, green, good 3 & 5/00; body with one large cavity, COD Moneilema 5/01
82.00	3	5	1+4A	4.53	9	5+4A	5.49	9	6+3A	discovered 3/00; maroonish, OK 3 & 5/00; green good 3/01; maroon, OK 5/01; purplish green, OK 3 & 5/02, 3 & 5/03
83.00	3	6	1+2A	5.46	8	9	6.39	8	6+2A	discovered 3/00; green with orange tubercle tips, OK 3 & 5/00; two flowers partly eaten, plant eaten on one side (scarred over), green with maroon tubercles, OK 3/01; maroonish-green, good 5/01; purplish green, OK 3/02; olive, OK 5/02; five flowers partly eaten, plant reddish green, good 3/03; green with some tan tubercle tips, OK 5/03
83.10	3							3	2+1A	discovered 3/03; green, good 3 & 5/03
84.00	3	1	1A	4.76	3	4	5.60	3	3	edge of prickly pear, discovered 3/00; green, good 3 & 5/00, 3 & 5/01, 3 & 5/02, 3 & 5/03
85.00	3	2	1A	2.61	2	1+1A	3.78	4	3+1A	discovered 3/01; green, good 3 & 5/01; olive, OK 3/02; green, good 5/02; olive, OK 3/03; hunkered, green, OK 5/03
86.00	3	4	2	3.13	5	2	3.81	2	2	along old road, ~3m below juniper by big rock, discovered 3/01; lopsided, green, good 3 & 5/01; green, OK 3 & 5/02, 3/03; green, good 5/03
87.00	3			6.11	9	7+1A	7.17	9	6+3A	discovered 3/02; purplish-green, OK 3 & 5/02, 3 & 5/03
88.00	3			2.73	3	3	3.95	4	4	discovered 3/02; green, OK 3/02; green, good 5/02, 3 & 5/03
89.00	3						4.51	5	3+2A	discovered 3/03; maroonish, OK 3/03; green with some orange tubercle tips, OK 5/03
90.00	3						3.48		0	discovered 5/03; orangish, poor 5/03
Reference Poin										
1.00	3A									discovered 3/00; green with a few orange tubercle tips, OK 3 & 5/00; chambers, galleries, and exit holes, COD weevils 3/01
2.00	3A									discovered 3/00; reddish, OK 3/00; slightly purplish-green, OK 5/00; black inside, COD fungus 3/01
3.00	3A	1	0	2.22	1	1	2.69	0	0	discovered 3/01; green with some yellow tubercle tips, OK 3/01; yellowish, OK 5/01; hunkered green, OK 3 & 5/02; popped out, green, OK 3/03; green, good 5/03
4.00	3A	0	0	1.26	0	0	1.93	0	0	discovered 3/01; green, good 3 & 5/01; green, good 3 & 5/02, 3 & 5/03
5.00	3A						2.58	1	1	discovered 3/03; green, good 3 & 5/03
6.00	3A						2.99		3	discovered 5/03; green, good 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
21.01	3A	3.46	44						2.20	1	1	3.50	3fr	1	4.57	5A	1A	5.44	2+4fr	2A+2	dead
21.10	3A	5.06	34			2.20	1	0	2.70	3	2	2.70	1	1	3.04	1fr	0	3.37	2fr	1+1A	4.09
21.11	3A	4.74	31									nd		0	1.38	0	0	1.22	0	0	1.80
21.12	3A	4.75	31									nd		0	1.18	0	0	1.46	0	0	2.11
21.20	3A	5.35	29			2.00	0	0	2.50	2	1+1A	3.10	1+1fr	1+1A	3.13	2A	0	3.60	2fr	1+1A	4.47
21.21	3A	5.58	29															1.96	0	0	2.67
21.30	3A	1.86	119						3.90	5	4	4.60	3	3A	5.66	2+4fr	5A	5.46	3	1+2A	dead
21.31	3A	2.56	125									1.80	0	0	1.39	0	0	1.52	0	0	1.57
21.32	3A	1.85	56									1.10		0	2.02	1fr	1	2.52	1fr	1 dispersed	3.38
21.33	3A	1.87	56									0.80		0	1.15	0	0	Dead			
21.40	3A	2.48	227						3.80	1+5fr	1+3A	4.40	4	4	4.81	4A+1fr	1A	4.78	8fr	5+1A	
21.50	3A	3.35	243						3.50	1+1fr	1+1A	3.90	3fr	3	4.41	3A	0	4.56	5fr	4+1A	4.75
21.60	3A	3.45	243						4.30	2+2fr	1+2A	5.50	1+3fr	4	5.50	5fr	4A+1	5.96	6fr	5	dead
21.70	3A	3.38	243						1.90	0	0	2.30	1	1	2.24	0	0	2.74	0	0	3.33
21.80	3A	3.37	243						1.50	0	0	1.40	0	0	1.50	0	0	1.48	0	0	1.92
21.90	3A	3.39	243						1.80	0	0	2.00	0	0	2.05	0	0	2.28	0	0	2.69
22.00	3A	2.80	50	sm-med	2	2.70	2	0	3.30	1+2fr	1+1A	3.90	3	3	4.49	6A+1fr	1A	4.80	2+5fr	3A, rest dispersed?	3.87
22.01	3A	2.82	50																		

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
21.01	3A									evidently a seedling or pup of 21.00; green, good 3 & 5/99, 3/00; top eaten off of one fruit, plant green, good 5/00; eaten below soil surface, COD herbivory 3/01
21.10	3A	3	3A	3.61	3	2+1A	4.34	3	3	discovered 3/96; below prickly pear; green, good 3/99; hole in petal of flower; green, good 5/99; green, good 3 & 5/00, 3 & 5/01, 3 & 5/02, 3 & 5/03
21.11	3A	0	0	1.53	0	0	2.25	0	0	discovered 5/98; green, good, hunkered in moss 3/99; green, good 5/99, 3 & 5/00, 3 & 5/01, 3 & 5/02, 3 & 5/03
21.12	3A	0	0	2.15	1	1	2.80	0	0	discovered 5/98; green, good, hunkered in moss 3/99; green, good 5/99, 3 & 5/00, 3 & 5/01, 3 & 5/02, 3 & 5/03
21.20	3A	2	1A	4.25	5	3	4.50	0	0	discovered 3/96; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01, 3 & 5/02, 3 & 5/03
21.21	3A	0	0	2.46	2	2	dead			discovered 3/00; popping out of crustose lichen, green, good 3 & 5/00, 3 & 5/01; green OK 3 & 5/02; large chamber, COD Monellema 3/03
21.30	3A									stepped on 3/98; green, great 3 & 5/99, 3/00, fruit with hole in top; plant green, good 5/00; eaten below soil surface, COD herbivory 3/01
21.31	3A	0	0	1.67	0	0	1.50	0	0	in prickly pear; discovered 3/98; loosely rooted, green, good 3/99; green, loosely rooted, OK 5/99; dull green, OK 3 & 5/00, 3 & 5/01; green, OK 3 & 5/02, 3 & 5/03
21.32	3A	3	2A	3.40	7	2+3A	dead			discovered 5/98; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; 5 flowers partially eaten; plant green, good 3 & 5/02, mostly eaten, COD herbivory 3/03
21.33	3A									on its side, loosely rooted, discovered 5/98; turning orange on exposed side, OK 3 & 5/99; dead, hard, solid, dry, COD unknown 3/00
21.40	3A	0	dead							fruit partly eaten 5/97; maroonish with a few orangish tubercle tips, OK 3 & 5/99; dark green, good 3/00, hole in top of one fruit, green, good 5/00; top mostly eaten, a few red-brown tubercles left, poor 3/01, COD herbivory 5/01
21.50	3A	2	2A	dead						little bluestem clump; green, good 3 & 5/99, 3 & 5/00, one flower mostly eaten, plant green with a few orange tubercle tips, OK 3/01, green, good 5/01, COD Monellema 3/02
21.60	3A									flowers & fruit partially eaten 3/97, fruit partially eaten 5/97, fruit with ants but no seeds, fruit removed by WHC 5/99; green, great 3 & 5/99, 3 & 5/00; galleries, chambers, exit holes, COD weevils 3/01
21.70	3A	1	1A	dead						right of 21.8 and in front of 21.90; measured in one direction only 3/98; green, good 3 5/99, 3 & 5/00, 3 & 5/01; spines left, COD unknown 3/02
21.80	3A	0	0	2.97	0	0	mia			measured in one direction only 3/98; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; green, OK 3 & 5/02; loose spine clusters in area, plant and tag mia 3 & 5/03
21.90	3A	0	0	3.22	2	1A	mia			measured in one direction only 3/98; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; green with reddish tubercle tips, OK 3 & 5/02; loose spine clusters in area, plant mia 3 & 5/03
22.00	3A	0	0	1.91	0	0	2.84	3	1+2A	in front of 22.01; fruit partially eaten 3/97; slightly maroonish, OK 5/99; yellowish, OK 3/00; tubercles yellowish on one side 5/00; center eaten, two tubercles with new spine growth, tubercles red-green, poor 3/01; two new green apices forming, good 5/01; green, OK 3/02; green, good 5/02, 3 & 5/03
22.01	3A			2.03	0	0	2.88	3	2A	discovered 3/02; green, OK 3 & 5/02; green, good 3 & 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
22.10	3A	5.71	67						4.30	3	1+1A	4.60	1fr	1	4.78	4A	0	4.96	5fr	1A+4	dead
22.11	3A	5.30	64												2.66	0	0	3.08	1+1fr	1+1A	2.89
23.00	3A	2.58	82																		
23.01	3A	2.58	85																		
23.02	3A	2.60	85																		
24.00	3A	5.94	61																		
25.00	3A	7.01	50																		
26.00	3A	6.94	49																		
27.00	3A	8.05	48																		
Reference point 3B is 19.5m at 159 degrees from Stake 3. R031320A																					
1.00	3B	3.03	204																		9.34
2.00	3B	11.87	176																		5.13
3.00	3B	12.71	177																		7.06
4.00	3B	12.81	176																		2.53
5.00	3B	13.43	168																		6.65
6.00	3B	18.83	169																		3.62
7.00	3B	18.89	171																		4.16
8.00	3B	21.97	161																		
Reference point 4 was a painted cross on a flat rock covered by flint 14.65m at ~340 degrees from rebar, wes																					
	across drainage, follow flagging; rebar stake between Yucca clumps, ~46.8m at ~94 degrees from Stake 3. R031321B																				
1.00	4	10.82	98															4.47	3fr	3	dead
2.00	4	8.55	92															5.33	7fr	dispersed?	7.43

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
22.10	3A									one flower partially eaten 3/97, 1 orange tubercle tip otherwise green, good 3 & 5/99, 3 & 5/00, eaten down below soil surface, COD herbivory 3/01
22.11	3A	0	0	mia			mia			green, good 3 & 5/99, 3 & 5/00; center eaten, a few green or red tubercles left, poor 3/01; two new green apices forming, good 5/01; loose spines in vicinity, plant mia 3 & 5/02, 3 & 5/03
23.00	3A			3.31	3	0	mia			discovered 3/02; dull olive, OK 3/02; orange, OK 5/02; plant mia 3 & 5/03
23.01	3A						1.84	0	0	discovered 3/03; green, good 3 & 5/03
23.02	3A						1.59	0	0	discovered 3/03; green, good 3 & 5/03
24.00	3A			2.79	2	2	3.17	1	1A	discovered 3/02; green, good 3 & 5/02, 3 & 5/03
25.00	3A			1.69	2	2	2.77	0	0	discovered 3/02; hunkered, green, good 3 & 5/02, 3 & 5/03
26.00	3A			1.13	0	0	1.61	0	0	discovered 3/02; green, good 3 & 5/02, 3 & 5/03
27.00	3A			3.49	4	3	3.60	0	0	discovered 3/02; purplish-green, good 3 & 5/02; center eaten, purplish poor 3/03; center and back scarred over, rest of plant red, poor 5/03
Reference poin										
1.00	3B	9	9A	8.52	12	6+6A	9.09	12	11+3A	discovered 3/01; dull green, good 3/01; green, good 5/01, 3 & 5/02, 3 & 5/03
2.00	3B	4	4A	5.10	8	4+4A	6.41	9	9	discovered 3/01; one flower partly eaten, plant blue-green, good 3 & 5/01; green, good 3 & 5/02, 3 & 5/03
3.00	3B	9	8A	5.31	5	2+1A	6.23	9	5+2A	discovered 3/01; all flowers partly eaten, plant green, good 3 & 5/01; olive with goldish tubercle tips 3/02; green with red & yellow tubercle tips, OK 5/02; two light gray stink bugs on plant, plant dull green, OK 3/03; tiny ants swarming fruit, plant green with som orange tubercle tips, OK 5/03
4.00	3B	1	0	2.61	2	1+1A	3.88	2	1+1A	discovered 3/01; green, good 3 & 5/01, 3 & 5/02; purplish green, OK 3/03; green with some orange tubercle tips, OK 5/03
5.00	3B	9	4A	5.24	12	5+3A	7.87	11	6+5A	discovered 3/01; all flowers partly eaten, plant blue-green, good 3/01; green, good 5/01, 3 & 5/02; purplish green, good 3/03; green with a few tan tubercle tips, good 5/03
6.00	3B	3	2A	3.83	5	5	5.15	3	2+2A	discovered 3/01; green, good 3 & 5/01, 3 & 5/02; olive, OK 3/03; purplish green, OK 5/03
7.00	3B	3	3A	3.65	3	3	4.34	3	3	discovered 3/01; olive, OK 3 & 5/01; reddish green, OK 3 & 5/02; olive, OK 3/03; purplish green, OK 5/03
8.00	3B			5.42	8	8	6.41	4	4+A	discovered 3/02; green, good 3 & 5/02; olive with some pale orange tubercle tips, OK & 5/03
Reference poin										
	across dr									
1.00	4									discovered 3/00; yellowish, OK 3/00; green with some yellow tubercle tips, good 5/00; one large chamber, COD Monellema 3/01
2.00	4	8	7A	5.62	15	6+3A	7.61	12	11	discovered 3/00; green, good 3 & 5/00; five flowers partly eaten, plant green, good 3 & 5/01; green, OK 3 & 5/02; green, good 3/03; green, OK 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
2.10	4	6.18	93																		2.74
2.20	4	9.76	87																		4.52
2.30	4	9.82	93																		4.07
2.40	4	10.65	85																		3.06
2.50	4	10.93	86																		
3.00	4	9.31	107															3.39	2fr	2	3.83
4.00	4	8.05	109															4.14	4fr	4	5.71
4.10	4	8.45	107																		3.11
4.20	4	8.56	105																		1.66
4.30	4	7.58	100																		
4.40	4	7.66	99																		
4.50	4	8.30	99																		
4.51	4	8.27	98																		
4.52	4	8.25	98																		
4.53	4	8.15	98																		
4.60	4	8.51	99																		
4.70	4	8.74	104																		
5.00	4	8.45	123															4.12	3fr	dispersed	6.27
5.10	4	~7.51	~123																		2.93
5.20	4	1.90	119																		3.81
5.30	4	7.95	118																		
6.00	4	12.20	127															3.20	3fr	1+2 dispersed	3.65
6.10	4	13.37	151																		
6.20	4	13.54	150																		
6.30	4	~15.05	~132																		

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.10	4	0	0	2.94	3	3	3.75	0	0	discovered 3/01; green, good 3 & 5/01, 3/02; green, OK 5/02, 3/03; green, good 5/03
2.20	4	4	2A	mia			mia			discovered 3/01; all flowers partly eaten, plant green, good 3 & 5/01; depression but no sign of plant found 3/02, plant mia 3 & 5/02, 3 & 5/03
2.30	4	3	1A	mia			mia			discovered 3/01; blue-green, good 3 & 5/01; loose spines in vicinity, plant mia 3 & 5/02, 3 & 5/03
2.40	4		0	2.88	3	3A	mia			discovered 5/01; green, good 5/01; green, OK 3 & 5/02; just a few loose spines, plant mia 3 & 5/03
2.50	4			0.81	0	0	1.37	0	0	discovered 3/02; green, good 3 & 5/02, 3 & 5/03
3.00	4	0	0	1.18	0	0	2.30	0	0	under juniper, discovered 3/00; green, good 3 & 5/00, 3 & 5/01; loose spines around, maybe eaten partially, green, good 3 & 5/02; green, good 3 & 5/03
4.00	4	4	1+3A	dead						discovered 3/00; green, good 3 & 5/00; tag mia replaced 3/01; green, good 3 & 5/01 loose spine in vicinity, found original tag, root dry, corky, COD unknown 3/02
4.10	4		1A	3.07	2	1+1A	dead			discovered 5/01; green, good 5/01; one flower with hole eaten in side, plant green, OK 3 & 5/02; eaten below soil surface, COD herbivory 3/03
4.20	4		0	1.43	0	0	2.26	2	1+1A	discovered 5/01; green, good 5/01; green, OK 3 & 5/02; green, good 3 & 5/03
4.30	4			1.65	1	1	2.67	0	0	discovered 3/02; hunkered, green, OK 3 & 5/02; purplish green, good 3/03; green, good 5/03
4.40	4			1.88	1	1	2.64	1	0	discovered 3/02; slightly purplish green, OK 3/02; hunkered, green, OK 5/02; purplish green, good 3 & 5/03
4.50	4			1.94		0	2.32	0	0	discovered 5/02; edge of small dug hole; plant green, good 5/02, 3 & 5/03
4.51	4						2.24	0	0	discovered 3/03; green, good 3 & 5/03
4.52	4						1.76	0	0	discovered 3/03; green, good 3 & 5/03
4.53	4						1.24	0	0	discovered 3/03; green, good 3 & 5/03
4.60	4						1.43	0	0	discovered 3/03; green, good 3 & 5/03
4.70	4						1.49	0	0	discovered 3/03; green, good 3 & 5/03
5.00	4	4	3A	4.47	3	3	mia			discovered 3/00; green, good 3 & 5/00, 3 & 5/01; olive, OK 3 & 5/02; plant mia 3 & 5/03
5.10	4		0	2.81	3	2	dead			discovered 5/01; green, good 5/01; 3 & 5/02; dead, COD uprooting 3/03
5.20	4		0	2.80	4	4	mia			discovered 5/01; purplish-green, good 5/01; purplish-green, OK 3/02; green, OK 5/02; a few loose spines nearby, plant mia 3 & 5/03
5.30	4						2.64	2	1	discovered 3/03; flowers partly eaten, plant purplish green, OK 3 & 5/03
6.00	4	1	1A	2.59	0	0	3.52	1	1	discovered 3/00; green, good 3 & 5/00; some tubercle damage, plant green, OK 3 & 5/01; recovering from a bite out of side, green with orange tubercle tips, OK 3 & 5/02; apex shifted, green OK 3 & 5/03
6.10	4			1.77	2	2	2.89	0	0	discovered 3/02; green, OK 3/02; green, good 5/02, 3 & 5/03
6.20	4			3.94	6	2+2A	5.00	0	dead	discovered 3/02; olive, OK 3/02; olive with tan tubercle tips, OK 5/02; green with some red tubercle tips and small hole in tubercle, OK 3/03; weevils inside, COD weevils 5/03
6.30	4			3.19		1A	mia			discovered 5/02; green, good 5/02; a few loose spines, plant mia 3 & 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
6.40	4	10.48	~148																		
6.41	4	10.49	~148																		
6.42	4	10.50	~148																		
6.50	4	~11.39	~128																		
6.51	4	~11.40	~128																		
6.52	4	~11.42	~128																		
6.53	4	~11.42	~128																		
6.54	4	~11.44	~128																		
6.55	4	~11.45	~128																		
6.60	4	~11.53	~134																		
7.00	4	19.98	103																		6.05
7.10	4	18.85	107																		
7.20	4	16.55	110																		
7.30	4	~19.18	130																		
7.40	4	~19.82	133																		
7.50	4	19.84	133																		
7.60	4	20.61	132																		
7.61	4	20.39	132																		
7.70	4	20.62	129																		
7.80	4	20.97	132																		
7.90	4	20.62	136																		
7.91	4	20.61	136																		
7.92	4	20.62	136																		
8.00	4	5.83	151																		3.04
9.00	4	5.42	157																		4.92
9.10	4	5.28	161																		
9.20	4	5.08	161																		
10.00	4	4.54	351																		2.03
11.00	4	15.54	331																		1.03
12.00	4	15.53	331																		0.93

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
6.40	4			1.57		0	1.97	0	0	discovered 5/02; green, good 5/02, 3 & 5/03
6.41	4			1.93		0	1.92	1	1	discovered 5/02; green, good 5/02, 3 & 5/03
6.42	4			1.35		0	1.95	0	0	discovered 5/02; green, good 5/02, 3 & 5/03
6.50	4						2.36	1	0	discovered 3/03; green, good 3 & 5/03
6.51	4						1.05	0	0	discovered 3/03; green, good 3 & 5/03
6.52	4						1.05	0	0	left of 6.53, discovered 3/03; green, good 3 & 5/03
6.53	4						1.21	0	0	right of 6.52, discovered 3/03; green, good 3 & 5/03
6.54	4						0.64	0	0	left of 6.55, discovered 3/03; green, good 3/03; hunkered, green, OK 5/03
6.55	4						0.63	0	0	right of 6.54, discovered 3/03; green, good 3 & 5/03
6.60	4						2.47	0	0	discovered 3/03; green, good 3 & 5/03
7.00	4	6	5A	5.10	9	8+1A	3.16	0	0	discovered 3/01; green with reddish tubercle tips, OK 3/01; dull green, OK 5/01; green, good 3 & 5/02; eaten and perhaps two new apices forming, plant green, good 3/03; one apex, green, good 5/03
7.10	4			3.52	6	6	4.62	5	5	discovered 3/02; green, good 3/02; green with some tan tubercle tips, OK 5/02; green, good 3/03; green with some orange tubercle tips, OK 5/03
7.20	4			3.72	3	3	4.46	3	3	discovered 3/02; green, good 3 & 5/02, 3 & 5/03
7.30	4			2.01	2	2	3.00	2	2A	measured through junipers, discovered 3/02; green, good 3 & 5/02; apex shifted, one flower eaten, plant green, OK 3/03; green, good 5/03
7.40	4			2.47	1	1	mia			discovered 3/02; green, OK 3 & 5/02; a few scattered spines, plant mia 3 & 5/03
7.50	4			2.56	2	1+1A	mia			discovered 3/02; green, OK 3 & 5/02; a few scattered spines, plant mia 3 & 5/03
7.60	4			3.89	6	6	4.70	6	6	discovered 3/02; olive, OK 3 & 5/02, 3 & 5/03
7.61	4						0.98		0	discovered 5/03; hunkered, green, good 5/03
7.70	4			3.94	5	5	5.42	7	7	discovered 3/02; green, OK 3/02; maroonish, OK 5/02; slightly reddish olive, OK 3/03; green with some yellow tubercle tips, OK 5/03
7.80	4			2.55	2	2	3.46	3	3	discovered 3/02; green, OK 3 & 5/02; green, good 3 & 5/03
7.90	4			3.12	5	5				discovered 3/02; green, OK 3 & 5/02; eaten, formed two heads - 7.91 and 7.92 3/03
7.91	4						1.85	0	0	green, OK 3/03; green, good 5/03
7.92	4						1.18	0	0	green, OK 3/03; green, good 5/03
8.00	4	0	0	dead						discovered 3/01, green, good 3 & 5/01; small holes in the top (weevil exit holes), COD weevils 3/02
9.00	4	5	1	4.34	5	1+1A	dead			discovered 3/01, green, good 3 & 5/01; reddish green, OK 3/02; olive, OK 5/02; eaten below soil level, COD herbivory 3/03
9.10	4						1.84	0	0	discovered 3/03; green, good 3 & 5/03
9.20	4						2.33	2	1+1A	discovered 3/03; green, good 3 & 5/03
10.00	4		0	2.03	0	0	2.99	2	2	discovered 5/01; green, good 5/01, 3 & 5/02, 3 & 5/03
11.00	4		0	1.03	0	0	1.24	0	0	left of 12.00 and behind 15.00, discovered 5/01; green, OK 5/01; purplish green, OK 3/02; olive, OK 5/02; green, OK 3 & 5/03
12.00	4		0	0.94	0	0	1.50	0	0	right of 11.00 and 15.00, discovered 5/01; green, OK 5/01; purplish-green, OK 3/02; olive, OK 5/02, 3/03; green, OK 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
13.00	4	15.39	330																		1.80
14.00	4	16.09	331																		1.40
15.00	4	15.54	331																		0.25
16.00	4	18.45	329																		2.52
17.00	4	17.64	328																		2.77
18.00	4	18.86	325																		0.89
19.00	4	18.92	326																		1.38
20.00	4	14.87	323																		
21.00	4	14.88	320																		
22.00	4	15.95	332																		
27.00	4	13.78	345	sm-med	0	2.50	0	0	2.80	4fr	4	3.00	0	0	3.14	0	0	2.88	2fr	2	3.84
27.01	4	13.80	345																		0.62
28.00	4	13.80	345	small	0	1.80	0	0	2.40	3fr	3	2.90	0	0	2.80	0	0	2.88	2fr	2	3.17
29.00	4	3.05	257	sm-med	1	mia			mia			mia									
29.10	4	16.78	~332						0.60		0	0.90	0	0	mia			mia			mia
29.20	4	16.78	~332						0.70		0	1.00	0	0	1.26	0	0	1.95	0	0	3.83
Reference point 5 is a painted cross covered by flint on a rock beyond Reference point 6; ID #5 R031221																					
1.00	5	0.82	172			0.70		0	1.20	0	0	1.60	0	0	2.02	0	0	2.66	0	0	4.30
2.00	5	1.14	222												1.75	0	0	2.30	0	0	dead

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
13.00	4		0	2.04	3	1+1A	2.89	0	0	discovered 5/01; squishy, olive, OK 5/01; purplish, OK 3/02; olive, OK 5/02; purplish green, OK 3 & 5/03
14.00	4		0	1.57	1	0	dead			discovered 5/01, green, good 5/01; green, OK 3/02; green, good 5/02; large larva inside, COD Moneilema 3/03
15.00	4		0	0.24	0	0	0.32	mia	0	between 11.00 and 12.00, in front of 11 and left of 12; discovered 5/01; not tagged, green, OK 5/01; purplish, OK 3/02; green, OK 5/02; plant mia 3/03; buried, green, OK 5/03
16.00	4		0	dead						discovered 5/01, green, OK 5/01, COD Moneilema 3/02
17.00	4		0	2.73	2	1	dead			discovered 5/01, green, good 5/01, 3 & 5/02; just spines left, COD unknown 3/03
18.00	4		0	0.89	0	0	1.07	0	0	discovered 5/01; green, good 5/01; olive, OK 3 & 5/02, 3 & 5/03
19.00	4		0	1.31	0	0	1.75	0	0	discovered 5/01; green, good 5/01; green, OK 3 & 5/02, 3 & 5/03
20.00	4			1.73		0	2.32	1	1A	discovered 5/02; green, good 5/02, 3 & 5/03
21.00	4			4.30		3	mia			discovered 5/02; green, good 5/02; scattered spine clusters, plant mia 3 & 5/03
22.00	4						1.39	0	0	discovered 3/03; green, good 3 & 5/03
27.00	4	0	0	3.35	4	3+1A	dead			flower partially covered by animal droppings 3/96; covered by disintegrating animal droppings, good 3 & 5/99; maroonish, some loose spines, squishy, OK 3/00; olive, OK 5/00; maroonish-green, new apical spine growth, OK 3 & 5/01; purplish, OK 3/02; reddish, OK 5/002; mostly eaten, COD herbivory 3/03
27.01	4		0	0.57	0	0	mia			upper right edge of tag 27.00, discovered 5/01 not tagged, green, OK 5/01; green, OK 3 & 5/02; plant mia 3 & 5/03
28.00	4	0	0	2.80	2	1A	dead			flower partially covered by animal droppings 3/96; covered by disintegrating animal droppings, good 3 & 5/99; green, a few orange tubercle tips, OK 3/00; olive, OK 5/00; purplish-green with new apical spine growth, OK 3/01; orangish-green, OK 5/01; dehydrated, OK, can't see colors 3/02; green, OK 5/02, mostly eaten, COD herbivory 3/03
29.00	4									could not relocate, unsure of reference point 3 & 5/96; relocated reference point, but plant & tag still mia 3/97 & 5/97, 3 & 5/98
29.10	4									by old dead plant, discovered 5/97, not tagged; retagged 3/98, mia 99, 3 & 5/00, 3 & 5/01
29.20	4	1	1A	3.99	7	4+3A	mia			discovered 5/97; not tagged; retagged 3/98; green, good 3/99; olive, OK 5/99; green, good 3 & 5/00, 3/01; green with some red tubercle tips, good 5/01; green, OK 3 & 5/02; tag and plant mia 3/03; tag found, replaced, plant mia 5/03
Reference poin										
1.00	5	3	3A	4.72	9	9	dead			discovered 5/96, probably a seedling of 31.00; originally tagged as 68 then as 31.01; large hole in center but stem still green 3/97; two new spine clusters at opposite sides 5/97, green, good 3 & 5/99; 3 & 5/00, 5/01; green, good OK 3 & 5/02; small exit holes, COD weevils 3/03
2.00	5									green, good 3 & 5/99; 3 & 5/00; just spines left, COD unknown 3/01

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
3.00	5	1.22	226												2.09	1A	0	2.04	1fr	1	3.16
4.00	5	1.23	228												2.91	1A	0	3.01	1+1fr	dispersed	4.12
5.00	5	2.07	96															4.15	1+2fr	2A+1	5.05
5.10	5	1.86	82																		
6.00	5	7.60	146															4.02	1A+1fr	1A	5.55
6.01	5	7.60	146																		
6.02	5	7.65	146																		
7.00	5	1.35	109																		2.45
8.00	5	6.85	140																		6.45
9.00	5	10.11	177																		3.68
10.00	5	10.12	180																		3.00
11.00	5	9.72	180																		1.98
12.00	5	10.83	174																		3.89
13.00	5	0.52	351																		
30.00	5	0.70	140	small	0	1.90	0	0	Dead												
31.00	5	0.80	170	sm-med	2	Dead															
31.10	5	3.25	254			2.40	0	0	Dead												
31.20	5	3.20	254			nd	nd	Dead?	Dead												
32.00	5	0.83	160	sm-md	0	Dead															
32.10	5	1.27	291						3.20	3fr	2+1A	3.20	3fr	3	3.63	3A	0	3.73	1+2fr	1A+2	4.42
33.00	5	7.54	324																		7.98
34.00	5	6.13	340																		3.79

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
3.00	5	1	1A	2.06	3	1	1.85	0	0	maroonish, OK 3 & 5/99; hunkered, dark green, OK 3/00; hunkered, green, good 5/00; popped out, green, good 3/01; olive, OK 5/01; loose spines in vicinity, apex has shifted toward ground, but plant green, good 3 & 5/02, 3 & 5/03
4.00	5	2	1A	4.44	6	5+1A	4.54	4	4	maroonish, OK 3 & 5/99, 3 & 5/00, 3 & 5/01; purplish green, good 3 & 5/02; purple, OK 3 & 5/03
5.00	5	4	4A	4.29	6	4+2A	dead			discovered 3/00; goldish, OK 3/00; maroonish, OK 5/00; olive, OK 3 & 5/01; purplish, OK 3 & 5/02; uprooted, COD uprooting 3/03
5.10	5						3.97	3	3	under rock, discovered 3/03; purplish green, good 3 & 5/03
6.00	5	6	2+2A	5.30	5	4+1A	dead			discovered 3/00; green, good 3/00; yellowish-green, good 5/00; green, good 3 & 5/01; green with a few tan tubercle tips, OK 3/02; green & gold, OK 5/02; collected for weevil study, COD weevils 3/03
6.01	5						0.46	0	0	seedling of 6.00, discovered 3/03; replanted, green, OK 3 & 5/03
6.02	5						0.47	0	0	seedling of 6.00, discovered 3/03; reddish green, OK 3 & 5/03
7.00	5	0	0	2.37	3	3	3.24	2	2	discovered 3/01; green, OK 3 & 5/01; purplish, OK 3/02; olive, OK 5/02; blackish green, good 3/03; reddish green, OK 5/03
8.00	5	6	6A	5.20	6	1+3A	5.60	5	5	discovered 3/01; green, good 3 & 5/01; green with some tan tubercle tips, OK 3 & 5/02 3 & 5/03
9.00	5	3	3	3.68	5	4+1A	3.21	0	0	discovered 3/01; green, good 3 & 5/01, 3 & 5/02; eaten almost to soil level, two remaining tubercles red, poor 3/03; reddish green, OK 5/03
10.00	5	1	1A	2.65	1	1	2.81	0	0	discovered 3/01; green, good 3 & 5/01; green, OK 3 & 5/02, 3/03; green, good 5/03
11.00	5	0	0	1.98	0	0	2.44	0	0	discovered 3/01; green, good 3 & 5/01, 3 & 5/02; apex eaten, scarring over, plant goldish green, OK 3/03; scarred over, green, OK 5/03
12.00	5	2	2A	dead						discovered 3/01; dark olive, good 3/01; green, good 5/01, COD unknown, collected for weevil study 3/02
13.00	5						1.04	0	0	under a rock, removed, discovered 3/03; green, OK 3/03; green, good 3 & 5/03
30.00	5									sick 3/96, new growth, OK 5/96, COD unknown, only spines left, tag missing 3/97
31.00	5									only loose spines left 3/96; tag gone 5/96
31.10	5									discovered 3/96, originally tagged as 43; COD unknown; scattered loose spines in vicinity 3/97
31.20	5									discovered 3/96, severely eaten, main above ground plant gone, spines still attached to someting 5/96; not tagged, COD unknown, plant gone 3/97
32.00	5									only loose spines left 3/96; tag gone 5/96
32.10	5	3	3A	3.81	5	4	4.63	2	0	reddish 3/98 & 3/99; reddish, OK 5/99; olive, OK 3 & 5/00; reddish, OK 3 & 5/01; purplish green, OK 3/02; reddish, OK 5/02, 3 & 5/03
33.00	5	9	1+9A	6.52	14	13+3A	6.42	5	2+3A	discovered 3/01; flowers with pinkish tinge, stigmas yellow to pinkish-yellow, plant purple, OK 3 & 5/01; dark green, purplish at the base, good 3/02; dark olive, OK 5/02; severed at ground level, reddish purple, poor 3 & 5/03
34.00	5	3	3A	4.65	5	6	5.71	5	2	discovered 3/01; green, good 3 & 5/01, 3 & 5/02, 3/03; a few tubercles eaten, scarred over, green with a few red tubercle tips, OK 5/03

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PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
35.00	5	11.50	81																		5.40
36.00	5	11.54	77																		2.75
37.00	5	1.41	29																		2.40
37.01	5	1.41	29																		
38.00	5	13.15	76																		2.98
39.00	5	13.35	74																		3.48
40.00	5	13.42	74																		5.75
41.00	5	13.56	76																		1.55
42.00	5	12.39	75																		
43.00	5	11.68	57																		
44.00	5	12.98	55																		
45.00	5	13.40	51																		
46.00	5	12.41	72																		
Reference point 6 is a painted cross covered by flint on a flat rock. R031220[illegible]																					
1.00	6	2.50	180												2.05	0	0	2.21	1fr	1 dispersed	3.22
2.00	6	2.18	197			1.80		0	1.90	1A	0	2.10	1fr	1	2.97	3A	0	3.11	1+3fr	1A+rest dispersed	mia
3.00	6	4.70	174												3.08	1A	0	3.23	1fr	1	mia
3.01	6	4.45	170												2.20		0	2.57	0	0	mia
4.00	6	4.85	174												1.39	0	0	1.33	0	0	1.46
5.00	6	5.19	174												1.97	0	0	2.55	0	0	3.15

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
35.00	5	6	6A	4.79	7	6+1A	6.31	9	4+1A	discovered 3/01; green, good 3 & 5/01, 3 & 5/02; spotted cucumber beetle on flowers, plant green, good 3/03; green, good 5/03
36.00	5	0	0	3.02	3	2A	3.93	2	0	discovered 3/01; green, good 3 & 5/01; blackish, OK 3/02; green, OK 5/02, 3/03; eaten to soil level, poor 5/03
37.00	5	0	0	2.70	3	3	dead			discovered 3/01; reddish-green, OK 3 & 5/01; green, good 3/02; reddish green, OK 5/02; just spine cap left, COD unknown 3/03
37.01	5						0.46	0	0	seedling of 37.00, discovered 3/03; reddish, poor 3 & 5/03
38.00	5		0	2.61	0	0	3.42	2	2	discovered 5/01; reddish-olive, OK accidentally stepped on 5/01; green, OK 3/02; reddish green, OK 5/02; green, OK 3 & 5/03
39.00	5		0	2.94	2	2	3.99	4	0	discovered 5/01; green, good 5/01; purplish OK 3 & 5/02; green with red tubercle tips, OK 3 & 5/03
40.00	5		0	dead						discovered 5/01; green with maroonish tubercles, good 5/01; COD unknown, collected for weevil study 3/02
41.00	5		0		mia	dead				discovered 5/01; green, good 5/01; plant mia 3/02; relocated, dead, hard, dry corky, COD unknown 5/02
42.00	5			2.73	4	4A	3.99	6	3+1A	discovered 3/02; purplish green, OK 3 & 5/02; green with purple tubercle tips, good 3 & 5/03
43.00	5			5.73	6	4+2A	7.40	10	1	discovered 3/02; green, good 3 & 5/02, 3/03; green with some yellow tubercle tips, OK 5/03
44.00	5			5.22	9	6+2A	6.16	9	0	discovered 3/02; green, good 3 & 5/02, 3/03; 35% eaten, rest green, OK 5/03
45.00	5			4.36		4	4.20	2	1A	discovered 5/02; green, good 5/02; flowers partly eaten, plant green, OK 3/03; green, good 5/03
46.00	5			1.83		0	2.63	0	0	discovered 5/02; green, OK 5/02; green, good 3 & 5/03
Reference poin										
1.00	6	3	1A	2.83	3	3A	dead			green, good 3 & 5/99, 3 & 5/00, purple, OK 3 & 5/01, reddish olive, OK 3 & 5/02; small exit holes, COD weevils 3/03
2.00	6			mia			mia			discovered 5/96, originally tagged as 69, then 33.10, retagged as 2.00, green, good 3/99, olivish, OK 5/99, 3/00, purplish-green, good 5/00, tag loose, replaced, plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03
3.00	6			mia			mia			maroonish, OK 3 & 5/99, 3/00, orangish, OK 5/00, plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03
3.01	6			mia			mia			discovered 5/99, maroonish, OK 5/99, 3/00, green, good 5/00, plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03
4.00	6	0	0	1.59	0	0	0.94	0	0	green, good 3 & 5/99, 3 & 5/00; hunkered, green, OK 3/01; green, good 5/01; hunkered, green, OK 3/02; popped out, green, good 5/02; may be just a tubercle of larger plant, green, OK 3 & 5/03
5.00	6	0	0	3.05	2	1+1A	1.36	0	0	green, good 3 & 5/99, 3 & 5/00, 3 & 5/01, 3 & 5/02; large loose spines in vicinity, may be a tubercle of a larger plant, green, OK 3 & 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
6.00	6	5.45	205			1.30		0	2.20	1A	0	2.80	1fr	1	3.28	0	0	3.68	1fr	1	dead
7.00	6	9.69	180												2.34	1fr	0	2.62	1fr	0	mia
7.10	6	9.55	207																		2.36
8.00	6	13.34	185			2.50		0	2.90	1+1fr	1+2fr	3.30	2	2	3.62	2fr	1A	4.06	2fr	2	0.94
9.00	6	16.70	185												4.71	4A+2fr	4A+1	Dead			
10.00	6	17.47	185												2.91	1+1A+ 2fr	2+2A	2.13	1	0	mia
11.00	6	18.54	188												3.02		0	2.63	3fr	dispersed	3.40
12.00	6	11.77	186												2.43		0	2.80	1fr	1	dead
13.00	6	8.71	178												2.30		0	2.48	1fr	1	3.50
14.00	6	8.12	190															2.29	1fr	1 dispersed	dead
15.00	6	10.34	195															2.32	1fr	1	mia
16.00	6	9.95	198															2.44		1	2.91
17.00	6	17.47	192																		3.52
18.00	6	~25.60	~186																		3.81
18.10	6	~24.75	~186																		
18.20	6	~24.80	~185																		

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
6.00	6									under rock, discovered 5/96, originally tagged as 70, then 33.20, retagged as 6.00, green, good 3 & 5/99, 3 & 5/00, hole surrounded by spine clusters, COD unknown 3/01
7.00	6			mia			mia			green, good 3 & 5/99, hunkered, green, good 3/00, popping out green, good 5/00, plan mia 3 & 5/01, 3 & 5/02, 3 & 5/03
7.10	6		0	2.35	2	0	0.90	0	0	discovered 5/01; green, good 5/01; slightly reddish-green, good 3/02; only a few tubercles above ground level 5/02; only one tubercle left, green, OK 3 & 5/03
8.00	6	0	0	1.60	0	0	nd	0	0	discovered 5/96; originally tagged as 71, then 33.30, retagged as 8.00; partially eaten but new spine growth 5/97; maroonish, OK 5/99; dull green, OK 3/00; green, good 5/00; almost totally eaten, pup forming on one side, green, OK 3/01; green, good 5/01 green, good 3 & 5/02; eaten below ground level, poor 3/03; one tubercle resprouting, green, OK 5/03
9.00	6									green, good 3 & 5/99; dead, collected for weevil study, no evidence of weevils, COD unknown 3/00
10.00	6			mia			mia			green, good 3/99, OK, almost buried in ant gravel, but coming out 5/99, buried, maroonish, OK 3/00, coming out, red, OK 5/00; plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03
11.00	6	0	0	3.22	3	3	3.54	0	0	discovered 5/99; maroonish, OK 5/99; hunkered, maroonish, OK 3/00; green, OK 5/00; misshapen, most spine clusters missing, purplish-green, OK 3/01; new spine growth, purplish-green, OK 5/01; reddish purple, OK 3/02; uprooted by some animal digging large hole, replanted, plant green, OK 5/02; reddish olive, OK 3 & 5/03
12.00	6									discovered 5/99, maroonish, OK 5/99, 3/00, yellowish, OK 5/00, just spines left, COD unknown 3/01
13.00	6	0	0	3.25	4	1+3A	dead			discovered 5/99, olive, dull gray spines, some new spine growth, OK 5/99, olive, OK 3 & 5/00, green, good 3 & 5/01, reddish-green, OK 3/02, green, OK 5/02, eaten below soil level, COD herbivory 3/03
14.00	6									discovered 3/00, olive, hunkered, OK 3/00, green, good 5/00, just spines left, COD unknown 3/01
15.00	6			mia			mia			discovered 3/00, green, hunkered, OK 3/00 & 5/00, tag loose, replaced, spine clusters in vicinity, plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03
16.00	6	1	1A	2.70	1	0	3.00	2	1	discovered 5/00; green, good 5/00; purple, OK 3/01; dark green, OK 5/01; green, OK 3 & 5/02; purplish green, OK 3/03; reddish green, OK 5/03
17.00	6	3	3A	2.88	4	3A	2.92	0	0	discovered 3/01; bluish-green, OK 3/01; green, good 5/01; purplish green, OK 3/02; green, good 5/02; center eaten, scarring over, reddish olive, poor 3 & 5/03
18.00	6		0	2.81	0	0	dead			discovered 5/01, green, good 5/01, some loose spine clusters, purplish-green, OK 3/02, center eaten, three tubercles resprouting, body red and green, poor 5/02, eaten below soil surface, COD herbivory 3/03
18.10	6						3.04	0	0	discovered 3/03; green, good 3/03; apex eaten, scarring over, plant reddish green, OK 5/03
18.20	6						2.44	0	0	discovered 3/03; green, good 3 & 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
19.00	6	~25.55	~186																		4.15
33.00	6	12.50	151	sm	5	3.50	4 fr	Dead													
33.01	6	12.50	151																		5.19
33.02	6	12.51	151																		
33.40	6	~27.98	186			2.10		0	2.80	2fr	1+1A	3.00	0	0	3.41	2A	0	3.58	2fr	dispersed?	1.68
33.41	6	~27.98	186																		
33.50	6	~28	~186						4.00	4fr	1+3A	4.90	5fr+1A	5	4.15	0	dead				
33.60	6	8.35	200									1.70		0	2.71	1+1A	1 disp	3.08	3fr	dispersed	mia
34.00	6	3.70	56	sm	0	2.20	0	0	2.90	2fr	1A	3.00	2fr	2	3.61	2fr	disp?	3.81	2fr	1+1	dead
35.00	6	7.35	350	sm-md	0	Dead		Dead?	Dead												
36.00	6	0.52	6	md	4	Dead															
37.00	6	3.20	68																		4.24
Reference point 7 was a painted cross on a small rock north of a juniper which is west of Reference point 2, thru thicket; merged with Reference point 3 in 3/																					
37.00	7	1.81	138			2.80		2	Dead												
38.00	7	2.87	92			4.00		0	Dead												
39.00	7	3.06	92			3.80		0	Dead												
40.00	7	3.08	92			0.80		0	1.00	0	0	Dead									
41.00	7	2.95	85			2.90		3	Dead												
Reference point 8 is uphill of reference point 1, 19.9m at 274 degrees (through junipers), rusty nail spike behii																					
	small juniper; ID#8 R032415B; R031314B																				
46.00	8	1.25	32						1.80	0	0	2.00	0	0	2.43	0	0	3.30	1fr	dispersed?	4.84

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
19.00	6		0	dead						discovered 5/01; green, good 5/01; dead; COD Moneilema; larva accidentally killed 3/02
33.00	6									under Texas persimmon; only spines left 5/96; tag removed
33.01	6		4A	5.06	11	6	dead			discovered 5/01; green; good 5/01; good; green with reddish tubercle tips 3 & 5/02; eaten below soil surface, root with Moneillema; COD herbivory and Moneillema 3/03
33.02	6						0.48	0	mia	discovered 3/03; olive, OK 3/03; plant mia 5/03
33.40	6	0	mia	mia			mia			discovered 5/96; measured through junipers; originally tagged as 72; good, green 3 & 5/99, 3/00; many loose spines, sunken in center, olive, OK 5/00; eaten, spineless, tubercleless nub left, extremely poor 3/01; plant mia 5/01; scattered spines 3/02; plant mia 3 & 5/02, 3 & 5/03
33.41	6						0.47		0	right upper edge of tag, discovered 5/03; green, OK 5/03
33.50	6									~75 cm NW of 33.4; several tubercles maroon, OK 3/99; spines dull gray, yellowish, no evidence of weevils, COD unknown, collected by WHC 5/6/99
33.60	6			mia			mia			discovered 5/98; maroon, OK 5/99; hunkered, olive, OK 3/00; green, OK 5/00; a few spines nearby; plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03
34.00	6									dark green, good 3 & 5/99, 3 & 5/00; one large chamber; COD Moneilema 3/01
35.00	6									measured over shrubs; only loose spines left 3/96; looks like a piece of the stem is left 5/96; COD unknown, plant & tag gone 3/97
36.00	6									large hole in root & tag gone 5/96
37.00	6	3	2A	3.98	4	2+2A	0.87	0	mia	discovered 3/01; green, good 3 & 5/01; small, green, dead?, metallic bee in open flower, plant purplish 3/02; orangish, OK 5/02; eaten below soil surface, seedling or tubercle left and its center eaten, reddish green, poor 3/03; plant mia 5/03
Reference poin										
37.00	7									discovered 5/96; originally tagged as 59; COD unknown; just spines left 3/97
38.00	7									discovered 5/96; originally tagged as 60; COD unknown; only a few loose spines left; tag removed 3/97
39.00	7									discovered 5/96; originally tagged as 61; COD unknown; only a few loose spines left; tag removed 3/97
40.00	7									discovered 5/96; barely rooted; new spine growth; Jabba the Hut syndrome 3 & 5/97; just spines left; COD unknown 3/98
41.00	7									discovered 5/96; originally tagged as 63; COD weevil
Reference poin										
	small jun									
46.00	8	4	2+1A	dead						green; good 3 & 5/99, 3 & 5/00, 3 & 5/01; scattered loose spines; body dry & hard, corky; COD unknown 3/02

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
47.00	8	0.99	61						1.00	0	0	1.00	0	0	1.07	0	0	1.50	0	0	2.74
48.00	8	0.99	75						1.00	0	0	1.10	0	Dead							
48.10	8	0.99	75												1.16	0	0	0.47	mia	0	0.87
49.00	8	1.00	75						1.30	0	0	1.00	0	0	1.36	0	0	1.61	0	0	3.11
50.00	8	1.14	75						2.00	0	0	Dead									
51.00	8	1.16	75						1.30	0	0	Dead									
52.00	8	1.18	75						1.80	0	0	Dead									
53.00	8	1.18	76						1.40	0	0	Dead									
54.00	8	1.13	82						2.30	2fr	0	Dead									
55.00	8	1.27	82						1.20	0	0	1.20	0	0	1.39	0	0	0.96	0	0	dead
56.00	8	1.51	75						0.90	1	1	mia			dead						
57.00	8	1.51	83						1.60	0	0	1.70	0	0	1.72	0	0	1.48	0	0	3.04
58.00	8	0.72	125						3.00	1+1fr	1	Dead									
59.00	8	2.16	155						3.40	4+1fr	3A	Dead									
60.00	8	1.58	198						4.30	5	5	Dead									
61.00	8	1.53	199						2.10	2	2	Dead									
62.00	8	1.86	78						1.40		0	1.40	0	0	1.36	0	0	1.45	0	0	1.32
63.00	8	2.45	71						1.40		0	1.60	0	0	1.84	1fr	0	2.23	2fr	2A	3.19
64.00	8	2.27	67						1.40		0	0.90	0	0	mia			mia			mia
65.00	8	1.70	161																		
Reference point 9 is before reference points 5 & 6, just as one turns into the large clearing, rebar in front of shin oak																					
	ID#9 R032421A; R031220A																				
1.00	9	5.79	328															3.38	3fr	3 dispersed	mia

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
47.00	8	2	1+1A	2.74	3	1+2A	mia			spines falling off, plant damaged 3/98; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; olive, OK 3 & 5/02; just a few scattered spine clusters, plant mia 3 & 5/03
48.00	8									closer to reference point than 49, measured in one direction only 3/98, dried up, COD unknown 5/98
48.10	8	0	0	0.86	0	0	mia			new plant or old nub of 48?, green, good 3 & 5/99; plant mia 3/00; relocated, under rock, green, OK 5/00; green, good 3 & 5/01; green, OK 3/02; almost covered by ant dirt, green, good 5/02; plant mia 3 & 5/03
49.00	8	2	1A	3.76	6	4	dead			farther from reference point than 48, measured in one direction only 3/98, green, good 5/99, 3 & 5/00, 3 & 5/01, 3 /02; all fruits partly eaten, ant mound at plant base, plant green, OK 5/02; just a few spine clusters and piece of root remainign, COD unknown 3/03
50.00	8									of 50-53, the closet to the reference point; just spines left, COD unknown 3/98
51.00	8									behind 50.00; just spines left, COD unknown 3/98
52.00	8									behind 51.00 & to the right of 53.00; just spines left, COD unknown 3/98
53.00	8									behind 51.00 & 52.00, to the left of 52.00; just spines left, COD unknown 3/98
54.00	8									fruit eaten 3/97, COD unknown 3/98
55.00	8									one measurement only 3/00, apical meristem shifted to side, OK 3/99, dull green, OK 5/99, looks dead, but firmly rooted 3 & 5/00, dead, uprooted, ~15cm downhill, COD unknown 3/01
56.00	8									mia 3/98 & 5/98, plant relocated, dry, fluffy inside, COD unknown 3/99
57.00	8	1	0	2.94	5	0	dead			green, good, hunkered 3 & 5/99; popping out, green, good 3 & 5/00, 3 & 5/01, purplish, OK 3/02, covered by ant dirt, only spines showing 5/02, ant dirt gone, plant hard, dry, COD ants 3/03
58.00	8									at base of three awn below small juniper, hollow, weeils? 3/98
59.00	8									2 flowers partially eaten 3/97, hollow, weevils? 3/98
60.00	8									hollow, weevils? 3/98
61.00	8									solid, COD unknown 3/98
62.00	8	0	dead							discovered 5/97, measured in one direction only 3/98, green, good 3 & 5/99, 3/00 green, OK 5/00, pale green, OK 3/01, COD root rot 5/01
63.00	8	2	1A	2.85	4	0	1.90	0	0	discovered 5/97; green, good 3 & 5/99; a loose spine cluster, green, good 3 & 5/00, 3 & 5/01; olive, OK 3/02; all fruits eaten & chunk out of apex, scarred over, olive, OK 5/02; new stem forming, green, good 3 & 5/03
64.00	8									discovered 5/97, dead? 5/98, gone without a trace 3 & 5/99, 3 & 5/00, 3 & 5/01
65.00	8			3.23	4	4	3.56	3	3	discovered 3/02; slightly purplish-green, OK 3 & 5/02, 3 & 5/03
Reference poin										
	ID#9 R0:									
1.00	9			mia			mia			discovered 3/00; green, good 3 & 5/00, tag loose, replaced 3/01, loose spines in vicinity, plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	DIST.	ANGLE	95DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM
2.00	9	5.92	328															2.49	2fr	2	mia
3.00	9	12.61	34															4.40	5fr	5	dead
4.00	9	11.17	37															2.77	2fr	2A	3.33
5.00	9	10.47	41															5.17	7fr	dispersed	mia
6.00	9	12.71	21															3.94	1A+1fr	1 dispersed	4.88
6.01	9	12.73	21																		
6.10	9	11.38	27																		
7.00	9	11.94	18															4.03	3fr	2 dispersed	4.87
8.00	9	12.34	14															2.30	2fr	1+1 dispersed	3.41
9.00	9	7.80	45																		
10.00	9	7.71	44																		
76.00	9	4.75	12						0.60		0	mia			mia			mia			
77.00	9	4.77	12						0.60		0	mia			mia			mia			
78.00	9	4.78	12						0.60		0	mia			mia			mia			
79.00	9	7.03	347						3.00		2A	3.00	2fr	2	3.46	2fr	disp?	3.28	1fr	1 dispersed	dead
80.00	9	7.07	345						1.90		0	2.20	1fr	1	2.26	0	0	mia			mia
81.00	9	7.00	345						1.60		0	1.70	0	0	1.86	0	0	mia			mia
82.00	9	5.92	3																		

Reference point 10 was a dead juniper stump by trash dump; all plants were switched to Reference point 3 3/(

Data taken and recorded by Jackie Poole 3/13/96, 5/7/96, 3/24/97, 5/9/97, 5/9/98, 3/24/99, 5/6/99 with Bill Calvert (WHC), 3/15-16/00, 5/3/00, 3/13-15/01, 5/11/01, 3/13/02 with Celeste Brancel-Brown, 5/3/02, 3/19-21/03, 5/6/03

Data taken by Gena Janssen and recorded by Jackie Poole 3/26/98

Ancistrocactus tobuschii Data for Junction

PL#	STAKE	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.00	9			mia			mia			discovered 3/00; green, good 3 & 5/00; plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03
3.00	9									discovered 3/00; green, good 3 & 5/00; body solid; COD unknown 3/01
4.00	9	2	2A	4.09	5	0	dead			discovered 3/00; green, good 3 & 5/00; 3 & 5/01; green, good 3/02; center eaten, scared over, poor 5/02; just loose spine clusters left; COD herbivory 3/03
5.00	9			mia			mia			discovered 3/00; maroon, OK 3 & 5/00; scattered spine clusters, plant mia 3 & 5/01, 3 & 5/02, 3 & 5/03
6.00	9	4	4A	4.50	5	4A	dead			discovered 3/00; olive, OK 3/00; green, good 5/00; purple, OK 3 & 5/01; reddish green, OK 3 & 5/02; just loose spines left; COD herbivory 3/03
6.01	9						1.57	0	0	discovered 3/03; green, good 3 & 5/03
6.10	9			4.94	6	3+2A	dead			discovered 3/02; green, good 3 & 5/02; just loose spines left; COD herbivory 3/03
7.00	9	2	0	4.53	5	disp?	dead			discovered 3/00; green, good 3 & 5/00, 3/01; a few tannish tubercle tips, otherwise green, good 5/01; green, OK 3/02; green with some gold tubercle tips, OK 5/02; just loose spines left; COD herbivory 3/03
8.00	9	0	0	2.45	3	2+1A	3.58	4	2+2A	discovered 3/00; green, OK 3/00; hunkering, green, OK 5/00; popped out, blue-green, OK 3 & 5/01; reddish, OK 3 & 5/02; purple, OK 3 & 5/03
9.00	9			4.03	5	0	dead			discovered 3/02; purplish, OK 3/02; green with orange tubercles, OK 5/02; just loose spines left; COD herbivory 3/03
10.00	9			3.34	4	2+1A	2.02	0	0	discovered 3/02; reddish-olive, OK 3/02; green, good 5/02; eaten almost to soil surface, two tubercles left, reddish green, poor 3/03; looks dead but firmly rooted 5/03
76.00	9									discovered 5/97; plant mia 3 & 5/98, 3/99, 3 & 5/00
77.00	9									discovered 5/97; plant mia 3 & 5/98, 3/99, 3 & 5/00
78.00	9									discovered 5/97; plant mia 3 & 5/98, 3/99, 3 & 5/00
79.00	9									discovered, 5/97; maroon, OK 3/99; very red, OK 5/99, 3/00; reddish green, OK 5/00; eaten below soil surface; COD herbivory 3/01
80.00	9			mia						discovered 5/97; maroon, OK 3/99; very red, OK 5/99; some loose spines in area, plan mia 3 & 5/00, 3 & 5/01, 3 & 5/02
81.00	9			mia						discovered 5/97; maroon, OK 3 & 5/99; some loose spines in area, plant mia 3 & 5/00 3 & 5/01, 3 & 5/02
82.00	9			3.93	1	0	dead			discovered 3/02; purplish green, OK 3/02; green, good 5/02; found tag but no plant, loose spine clusters in vicinity, eaten below soil surface, dead; COD herbivory 3/03
Reference poin										
Data taken and r										
	3/15-16/0									
Data taken by G										

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Butterfly Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 47A is 0.2 mi South from North gate & South road jct, ~ 70 paces Northwest from road, by pinyon-agarita-Texas persimmon clump;																												
	Stake 47A = GPS13; R021722A																											
1.00	47A	25.93	38										2.99	1+ 2fr	3	3.61	2	2disp	3.47	4	3+2A	3.44	4	4A	4.35	8	7+2A	green, OK, hunkering 4/99; green, good 2/00; some orange tubercles, OK 4/00; maroon, OK 2/01; maroonish-olive, poor 5/01; olive with some oranish tubercle tips, OK 2/02; olive, OK 4/02; green, good 2 & 4/03
2.00	47A	29.71	46										1.75	1+1fr	2	2.18	1	1A	2.74	3	1+1A	2.71	3	1+2A	2.90	4	2	green, OK, hunkered 4/99; green, good 2/00; some orangish tubercles, OK 4/00; olive, OK 2/01; green with reddish tubercle tips, OK 5/01; olive, good 2/02; green, good 4/02; grayish-olive with a few red tubercle tips, OK 2/03; green, OK 4/03
3.00	47A	28.25	45										2.13	1	1	2.35	2	1disp	3.03	3	3	2.72	3	1A	mia			reddish, OK, hunkering 4/99; maroonish, OK 2 & 4/00; green, good 2/01; purplish-green, OK 5/01, 2/02; yellowish-orange, OK 4/02; plant mia, tage present & spine cluster in vicinity, 2/03; plant mia 4/03
3.10	47A	28.37	45													1.11	0	0	1.85	0	0	1.71	1	1	2.17	1	0	right of 3.20 & 3.30; green, good 2 & 4/00, 2 & 5/01; hunkered, green, OK 2/02; green, OK 4/02; green, good 2 & 4/03
3.20	47A	28.36	45													1.00	0	0	1.41	0	0	1.36	0	0	1.76	1	1	between 3.10 & 3.30; green, good 2 & 4/00, 2 & 5/01; hunkered, purplish, OK 2/02; olive, OK 4/02; green, OK, hunkered 2 & 4/03
3.30	47A	28.37	46													2.18	1	1A	2.66	3	2	2.45	2	0	2.74	2	2	left of 3.10 & 3.20; green, good 2 & 4/00, 2 & 5/01; purplish green, good 2 & 4/02; green, good 2/03; squishy, loosely rooted, poor 4/03
3.40	47a	28.15	43																			0.79		0	1.09	0	0	discovered 4/02; green, OK 4/02; green, hunkered, OK 2 & 4/03
4.00	47A	24.20	55										1.99	3	1 disp	2.76	4	disp?	3.45	4	2+2A	3.42	4	2+1A	4.00	5	8	reddish, OK 4/99; dark green, good 2/00; orangish, OK 4/00; maroonish-brown, OK 2/01; olive, OK 5/01, 2/02; orangish-green, OK 4/02; beside small grass clump, reddish-olive, good 2/03; hunkered, green, OK 4/03
5.00	47A	~25.50	247										2.24		0	2.25	1	0	2.62	1	1A	2.96	1	1A	dead			olive, OK, discovered 4/99; reddish, OK 2 & 4/00; green with a few red tubercle tips, OK 2/01; dull olive, OK 5/01, 2/02; green, good 4/02; dead; just spines left, COD unknown 2/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Butterfly Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
6.00	47A	~25.67	251										1.41		0	1.27	0	0	1.50	0	0	1.50	0	0	2.14	1	1	discovered 4/99;green, good 4/99; hunkered, OK 2 & 4/00, 2 & 5/01, 2/02; green, good 4/02, 2 & 4/03
7.00	47A	~25.64	249										0.57		0	0.91	0	0	dead									discovered 4/99; OK 4/99; under rock maroonish; OK 2 & 4/00; body solid, COD unknown 2/01
8.00	47A	~25.41	245										2.26		0	2.39	1	1 disp	2.25	0	0	1.96	1	1A	3.31	3	3	discovered 4/99; green, good 4/99; flower pink, stigma green, plant dark green, good 2/00; hunkered, dark green, OK 4/00, 2 & 5/01, 2/02; green, good 4/02, 2 & 4/03
9.00	47A	25.63	246													1.34	0	0	1.65	0	0	1.62	1	1	1.80	1	1	hunkered, OK 2 & 4/00, 2 & 5/01, 2/02; green, OK 4/02, 2 & 4/03
10.00	47A	~25.85	~246																						1.85		1	discovered 4/03; green, good 4/03
47.10	47A	35.38	42	4.30	1+3 fr	disp	5.10	4	4	Dead																		killed by being dug up by unknown assailant 2/98
47.11	47A	34.64	41	6.10	1+8 fr	disp	6.90	10	6+4A	Dead																		killed by being dug up by unknown assailant 2/98
47.111	47A	34.68	41							1.30	0	mia	1.08	0	0	1.83	0	0	2.80	1	0	2.99	3	3	3.36	2	1	seedling of 47.11, discovered 2/98; plant mia 5/98; green, good 4/99, 2 & 4/00, 2/01, 2 & 4/02; rock removed from on top of plant, green, good 2 & 4/03
47.112	47A	34.69	41													0.87	0	0	1.30	0	0	1.36	0	0	1.31	0	0	green, good 2 & 4/00, 2 & 5/01; hunkered, green, OK 2/02; green, good 4/02, 2 & 4/03
47.113	47A	34.74	41													1.92	0	0	3.24	1	1	3.18	2	2A	dead			green, good 2 & 4/00, 2 & 5/01, 2/02; reddish-green good 4/02; dead, just spines left; COD unknown 2/03
47.114	47A	34.75	41													0.91	0	0	1.32	0	0	1.66	0	0	1.42	0	0	green, good 2 & 4/00, 2 & 5/01, 2 & 4/02; green, OK 2 & 4/03
47.115	47A	34.73	42													1.08	0	0	1.56	0	0	1.42	0	0	2.16	1	1	green, good 2 & 4/00, 2 & 5/01; hunkered, green, good 2/02; green, good 4/02, 2 & 4/03
47.12	47A	34.20	43	3.40	2 fr	2A	Dead																					COD unknown, just spines left; tag removed 2/97
47.13	47A	33.34	41	3.50	1+3 fr	disp	4.40	5	3+2A	4.60	3	disp	3.99	0	3A	2.95	3	4	3.99	4	2+2A	4.43	3	2+2A	4.14	5	4	dull green, OK 4/99; two stemmed, stem closest to stake, green, good 2 & 4/00, 2 & 5/01; purplish green, good 2 & 4/02; green, good 2 & 4/03
47.131	47A	33.37	41													2.92	3	3	4.25	4	4+1A	4.46	4	3+3A	4.67	5	6	green, good 2 & 4/00, 2 & 5/01; purplish green, good 2 & 4/02; second head of 47.13, green, good 2 & 4/03
47.132	47a	33.39	41																			0.27		0	0.34	mia	0	above 47.13 tag, discovered 4/02; green, OK 4/02; plant mia 2/03; green, OK 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Butterfly Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
47.14	47A	33.61	43	3.10	1+4 fr	disp	4.20	6	2+2A	4.10	5	5	3.34	3+2fr	1	3.93	3	2+1disp	4.78	5	5	dead						reddish at base, OK 4/99, 4/00; dark green, good 2/00; green with some red tubercle tips, OK 2/01; dull green, OK 5/01; dead, COD unknown, collected for weevil study 2/02
47.15	47A	33.27	41				1.90	0	0	2.00	0	0	2.49	0	0	2.28	1	0	3.15	3	1	3.54	5	3A	dead			green, good 4/99; green, good 2 & 4/00, 2 & 5/01, 2 & 4/02; dead, just spines left, COD unknown 2/03
47.20	47A	~15.25	~64	2.20	1 fr	1disp	3.10	3B	0	Dead																		dist. measured over juniper; tag mia, replaced 2/97; just spines, COD unknown 2/98
47.21	47A	~14.66	57	2.30	2 fr	2A	2.70	2	0	3.10	4	3A	2.49	2+1A	2+1A	3.96	3	1+2disp	4.37	4	5	3.91	4	2+2A	3.91	7	6+1A	measured over agarita; maroonish, OK, hunkering 4/99; green, good 2/00; dark green, OK 4/00; maroonish green, OK 2/01; purple, poor 5/01; purplish green, OK 2/02; orangish purple, OK 4/02; green, good 2/03; reddish olive, OK 4/03
47.30	47A	~25.7	~244	6.40	6 fr	6	Dead																					measured from edge of juniper, COD unknown, top spines lifted off, root black & solid, no insect exit holes
47.31	47A	~25.7	~244				0.40	0	mia	mia			mia															measured from edge of juniper, seedling of 47.30
Stake 47B is 0.1 mi South from North gate & South road jct, 58 paces West of road, rocky opening by small lotebush; park by agarita;																												
	Stake 47B = GPS14; R021719A																											
1.00	47B	7.73	89										3.49	6fr	2+2A+ 1disp	4.02	5	1+rest disp	5.54	8	8A	4.94	7	3+1A	6.15	13	13	a few orange tubercle tips 4/99; popping out of crustose lichen, green, good 2 & 4/00; maroonish, OK 2/01; maroon with red tubercle tips at base, OK 5/01; maroonish green, OK 2/02; green, good 4/02; purplish, good 2/03 green with a few tan tubercle tips, good 4/03
1.10	47b	6.82	83																			2.35		0	2.97	4	3	discovered 4/02, purplish-green, OK 4/02; purplish-green, good 2 & 4/03
2.00	47B	12.51	23										1.74	2	1	2.06	2	2A	dead									green, OK, hunkering 4/99; green, good 2 & 4/00; just spines left, COD unknown 2/01
3.00	47B	12.75	18										1.77	2	1disp	2.62	2	1+1disp	3.47	3	1+3A	3.80	5	4+3A	3.90	3	3	green, good 4/99; green, good 2 & 4/00; slightly maroonish-green, OK 2 & 5/01; olive, good 2/02, green, good 4/02; green with yellowish tubercles, OK 2 & 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Butterfly Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
3.01	47B	12.77	18																0.43		0	mia			0.53	0	0	at 5 o'clock on 3.00, discovered 5/01; one measurement only 5/01; green, OK 5/01; plant mia 2 & 4/02; green, OK 2 & 4/03
4.00	47B	16.11	199										2.11	1+1fr	2	mia			mia				mia	2A	3.82	4	3+1A	green, good 4/99; tag and plant mia 2 & 4/00, 2 & 5/01, 2/02; in grass clump, green, good 4/02, 2 & 4/03
5.00	47B	2.53	69										0.79		0	1.25	0	0	1.86	0	0	2.01	1	1A	2.01	2	2	discovered 4/99; green, good 4/99, 2 & 4/00, 2/01; hunkered, green, OK 5/01, 2/02; green, OK 4/02; green with two reddish tubercle tips, OK 2/03; hunkered, green, OK 4/03
47.40	47B	4.80	81	3.30	5 fr	5	4.20	5	2+3A	3.10	0	0	Dead															1 fruit very small but produced at leas 1 seed 5/96; tag mia, retagged 2/96; looks dead but firmly rooted 2 & 5/98; hollow chambers; COD weevils 2/99
47.41	47B	3.40	79	3.80	6 fr	1, rest disp	4.10	4	1+3A	Dead																		2 fruit with a few seeds left within 10 cm of plant; small ants walking by 5/96; COD unknown 2/98
47.42	47B	3.33	55	1.80	1 fr	disp	2.10	1	0	2.10	1	0	1.79	1	2	2.34	1	0	2.78	2	3A	2.55	3	3	2.88	4	4	orangish, hunkering, OK 4/99; popping out, dull green, OK 2 & 4/00; green with a few tan tubercle tips, OK 2/01; maroonish-green, OK 5/01; olive, OK 2 & 4/02; green with some light-orange areas, OK 2 & 4/03
47.430	47B	2.50	37	2.70	1	0	2.70	2	1A	3.30	3	2+1A	Dead															just spines - COD unknown 2/99
47.431	47B	2.52	37	0.90	0	0	mia			mia			0.63	mia	0	0.60	mia	0	0.89	0	0	1.63	0	0	2.10	0	0	measured in one direction only 4/99, 2/00, 2/01, 2/02; green, good, relocated 4/99; plant mia 2/00; relocated, green, good 4/00; hunkered, OK 2/01; popped out, green, good 5/01, 2 & 4/02; right of 47.433; green, good 2 & 4/03
47.432	47B	2.56	37	1.20	0	0	1.00	0	0	1.30	0	0	1.24	0	0	1.55	0	0	1.76	0	0	mia			mia			measured in one direction only 2/98, 2/99, 2/00, 2/01; green, good 4/99, 2 & 4/00, 2 & 5/01; plant & tag mia 2 & 4/02, 2 & 4/03
47.433	47B	2.55	37	0.90	0	0	0.70	0	0	1.60	0	0	0.89	0	0	1.29	0	0	1.62	0	0	1.66	0	0	2.00	0	0	measured in one direction only 2/98, 2/99, 2/00, 2/01, 2/02; green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02; left of 47.431; green, good 2 & 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Butterfly Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
47.44	47B	2.30	14	2.50	2 fr	2	2.10	0	0	2.00	2	mia	1.73	0	0	2.64	2	2+1A	3.08	3	3A	2.97	3	3A	3.49	5	5	plant shriveled but fleshy, fruit with holes 5/96; tag moved 2/97; retagged 5/97; relocated 2/99; green, good 4/99, 2 & 4/00; olive, OK 5/01; hunkered, green, good 2/02; green & good 4/02; green, OK 2 & 4/03
47.441	47B	2.35	14				1.00	0	mia	mia			mia															This plant has no roots, may have washed here during flood 2/97; mia 5/97, 2 & 5/98, 2 & 4/99
47.442	47B	3.22	28																			4.43	4	2+3A	4.42	7	5	discovered 2/02; green, good 2 & 4/02, 2 & 4/03
47.450	47B	2.44	35	4.10	3 fr	disp	3.50	0	0	3.30	3	3	3.28	2	1+1disp	2.64	2	2disp	3.04	3	2+2A	3.63	2	1+1A	3.98	8	5+3A	under prickly pear; four seedlings at base 5/97; 3 seedlings in 2/98 & 5/98; tubercle tips red, OK 4/99; green, good 2/00; maroonish, OK 4/00, 2 & 5/01; green, good 2/02; reddish-green, OK 4/02; reddish, OK 2 & 4/03
47.451	47B	2.41	35	0.90	0	0	0.90	0	0	1.00	0	0	1.00	0	0	1.49	1	1A	1.95	1	1	2.33	2	0	2.32	3	2	green, good 4/99; green, good 2 & 4/00, 2/01; hunkered, green, OK 5/01, 2/02; green, good 4/02, 2 & 4/03
47.452	47B	2.35	35				1.20	0	0	1.40	0	0	1.20	0	0	1.89	1	0	2.41	1	1A	2.36	1	1A	2.59	4	4	green, good 4/99, 2 & 4/00, 2/01; hunkering, green, OK 5/01, 2/02; green, OK 4/02 & 2/03; green, good 4/03
47.453	47B	2.43	35										0.84	0	0	0.96	0	0	1.02	0	0	1.20	0	0	1.19	0	0	green, good 4/99, 2 & 4/00, 2/01; green, OK 5/01, 2 & 4/02, 2/03; green, good 4/03
47.454	47B	2.37	37													1.31	0	0	dead									green, good, hunkered 2 & 4/00, filled with orange mush, COD fly larvae 2/01
47.455	47B	2.41	35																0.90	0	mia	mia			mia			left of 47.456, discovered 2/01; not tagged, green, good 2/01; mia 5/01, 2 & 4/02; plant and tag mia 2 & 4/03
47.456	47B	2.41	35																1.05	0	0	1.03	0	0	mia			behind 47.451, discovered 2/01; not tagged, green, good 2 & 5/01, 2 & 4/02; plant and tag mia 2 & 4/03
47.457	47B	2.46																							0.97	0	0	base of 47.450 at 11:30 o'clock; discovered 2/03; purplish, OK 2/03; green, good 4/03
47.46	47B	3.40	57							2.00		2A	2.92	1+2fr	4+ 1disp	3.60	6	6	3.29	3	3A	3.55	4	5A	3.53	6	5+1A	beside rock, discovered 5/98; green, hunkering, OK 4/99; green, good 2 & 4/00; squishy, shrunken, spines gray, poor 2/01; olive, OK 5/01; green, OK 2/02; reddish-green, OK 4/02; pale reddish-green, OK 2/03; green, OK 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Butterfly Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
47.470	47B	4.65	65										2.10	2	1+1A	dead												dull green, hunkering, OK 4/99; only spines left, COD unknown 2/00
47.471	47B	4.83	65										1.22		0	0.99	0	0	1.36	0	0	1.58	1	1	1.25	0	0	green, good, hunkered 4/99, 2 & 4/00 2 & 5/01, 2 & 4/02; hunkered, olive, OK 2 & 4/03
47.48	47B	5.09	85										1.55	1	1	2.24	2	1+1A	dead									green, OK, hunkering 2 & 4/99; green good 2 & 4/00, galleries, chambers, exit holes, COD weevils 2/01
Data taken and recorded by Jackie Poole 5/8/96, 2/12/97, 5/5/98, 2/99 with Linda Hedges, 4/23/99, 2/9/00 with Craig Scofield, 4/28/00,																												
	2/16/01, 5/01/01, 2/09/02, 4/2?/02, 2/6/03, 4/23/03																											
Data taken by Gena Janssen and recorded by Jackie Poole 2/17/98																												
Data taken by Dave Stuart and recorded by Jackie Poole 5/6/97																												

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Dan's Site

PL #	STK#	DIST	ANGLE	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 1 is ~105m at ~85 degrees from the east corner of a trough off of Hunt Road 8 past the cowbird trap, through the fence; GPS7 = R021816A																						
1.00	1	3.05	247	4.20	nd	3	4.62	1+4fr	5	4.56	2	1A	4.82	3	2A	4.66	4	3+2A	4.79	4	4	discovered 2/98; tagged 5/98; olive green, OK 4/99, 2/00; rock flipped on top, removed, green, good 4/00; maroon, OK 2/01; pale olive, OK 5/01; purplish-green, OK 2 & 4/02; purplish & green, OK, rock removed from plant 2 & 4/03
1.01	1	3.06	247	0.60	nd	0	1.12	mia	0	0.85	0	0	1.17	0	0	1.24	0	0	0.70	0	0	discovered 2/98; tagged 5/98; relocated, between 1.00 and 1.02, measured in one direction only 4/99; olive green, OK 2/00; green, good 4/00; green, OK 2/01; green, good 5/01; hunkered, OK 2/02; green, good 4/02, 2 & 4/03
1.02	1	3.07	247	0.90	nd	0	1.14	0	0	1.19	0	0	1.86	0	0	1.75	2	1A	dead			discovered 2/98; tagged 5/98; olive green, OK 2/00; green, good 4/00; olive, OK 2/01; green, OK 5/01; purplish-green, OK 2 & 4/02; just spines left, COD unknown 2/03
1.03	1	3.04	253																0.53		0	discovered 4/03; green, OK 4/03
1.04	1	3.04	250																0.37		0	discovered 4/03; green, good 4/03
2.00	1	3.20	242										2.44	1	1	2.47	2 (1+1fr)	1A	3.05	1	2	discovered 2/01; green, good 2 & 5/01; purplish-green, OK 2/02; reddish green, OK 4/02; purplish-green, OK 2 & 4/03
2.01	1	3.19	242																0.56		0	closest to stake, in front of 2.02-2.04 and between 2.03 and 2.04, at one o'clock on 2.00, discovered 4/03; OK 4/03
2.02	1	3.20	242																0.51		0	left of 2.01, 2.03 and 2.04, 11 o'clock on 2.00, discovered 4/03; OK 4/03
2.03	1	3.20	242																0.47		0	between 2.01 and 2.02, noon on 2.00, discovered 4/03; OK 4/03
2.04	1	3.20	242																0.58		0	right of 2.01-2.03, 1:30 o'clock on 2.00, discovered 4/03; OK 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Dan's Site

PL #	STK#	DIST	ANGLE	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
3.00	1	3.58	242										1.63	0	0	1.71	0	0	1.63	0	0	discovered 2/01; green, good 2 & 5/01; dark green, good 2 & 4/02; green, good 2 & 4/03
4.00	1	3.72	237										nd	0	0	1.94	1	0	2.71	2	1A	discovered 2/01; green, good 2 & 5/01; dark green, good 2 & 4/02; green, good 2 & 4/03
5.00	1	4.15	241													1.42	0	0	2.29	1	0	discovered 2/02; dark green, good 2 & 4/02; green, good 2 & 4/03
6.00	1	3.12	247																1.17	0	0	in dead grass clump, discovered 2/03; green, good 2/03; hunkered, green, OK 4/03
7.00	1	3.15	247																1.22	0	0	discovered 2/03; green, good 2 & 4/03
8.00	1	3.02	248																1.24	0	0	discovered 2/03; green, OK 2/03; green, good 4/03
9.00	1	0.70	350																2.81	3	3	discovered 2/03; green, OK 2 & 4/03
10.00	1	0.85	6																3.18	2	2	discovered 2/03; green, OK 2 & 4/03
11.00	1	2.78	247																0.39		0	discovered 4/03; green, OK 4/03
Data taken and recorded by Jackie Poole 5/5/98, 4/21/99, 2/9/00, 4/26/00, 2/16/01, 5/2/01, 2/04/02, 4/2?/02,																						
	2/6/03 with Sandy Birnbaum, 4/23/03																					
Data taken by Jackie Poole & recorded by Linda Hedges 2/8/99																						

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Deep Well Site

PL #	STK#	DIST	ANGLE	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Second old fenceless fencepost North of well; R020614A													
1.00		5.23	125	7.05	0	dead							may not be Ancistrocactus tobuschii, under Diospyros texana and Berberis trifoliolata, maroonish, OK 2/01; dead, COD weevils 5/01
2.00		57.30	263				2.29	2	1+1A	2.72	1	2+1A	discovered 2001; purple, OK 2 & 4/02; green, good 2 & 4/03
3.00		57.60	262				1.93	2	1+2A	2.05	2	2	discovered 2001; new growth from old stem, purple, OK 2 & 4/02; reddish-purple, OK 2 & 4/03
Data taken and recorded by Jackie Poole 2/19/01, 5/02/01, 2/06/02, 4/24/02, 2/6/03 with Sandy Birnbaum, 4/23/03													
Entered electronically in field 2/06/02, 4/24/02													

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Doesn't Matter Site

PL #	STK#	DIST	ANGLE	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
R020623A - rebar stake ~4-5 meters east of Cenizo										
1.00		14.38	196	3.06		3	3.69	5	5+1A	discovered 4/02; green, good 4/02; purplish, OK 2 & 4/03
Data taken and recorded by Jackie Poole 4/24/02, 2/6/03 with Sandy Birnbaum, 4/23/03										
2003 field notes recorded on Tank Hill 2003 field notes										

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - JD-0 Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
0.4 mi North/Northeast of bunkhouse on main road North, West side of road, South of Whiskey Bottle Site,																			
	look for small flagged persimmon ~2m off road; plot set up in 9/99																		
Rebar is double flagged by a persimmon																			
0.00		1.49	335													0.65	0	0	discovered 2/03; green, OK 2 & 4/03
1.00		1.46	338	0.60			0.74	0	0	1.14	0	0	1.07	0	0	1.42	0	0	OK 9/99, 2/00; olive, OK 4/00; edge of grass clump, green, good 2/01; edge of small dug hole, plant green, good 4/01; edge of grass clump, plant green, good 2 & 4/02, 2 & 4/03
2.00		1.78	346	0.43			0.50	0	0	0.90	0	0	1.12	0	0	1.14	0	0	OK?, may not be A. tobuschii 9/99; base of grass clump, OK 2/00; green, good 4/00; edge of grass clump, green, good 2 & 4/01, 2 & 4/02, 2 & 4/03
3.00		1.90	351	1.09			1.97	0	0	3.31	1	1	4.36	3	3A	dead			green, good, almost buried 9/99; green, good, popping out 2 & 4/00; bluish-green, good 2/01; green, good 4/01 & 2 & 4/02; just spines, COD unknown 2/03
4.00		2.01	10	0.96			1.30	0	0	2.26	0	0	2.76	2	1A	4.03	3	1+2A	OK, almost buried 9/99; green, good, popping out 2 & 4/00; green, good 2 & 4/01, 2 & 4/02; green, good, rooting in area 2 & 4/03
5.00		2.18	17	3.23			4.29	4	3disp +1A	6.13	5	6+2A	7.12	6	8+2A	6.05	mia	9	green, good 9/99; flowers yellow, plant green, good 2 & 4/00, 2 & 4/01, 2 & 4/02; plant and tag mia, rooting in area 2/03; plant and tag relocated, plant uprooted and moved, green, good but not rooted 4/03
6.00		2.09	22	0.86			1.17	0	0	1.09	0	0	1.50	0	0	1.50	0	0	OK?, almost buried 9/99; dull green, OK, edge of armadillo hole 2 & 4/00; green, OK 2 & 4/01; green, good 2 & 4/02; green, spineless, buried in dirt, OK 2/03; new spine growth, green, good 4/03
7.00		2.26	21	0.96			1.37	0	0	1.85	0	0	2.32	1	1	2.85	2	1+1A	green, good, almost buried 9/99; green, good, popping out 2 & 4/00; green, good 2 & 4/01, 2 & 4/02, 2 & 4/03
8.00		2.94	22	1.77			2.35	1	1A	3.34	2	0	3.58	4	4	4.24	2	4	green, good, edge of agarita 9/99, 2 & 4/00, 2 & 4/01, 2 & 4/02, 2 & 4/03
9.00		2.17	28	1.27			2.14	0	0	2.51	0	0	2.87	2	1+1A	3.43	3	0	green, good 9/99, 2/00; olive, OK 4/00; green, good 2 & 4/01, 2 & 4/02, 2 & 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - JD-0 Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
10.00		1.66	29	0.43			0.76	0	0	0.92	0	0	1.32	0	0	1.25	0	0	OK?, A. tobuschii? 9/99; green, good, pebble on top 2 & 4/00; green, OK 2 & 4/01; green, good 2 & 4/02; green, OK 2/03; green, good 4/03
11.00		1.72	76	1.70			2.37	1	0	3.58	0	0	4.71	5	6	5.45	8	12	green, good 9/99, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
12.00		2.00	66	2.35			2.90	1	1A		0	dead							green, good 9/99, 2 & 4/00, totally sunken, only spines at surface, may be dead 2/01, dead, COD unknown 5/01
13.00		1.92	64	0.54			1.04	0	0	1.55	0	0	1.73	0	0	2.77	3	3	OK, almost buried 9/99; good, green, popping out 2/00; hunkered, olive, OK 4/00; green, good 2 & 4/01; olive, OK 2/02; green, good 4/02, 2 & 4/03
14.00		1.83	65	1.51			2.31	1	0	mia			mia			mia			green, good 9/99, 2 & 4/00, plant mia 2 & 4/01, 2 & 4/02, tag present, plant mia 2 & 4/03
15.00		1.69	44	0.37			0.70	0	0	1.27	0	0	1.55	0	0	2.01	0	0	green, good 9/99; OK, dull green 2/00; green, good 4/00; pale green, OK 2 & 4/01; green, OK 2 & 4/02, 2/03; green, good 4/03
15.10		2.06	41										1.27	0	0	1.44	0	dead	discovered 2/02, green, good 2 & 4/02; green, hunkered, OK 2/03; dead, root hollow, COD weevils 4/03
16.00		1.76	56	1.94			3.14	3	2+ 1disp	mia			mia			mia			orangish-green, OK 9/99; dull green, OK 2/00; reddish, OK 4/00; plant mia 2 & 4/01, 2 & 4/02, tag present, plant mia 2 & 4/03
17.00		2.44	36	1.37			2.29	0	0	2.92	0	0	3.48	3	2	3.90	3	4+1A	green, good 9/99, 2 & 4/00; slightly maroonish-green, OK 2/01; green, good 5/01; slightly purplish green, good 2/02; accidentally stepped on, green, good 4/02; green, good 2 & 4/03
18.00		2.36	42	1.82			2.26	3	0	2.63	0	0	2.93	0	0	3.01	3	2	green, good 9/99; flowers pinkish, green, good 2/00; olive, OK 4/00; green, good 2 & 5/01; accidentally stepped on, green, good 2/02; green, good 4/02; green, good 2 & 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - JD-0 Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
19.00		2.90	71	1.34			1.82	1	0	1.93	0	0	2.85	2	3A	3.54	3	5	green, good, hunkered 9/99, 2 & 4/00; olive, OK 2/01; green, good 5/01; olive, good 2/02; green, good 4/02, 2 & 4/03
20.00		3.00	67	2.56			3.05	2	1disp	3.85	0	0	3.73	4	4A	4.73	6	7	hooded during weevil study in summer 99; green, good 9/99, 2 & 4/00; olive, OK 2 & 5/01, 2/02; green, good 4/02, 2 & 4/03
21.00		3.16	69	1.97			3.10	1	1	3.88	1	1A	4.26	3	1+2A	5.02	2	6+1A	green, OK, hunkered 9/99, 2 & 4/00; green, good 2 & 5/01; dark olive, good 2/02; slightly purplish green, good 4/02; green, good 2 & 4/03
22.00		4.58	31	5.37			5.93	6	6	7.00	8	6+3A	6.42	9	6+4A	6.88	9	11	green, OK, few orange tubercles 9/99; hooded during weevil study in summer 99; purplish green, OK 2 & 4/00, 2/01; olive, OK 5/01; one flower partially eaten, plant green, good 2 & 4/02; green, good 2 & 4/03
23.00		4.75	36	1.31			2.11	0	0	3.20	3	0	3.18	3	3	3.63	3	3	OK?, only spines showing, hunkered 9/99; purplish green, OK, out 2 & 4/00, 2/01; green, good 5/01, 2 & 4/02; dark green, good 2 & 4/03
24.00		4.86	31	0.76			0.83	0	0	0.58	0	0	0.60	0	0	0.70	0	0	green, OK, almost buried 9/99, 2 & 4/00, 2/01; coming out, green, OK 5/01; green, good 2/02; under leaf litter, green, OK 4/02, 2 & 4/03
25.00		4.70	30	0.85			1.18	0	0	1.54	0	mia	mia			mia			green, good, base of grass clump 9/99, 2 & 4/00, 2/01; plant mia 5/01, 2 & 4/02, 2 & 4/03
26.00		0.95	148										3.62		1	4.58	3	4+1A	under prickly pear, discovered 4/02; green, good 4/02, 2 & 4/03
27.00		1.07	160													2.49	1	1A	under prickly pear; discovered 2/03; green, good 2 & 4/03
28.00		~5.00	105													3.64	4	5+1A	measured over persimmon?; discovered 2/03; green, good 2 & 4/03
Data collected by Jackie Poole 9/15/99, 9/20/99, 2/8/00 with Craig Scofield, 4/28/00, 2/09/01, 5/01/01, 2/06/02, 4/24/02,																			
	2/5/03 with Sandy Birnbaum, 4/22/03																		
Data entered electronically in the field 2/06/02, 4/24/02																			

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - JD-1 Site

PL#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Site is located 0.5 mi South of Green Cave, through an opening on the East side of road just before creek crossing																		
Double flagged rebar - ~30m (~60 paces) @ 145 degrees from road to creek; ~37m (~74 paces) from creek to fence;																		
	~30m (~60 paces) @ 115 degrees from fence crossing; plot established 9/15/99; R020715A																	
1.00	1.74	9	1.99			2.35	0	0	dead									green, with some orange tubercle tips, OK 9/99; poor, purplish 2/00; looks dead 4/00; COD weevils (galleries) 2/01
2.00	1.84	14	2.30			2.09	0	0	dead									green, OK 9/99, 2/00; looks like just spines left 4/00; dead, just spines left, COD unknown 2/01
3.00	2.17	17	2.36			2.63	0	0	dead									olive green, OK 9/99, 2/00; looks dead 4/00; just spines left, COD unknown 2/01
3.01	2.17	17							0.43	0	0	0.49	0	0	0.52	0	0	seedling of 3.00, ~1cm from pin flag; green, OK 2/01; buried by gravel, only spines visible, poor 5/01; reddish gray, poor 2 & 4/02; purplish green, OK, partially buried 2/03; olive, OK 4/03
3.10	2.15	13										0.65		0	0.49	0	0	discovered 4/02; green, good 4/02; olive, OK 2 & 4/03
3.20	2.04	13										0.59		0	0.76	0	0	discovered 4/02; green, good 4/02; purplish green, OK 2 & 4/03
3.30	1.93	13													0.78	0	0	discovered 2/03; left of 3.40; green, good 2 & 4/03
3.40	1.94	13													0.95	0	0	discovered 2/03; right of 3.30; dark maroonish-green, OK 2 & 4/03
4.00	2.19	17	2.00			1.75	0	mia	mia			dead						green, good 9/99; one measurement only 2/00; dull green, OK 2/00; plant mia 4/00, 2 & 5/01; relocated, dead, just spines left, COD unknown 2/02
5.00	1.33	207	1.94			0.83	0	0	1.09	0	0	1.16	0	0	1.11	0	0	one measurement only 2/00; green, good, hunkered 9/99, 2/00; hunkered, olive, OK 4/00; covered by Selaginella, green, OK 2 & 5/01; popping out, green, good 2 & 4/02; olive, OK 2/03; green, good 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - JD-1 Site

PL#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
6.00	1.34	207	0.94			2.12	0	0	2.33	1	1	3.02	4	3+1A	3.37	3	4	green, OK, hunkered 9/99; green, hunkered, good 2/00; hunkered, green, OK 4/00; popped out, green, good 2 & 5/01, 2 & 4/02; green, good 2/03; green, OK 4/03
7.00	1.36	204	2.42			Dead												green, some tubercle tips tan, OK 9/99; collected by Bill Calvert, dead, killed by weevils
8.00	1.61	212	2.17			2.08	0	0	dead									green, OK, hunkered 9/99; gray spines, red body, poor 4/00; body solid, COD unknown 2/01
9.00	9.90	238	2.20			1.41	0	0	dead									green, good 9/99; poor, squishy, at edge of rock 2/00; looks dead 4/00; body solid, COD unknown 2/01
10.00	10.38	239	3.63			3.70	0	0	3.39	0	dead							sunken in center, some red tubercles, poor 2/00; new spine growth, olive, OK 4/00; top green, base yellowish-olive, OK 2/01; galleries, COD weevils 5/01
11.00	10.71	239							0.68		0	0.66	0	0	1.16	0	0	discovered 5/01; green, OK 5/01; almost buried in gravel, green, OK 2/02; green, good 4/02, 2 & 4/03
12.00	10.65	238										0.93	0	0	1.01	0	0	discovered 2/02; green, OK 2/02; olive, OK 4/02; at edge of rooting hole 2/03; green, good 2 & 4/03
Data collected by Jackie Poole 9/15/99, 2/8/00 with Craig Scoffield & Bill Calvert, 4/28/00, 2/16/01, 5/02/01, 2/09/02, 4/24/02,																		
	2/5/03 with Sandy Birnbaum, 4/22/03																	
Data entered electronically in the field 2/09/02, 4/24/02																		

Ancistrocactus tobuschii Data for Kickapoo Caverns SNA - JD-2 Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	NOTES
Site is located in NW area of park near dead pinyon on hilltop										
Stake is ~8m @ 200 degrees from dead pinyon										
1.00		3.04	63	3.02			Dead	0		yellowish green, OK 9/99; hollow, killed by weevils, Dead 2/00
2.00		2.73	63	3.11			Dead	0		orangish, OK 9/99; hollow, killed by weevils, Dead 2/00
Data collected by Jackie Poole 9/20/99, 2/8/00										

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - JD-3 Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Site is 0.6 mi North of residence; walk along fence from where road crosses creek, at a fence drainage crossing with																			
	several large pinyons (go past small drainage with hog panel & junipers), there is an old, large split pinyon																		
	on the North bank of the drainage, the stake is ~25m @ 107 degrees from the old, large split pinyon or 0.8 mi from																		
	residence, look for fence corner or brace, just before it is the large, old, split pinyon; plot set up 9/20/99; R020814A																		
1.00	JD-3	1.67	314	2.73			3.63	2	2disp	4.32	2	2A	4.24	3	2+2A	4.35	4	3+1A	OK, yellowish, squishy 9/99; OK, orangish-green 2/00; maroonish, OK 4/00, 2/01; dull olive-green, OK 4/01, 2 & 4/02; maroonish green, good 2/03; yellowish, OK 4/03
2.00	JD-3	2.96	280	5.08			5.00	0	0	4.77	0	collected							totally orangish, poor 9/99; very poor, totally orange 2 & 4/00; dry solid, tannish-orange, looks dead, collected 2/01
3.00	JD-3	3.68	233				3.70	1	disp?	dead									good, green 2/00; yellow-green, OK 4/00; body intact, COD unknown 2/01
Data collected by Jackie Poole 9/20/99, 2/8/00, 4/26/00, 2/19/01, 4/25/01, 2/08/02, 4/24/02, 2/5/03 with Sandy Birnbaum, 4/24/03																			
Data entered electronically in the field 2/08/02, 4/24/02																			

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Kelly Bryan Memorial Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake is ~90m at 320 degrees from a rock cairn atop exposed, large rock outcrop on the North side of the main																			
	road 0.3 mi North and then West of main gate; GPS19 = R021821A; R020623A																		
1.00		~77.55	~3	2.42	1+3fr	1+1A	3.21	1	1A	3.33	2	1A	2.75	2	1+1A	2.59	2	2	green, good 4/99; olive green, good 2/00; maroonish, OK 4/00, 2 & 4/01; hunkered, olive, OK 2/02; popped out, green & OK 4/02; dark green, good 2/03; hunkered, dark green, OK 4/03
2.00		17.96	2							3.79	3	1+2A	3.34	2	1+1A	3.43	2	2	discovered 2/01; maroonish-green, OK 2/01; dark green, OK 4/01; purplish green, OK 2 & 4/02; olive, OK 2 & 4/03
3.00		21.91	1													2.57	2	2	discovered 2/03; purplish, OK 2 & 4/03
Data collected by Jackie Poole 2/18/99 with Linda Hedges, 4/99, 2/9/00 with Bill Calvert, 4/28/00, 2/09/01, 4/25/01, 2/06/02, 4/24/02,																			
	2/5/03 with Sandy Birnbaum, 4/22/03																		
Data entered electronically 2/06/02, 4/24/02																			

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Kickapoo Site

GPS = 29o37'02.21107, 100o25'40.93984 uncor. Park car at end of road (blocked by railroad tie), cross, go up road to first major opening on right, follow opening, go to end of electric line and old utility box, go ~10 meters further and up open hill.

PL#	STK#	DIST	ANGLE	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.00	1	3.37	65	2.38		0	3.08	3	3	discovered 4/02; green, good 4/02, 2 & 4/03; honeybee trying to get in flower 2/03
2.00	1	3.09	98	3.98		2	4.28	5	4+1A	discovered 4/02; reddish-green, OK 4/02; maroonish green, good 2/03; olive, OK 4/03
3.00	1	5.55	87	4.70		5+1A	dead			discovered 4/02; orangish-purple, poor 4/02; plant uprooted and partly eaten, COD mammal herbivory 2/03
4.00	1	6.30	105	4.80		6	5.13	3	4	discovered 4/02; green, good 4/02 & 2/03; reddish olive, OK 4/03
5.00	1	3.89	119	1.21		0	dead			discovered 4/02; under rocks; misshapen, green, good 4/02; stem dry, solid, COD unknown 2/03
6.00	1	4.05	119	1.53		0	1.28	0	0	discovered 4/02; green, good 4/02, 2 & 4/03
7.00	1	4.13	119	1.39		0	mia			discovered 4/02; green, good 4/02; plant mia 2 & 4/03
8.00	1	4.14	119	1.46		0	mia			discovered 4/02; green, good 4/02; plant mia 2 & 4/03
9.00	1	4.20	119	1.55		0	1.53	0	0	discovered 4/02; green, good 4/02, 2 & 4/03
10.00	1	4.24	118	4.11		2	3.98	2	2	discovered 4/02; green, good 4/02, 2 & 4/03
11.00	1	5.01	128	4.90		5	3.89	0	0	discovered 4/02; purplish-green, good 4/02; red body, gray spines, poor 2 & 4/03
12.00	1	2.50	266	7.49		13	7.83	14	9+2A	discovered 4/02; green, good 4/02; maroonish-green, good 2 & 4/03
12.10	1	2.52	268	1.60		0	1.82	0	0	7 o'clock on 12.00, discovered 4/02; green, good 4/02, 2 & 4/03
13.00	1	2.20	102				3.21	4	4	discovered 2/03; green, good 2 & 4/03

Data collected by Jackie Poole 4/25/02, 2/12/03, 4/23/03

Data entered electronically 4/25/02

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Linda's Site

PL#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.0 mi from Green Cave and 0.2 mi from main gate, south side of road																		
Rebar 30m from road to the south; GPS17 = R020716A																		
1.00	15.62	290	2.25	1+1fr	0	3.33	2	2+1A	dead									maroonish, OK 4/99; hooded during weevil study in summer 99; maroonish with whitish speckles, OK 2/00; reddish-green, OK 4/00; dry, solid, COD unknown 2/01
1.10	14.99	294										5.49	4	4+3A	6.06	5	7	left of 1.20, discovered 2/02; purplish, good 2 & 4/02; green, good 2/03; green with a few purplish tubercle tips, OK 4/03
1.20	14.93	294										2.98	3	2A	4.31	4	4	right of 1.10, discovered 2/02; purplish, good 2/02; green, good 4/02, 2 & 4/03
2.00	15.50	290	4.12	1+2fr	2 disp	4.66	4	2	5.78	3	2+1A	5.67	5	3+5A	6.14	9	10	left of 3.00; hooded during weevil study in summer 99; very dark green, good 4/99 & 2/00; ants swarming fruit, plant green, good 4/00; slightly maroonish-green, good 2 & 5/01, 2 & 4/02; green, good 2 & 4/03
3.00	15.40	290	4.11	3+2fr	2+2A	4.85	4	2+1A+ 1disp	5.94	4	1+1A	5.87	2	1+2A	6.62	0	1	right of 2.00; red, OK 4/99; maroonish, OK 2 & 4/00; side nibbled, maroonish, OK 2/01; green, OK 5/01; rock flipped on top, plant green, good 2/02; purplish green, good 4/02; green, OK, large rock on top, removed 2/03; green with purple or tan tubercle tips, OK 4/03
4.00	15.92	300	3.97	1	1A	4.41	2	2disp	5.39	4	2A	5.49	3	2+3A	5.89	8	6+1A	maroonish, OK 4/99, 2 & 4/00, 2/01; blue-green, good 5/01; purplish green, good 2 & 4/02; green, good 2 & 4/03
4.10	16.23	295													1.64	0	0	discovered 2/03; green, OK 2/03; green, good 4/03
5.00	15.85	300	2.48	1	1A	3.73	2	2	5.36	4	1+3A	5.50	3	4A	6.12	7	9	green, good 4/99, 2/00; reddish, green, OK 4/00, 2/01; maroonish-green, OK 5/01; purplish green, good 2 & 4/02; green, good 2 & 4/03
5.01	15.88	300										1.64	0	0	dead			discovered 2/02; hunkered, just spines visible, OK; perhaps dead 2 & 4/02; dead, just spines left 2/03
6.00	15.84	300	1.89	1	1A	2.15	1	1disp	2.78	1	1A	mia			mia			dull green, OK 4/99, 2/00; reddish, OK 4/00; olive, OK 2 & 5/01; tag uprooted, plant gone without a trace 2 & 4/02; plant mia, tag present 2 & 4/03
7.00	15.80	300	2.49	0	0	3.10	1	1	3.91	2	2A	3.81	2	1+1A	4.43	3	3	green, good 4/99, 2 & 4/00; maroonish-green, OK 2/01; green, good 5/01; maroonish-green, good 2 & 4/02; purplish green, good 2 & 4/03
7.10	15.50	297													3.06	3	3	discovered 2/03; green, good 2 & 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Linda's Site

PL#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
8.00	5.51	96	4.80	2+5fr	4+1A	4.98	5	disp?	4.85	4	2A	4.97	6	2+4A	4.89	5	5	maroonish, OK 4/99; reddish tubercles, overall maroonish, OK 2/00; dark green, OK 4/00; green with some tan tubercles, OK 2/01; dull green, OK 5/01; accidentally stepped on, one flower partially eaten, plant purplish green, good 2/02; green, OK 4/02; dark olive, good 2 & 4/03
9.00	6.94	120	2.06	2+1fr	3	2.65	2	1A	3.62	3	1A	3.68	3	2+3A	4.68	6	6	green, OK, hunkered 4/99; maroonish, OK, hunkered 2/00; dark green, OK 4/00; dark olive, good 2/01; dark purple, OK 5/01; purplish green, good 2 & 4/02, 2 & 4/03
10.00	11.90	87	2.76	3+1fr	2+ 2 disp	4.01	5	3	5.52	7	5A	dead						hooded during weevil study in summer 99; green, good 4/99; maroonish, good 2/00; green, good 4/00; maroonish green, OK 2/01; small chunk eaten out of side, reddish-green, OK 5/01; dead, COD unknown, collected for weevil study 2/02
10.10	10.15	99													3.06	6	6	discovered 2/03; green, good 2 & 4/03
11.00	11.35	104	3.03	4	4	3.51	2	2	3.69	2	2A	3.96	3	2+1A	4.03	4	5	green, OK, hunkering 4/99; maroonish, good 2/00; hunkering, green, OK 4/00; green with maroonish tubercle tips, OK 2 & 5/01; olive, OK 2/02; green, OK 4/02; green with orange tubercle tips, OK 2/03; green, good 4/03
11.10	11.88	108										2.94		0	3.05	2	1+1A	discovered 4/02; green, good 4/02, 2 & 4/03
11.20	11.84	108										2.73		0	2.46	0	0	discovered 4/02; yellowish-green, OK 4/02; green, good 2 & 4/03
12.00	14.66	121	2.36	2+2fr	2+ 2 disp	2.87	2	disp	3.73	4	1A	4.35	4	4+2A	4.74	6	7	hooded during weevil study in summer 99; reddish, OK 4/99; maroonish, OK 4/00, 2 & 5/01, 2/02; blackish-green, OK 4/02; dark purplish-green, OK 2 & 4/03
13.00	18.45	105	4.56	3+5fr	disp	5.26	6	disp	6.03	11	2+9A	6.55	11	9+4A	6.68	12	7+1A	dull green, OK 4/99, 2/00; yellowish, OK 4/00; green with some tan tubercle tips, OK 2/01; green, good 5/01; olive with some reddish tubercle tips, good 2/02; green, good 2/03; green with some pale greenish-yellow tubercle tips, OK 4/03
14.00	18.63	123	2.82	2+1fr	2+ 1 disp	4.26	4	3+2A	5.86	4	1+6A	7.23	5	11+2A	5.88	2	5	reddish, OK 4/99, 2/00; green, good 4/00; olive, OK 2/01; blue-green, good 5/01; purplish olive, good 2/02; reddish-green, good, purplish-green, good 4/02; reddish-green, OK 2 & 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Linda's Site

PL#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
14.10	17.97	120													4.03	5	7	in bedrock crack, discovered 2/03; green, good 2 & 4/03
14.20	17.98	120													1.09	0	0	in bedrock crack, discovered 2/03; green, good 2 & 4/03
15.00	15.52	124	2.35	3+1fr	4	2.91	2	1disp	3.11	3	3A	3.27	3	3	3.55	4	4	hooded during weevil study in summer 99; green, OK, hunkering 4/99; green, good 2 & 4/00, 2/01; dull green, OK 5/01; green, good 2 & 4/02, 2 & 4/03
16.00	55.65	111	3.78	4+2fr	5	4.82	6	6	4.90	6	1+5A	4.47	2	0	dead			hooded during weevil study in summer 99; green, good 4/99; fruit red 4/00; nibbled on a few tubercles, green with tan tubercle tips, OK 2/01; green, good 5/01; partially uprooted, green, good 2/02; pinkish-yellowish-green, poor 4/02; uprooted, dead 2/03
17.00	~75.50	~116	3.76	5	4+1A	4.80	4	2+2A	5.30	4	5A/ dead							maroonish, OK 4/99; olive green, good 2 & 4/00; maroonish, OK 2/01; very squishy, maroonish, poor 5/01; dead, COD maggots (fly larvae) 5/01
17.01	~75.53	~116				0.67	0	0	0.94	0	dead							left of 17.02; discovered 2/00, green, good 2 & 4/00; green, OK 2/01, dead, COD fly larvae 5/01
17.02	~75.53	~116				0.44		0	0.50	0	dead							right of 17.01, discovered 4/00, green, good 4/00, green, OK 2/01; just spines left, COD unknown 5/01
18.00	~77.70	~269	2.31	2	2	2.69	2	1A	2.95	0	0	3.72	1	2A	3.74	2	2+1A	right of 23.00; green, OK, hunkering 4/99; green, good, popping out 2/00; olive green, OK 4/00, 2/01; green, good 5/01, 2/02; tag mia, replaced 2/02; green, good 4/02, 2/03 & 4/03
19.00	~77.70	~268	1.80		0	1.86	0	0	mia			mia			mia			discovered 4/99; green, good 4/99, 2/00; covered with litter, green, good 4/00; plant mia 2 & 5/01, 2 & 4/02, 2 & 4/03
20.00	11.65	266	3.63		0	3.69	0	0	dead									hooded during weevil study in summer 99; green, good 9/99, maroonish, most spines gray, very few new spines, poor 2/00; new spine growth, maroonish, OK 4/00; body hollow, Moneilema?, dead 2/01
20.01	11.63	266				1.26		0	1.50	0	dead							right of 20.02; discovered 4/00, green, good 4/00, 2/01; COD unknown 5/01
20.02	11.63	266				0.45		0	mia			mia			mia			left of 20.01; discovered 4/00, green, good 4/00; plant mia 2 & 5/01, plant & tag mia 2 & 4/02, 2 & 4/03
21.00	11.80	263	2.24		0	2.39	1	1	3.63	3	0/ dead							discovered summer 99; green, good 9/99, 2 & 4/00, 2/01, shrunken, orangish, poor 5/01, dead COD weevils 5/01
22.00	11.56	267				2.07		0	dead									discovered 4/00, green, good 4/00; just spines left, COD unknown 2/01

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Linda's Site

PL#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
23.00	~77.70	~269				1.73		0	2.71	1	1A	2.83	1	2A	3.66	2	3	left of 18.00; discovered 4/00; green, good 4/00, 2 & 5/01, 2/02; green, good 4/02, 2 & 4/03
24.00	77.20	125										2.94		2	mia			discovered 4/02; green, good 4/02; plant and tag mia 2 & 4/03
25.00	74.40	~269										1.37		0	1.11	0	0	discovered 4/02; purplish-green, OK 4/02; green, OK 2/03; green, good 4/03
26.00	74.25	272										2.95		2	2.94	2	2	discovered 4/02; green, good 4/02; purplish-green, OK 2/03; olive, OK 4/03
27.00	74.40	~269	~269												0.81	0	0	discovered 2/03; olive, lower stem exposed, OK 2/03; reddish-olive, OK 4/03
Data collected by Jackie Poole 2/17/99 with Linda Hedges, 4/23/99, 9/15/99, 2/9/00 with Craig Scofield & Bill Calvert,																		
	4/28/00, 2/16/01, 5/01/01, 2/07/02, 4/25/02, 2/6/03 with Sandy Birnbaum, 4/22/03																	

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Mark 1 Site

PL#	STAKE	DIST	ANGLE	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.00		4.56	244	4.75		1A	dead			discovered 4/02; orangish-green, OK 4/02; dead, COD weevils, collected for weevil study 2/03
2.00		3.40	267	4.19		3A	4.10	0	dead	discovered 4/02; reddish-green, good 4/02; rooting in area, green, good 2/03; large cavity and exit holes, removed for weevil study 4/03; COD weevils 5/03
3.00		1.60	300	2.00		0	1.19	0	0	discovered 4/02; olive, good 4/02; rooting around plant, only spines showing, poor 2 & 4/03
Data collected by Jackie Poole 4/24/02, 2/5/03 with Sandy Birnbaum, 4/22/03										

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Mark 2 Site

PL#	STAKE	DIST	ANGLE	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.00	1	8.35	166	2.56		1A	2.75	2	2	discovered 4/02; green, good, adjacent to dead plant (collected for weevil study, COD unknown) 4/02; green, good 2 & 4/03
2.00	1	8.32	170	4.32		5+2A	2.76	0	0	discovered 4/02; green, good 4/02; red, poor 2/03; piece of weevil inside and Moneilema chamber inside, still some green tubercles, replanted, poor 4/03
3.00	1	9.00	170	3.95		2+3A	4.05	3	5	discovered 4/02; green, good 4/02, 2 & 4/03
4.00	1	8.37	172	3.57		3	2.93	2	4	discovered 4/02; green, good 4/02; purplish-green, good 2/03; green, good 4/03
5.00	1	8.38	173	2.22		1	2.49	2	2	discovered 4/02; green, good 4/02, 2 & 4/03
6.00	1	8.79	17	2.72		1	3.20	2	1+1A	discovered 4/02; green, good 4/02, 2 & 4/03
7.00	1	6.71	181	4.25		2+2A	4.42	5	1+4A	discovered 4/02; green, good 4/02, 2 & 4/03; 4 large fruits without seeds, hole in side 4/03
8.00	1	7.02	214	3.51		2+2A	3.40	4	4+1A	discovered 4/02; green, good 4/02; purplish-green, good 2/03; one large friut without seeds, hole in side, plant purplish, OK 4/03
Data collected by Jackie Poole 4/25/02, 2/5/03 with Sandy Birnbaum, 4/22/03										

Ancistrocactus tobuschii Data for
Kickapoo Caverns SNA - Northeast Corner Site

PL#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
0.4 mi North of main gate on FM 674, at North boundary fence on west side of road, 150 m South/Southwest of fence corner; GPS16 = R021718A																		
1.00	47.05	149	2.41	1	1	2.74	1	1disp	2.46	0	0	2.57	0	0	3.34	3	3	green, good 4/99, 2 & 4/00, 2 & 4/01, 2 & 4/02, 2 & 4/03
2.00	25.69	33	2.55	1+1fr	0	2.79	2	1+1A	3.59	3	2+2A	3.24	2	2+1A	3.94	3	2+1A	loose spine cluster, otherwise green, good 4/99; green, good 2 & 4/00, 2 & 4/01, 2/02; green with tan tubercle tips 4/02; green, good, removed rock from top 2/03; green, good 4/03
3.00	~25.7	~30							2.53	1	1A	3.66	5	2A	3.27	3	1+2A	discovered 2/01; lopsided, green, OK 2 & 4/01; maroonish green, OK 2 & 4/02; green, OK 2 & 4/03
4.00	25.80	34										1.36		0	1.40	0	0	discovered 4/02; green, OK 4/02; green, good 2 & 4/03
5.00												4.07		0	4.25	2	1+1A	measured from plant 2.00, 27.92 m at 96 degrees, discovered 4/02; green, good 4/02; green, OK 2/03; dark green, OK 4/03
6.00												2.39		0	2.73	1	0	27.92 m from plant 2.00 at 96 degrees, left of plant 5.00, discovered 4/02; green, good 4/02, 2 & 4/03
7.00												2.07		0	mia			measured from plant 2.00, 27.94 m at 97 degrees, crowded between plants 6.00 & 8.00, discovered 4/02; green, good 4/02; plant mia 2 & 4/03
8.00												2.93		0	2.93	0	1	measured from plant 2.00, 27.94 m at 97 degrees, discovered 4/02; green, good 4/02, 2 & 4/03
9.00															4.23		0	measured from plant 2.00, 22.15 meters at 42 degrees; discovered 4/03; green, good 4/03
10.00															4.41		5	measured from plant 2.00, 21.70 meters at 42 degrees; discovered 4/03; green, good 4/03
Data taken by Jackie Poole 2/17/99 with Linda Hedges, 4/23/99, 2/15/00, 4/28/00, 2/09/01, 4/26/01, 2/10/02, 4/25/02, 2/6/03 with Sandy Birnbaum, 4/23/03																		

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - North Gate Site

PL#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
GPS18 = R021014A																		
1.00	29.13	320	3.59	1	1	3.58	1	0; Dead										reddish, OK 4/99; OK 2/00; reddish, poor; collected by Bill Calvert 4/00; dead; COD unknown
2.00	4.25	57	4.46	3+2fr	3+2A	5.08	5	5	4.79	2	2A	5.06	4	1+5A	5.97	6	8	green, good 4/99; green, good 2 & 4/00; green, good but with half of plant eaten on one side, appears to be scarred over, probably mammal herbivory 2/01; apex now at ground level, plant green, good 4/01; apex shifted to one side, plant green, good 2 & 4/02; green, good 2 & 4/03
2.01	3.99	54							1.71	0	0	1.69	0	0	2.67	2	2	discovered 2/01; green, good 2 & 4/01; hunkered, green, good 2/02; green, good 4/02; olive, OK 2/03; green, good 4/03
2.02	4.04	57							0.71		0	0.93	0	0	1.23	0	0	discovered 4/01; green, OK 4/01, 2 & 4/02; green, good 2 & 4/03
3.00	26.29	80	2.21	1	1	2.40	0	0	3.07	1	1A	2.67	2	1	2.51	0	0	green, OK, hunkered 4/99; popping out 2/00; grayish-green, poor sunken in center, OK 4/00; olive green, OK 2/01; dull green, OK 4/01; blue green, OK 2/02; purplish-green, OK 4/02; purplish, OK 2/03; green, good 4/03
4.00	28.55	78	4.21	3+1fr	4	4.46	3	1A+2disp	4.22	1	1A	4.39	4	1A	3.74	5	3+2A	green, good 4/99; grayish-green, OK 2/00; body green, tubercles orange, OK 4/00; green, some tubercles purplish, good 2/01; maroonish, OK 4/01; olive, OK 2/02; reddish-green, OK 4/02; dark purplish-olive, good 2 & 4/03
5.00	62.26	88	5.09	7	disp	5.98	5	2+5disp	5.62	4	5A	5.81	6	2+4A	5.73	4	6	green, good 2 & 4/00, 2 & 4/01, 2 & 4/02; green, OK 2 & 4/03
5.01	62.29	88	1.25		0	1.30	0	0	1.91	0	0	2.30	1	0	2.56	1	1	at six o'clock, discovered 4/99; green, good 4/99, 2 & 4/00, 2 & 4/01, 2 & 4/02, 2 & 4/03
5.02	62.25	88				1.24	0	0	1.63	0	0	2.03	0	0	2.23	0	0	at two o'clock; green, good 2 & 4/00, 2 & 4/01, 2 & 4/02, 2 & 4/03
5.03	62.28	88				1.33	0	0	1.85	0	0	2.02	0	0	2.16	1	0	at five o'clock; green, good 2 & 4/00, 2 & 4/01, 2 & 4/02, 2 & 4/03
5.04	62.27	88							0.79		0	1.32	0	0	1.20	0	0	at 4 o'clock, discovered 4/01; green, OK 4/01, 2/02; green, OK 4/02, green, OK 2& 4/03
6.00	34.60	102													3.17	3	3	discovered 2/03; green, OK 2 & 4/03
7.00	45.85	116													4.50	5	6	discovered 2/03; green, good 2 & 4/03
8.00	46.24	119													6.56	6	7+2A	discovered 2/03; purplish, OK 2/03; olive, good 4/03
9.00	17.35	149													6.05	8	6	discovered 2/03; dark green, good 2/03; apex shifting, green, OK 4/03
10.00	25.45	182													3.31	3	0	discovered 2/03; green, good 2/03; green, OK 4/03
11.00	34.95	173													2.87	3	2+1A	discovered 2/03; green, good 2 & 4/03
12.00	35.70	175													3.08	2	4	discovered 2/03; green, damaged tubercle tips, OK 2/03; purplish green, OK 4/03
13.00	46.78	131													2.34		0	discovered 4/03; probably stepped on, green, poor 4/03
Data collected by Jackie Poole 2/18/99 with Linda Hedges, 4/23/99; 2/10/00 with Craig Scofield, 4/25/00, 2/07/01, 4/25/01,																		
	2/10/02, 4/25/02, 2/3/03 with Sandy Birnbaum, 4/23/03																	
Data entered electronically in the field 2/10/02, 4/25/02																		

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Pipeline Site

PL #	STK#	DIST	ANGLE	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
From the well below Tank Hill, go about 100m at ~15 degrees; GPS = R020615A													
1.00		10.44	78	1.39	0	0	1.21	0	dead				hunkered, green, OK 2 & 5/01; very hunkered 2/02; dead, COD weevils, collected for weevil study 4/02
2.00		5.23	84	2.40	0	0	3.12	4	3	3.70	5	5+1A	olive, OK 2 & 5/01; green, OK 2/02; dark green, good 4/02, 2 & 4/03
3.00		7.55	85	1.58	0	0	1.15	0	0	1.57	0	0	green, good 2 & 5/01; green, very hunkered, OK 2/02; green, good 4/02, 2 & 4/03
4.00		7.59	88	1.29	0	0	0.93	0	0	1.49	0	0	green, OK 2 & 5/01; very hunkered, OK 2/02; green, good 4/02 & 2/03; hunkered, OK 4/03
5.00		7.59	89	1.56	0	0	1.08	0	0	1.96	1	1	olive, OK 2 & 5/01; rock on top, removed, plant green, OK 2 & 4/02; green, good 2/03; green, OK 4/03
6.00		7.45	89	1.28	0	0	1.13	0	dead				olive, OK 2 & 5/01, 2/02; dead, larva in plant, COD weevils, collected for weevil study 4/02
7.00		7.46	90	1.53	0	0	1.10	0	dead				green, good 2 & 5/01; olive, OK 2/02; dead, COD weevils, collected for weevil study 4/02
8.00		7.67	90	2.54	0	0	1.24	0	dead				olive, OK 2/01; new apex forming, green, OK, rest of plant olive, OK 5/01; very hunkered, loose, maybe dead 2/02; dead, COD weevils, collected for weevil study 4/02
9.00		7.38	91	2.74	3	3	2.68	1	dead				olive, OK 2 & 5/01; hunkered, OK 2/02; dead, collected for weevil study, COD unknown 4/02
10.00		4.66	92	1.85	0	dead							red, poor 2/01; COD weevils 5/01
11.00		11.99	159	2.12	1	1	1.67	0	dead				green, good 2/01; hunkering, green, OK 5/01; squishy, hunkered, poor 2/02; dead, collected for weevil study, COD weevils 4/02
12.00		12.07	160	2.45	1	1	1.28	0	dead				green, good 2/01; olive, OK 5/01; squishy, very loose, maybe dead 2/02; dead, COD weevils, collected for weevil study, 2 weevils active in plant 4/02

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Pipeline Site

13:00		13:53	168	5:21	6	5+1A	dead						ants swarming, dull green, OK 2/01; green, good 5/01, uprooted, dead 2/02; collected for weevil study, COD weevils 4/02
Data taken and recorded by Jackie Poole 2/19/01, 5/02/01, 2/06/02, 4/24/02, 2/6/03 with Sandy Birnbaum, 4/23/03													

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Quail Transect Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 41 is a flagged piece of rebar at the East end of the quail transect; 1.2 mi North of lodge on main road N, then ~1 mile South of main road;																												
	GPS10 = R020714A																											
41.10	41	26.75	257	1.00	0	0	1.10	0	0	1.50	0	0	1.26	0	0	0.72	0	0	0.87	0	0	1.21	0	0	1.27	0	0	by dead parent (dead in 1996, COD unknown) 3/96; really hunkered down 2/99; green, good 4/99; dark green, OK, hunkered 2 & 4/00; hunkered, green, OK 2 & 5/01, 2/02; green, OK 4/02; green, hunkered, OK 2 & 4/03
1.00	41	~29	264																3.88	3	2+2A	3.97	2	2+1A	mia			maroonish-brown, OK 2 & 5/01; olive, OK 2/02; green, good 4/02; tag present, plant mia 2/03; loose spine clusters in vicinity, plant mia 4/03
2.00	41	29.52	262																			2.94		2	mia			discovered 4/02; green, good 4/02; tag present, plant mia 2 & 4/03; area rooted by hogs 4/03
3.00	41	27.75	266																			2.78		2+1A	mia			discovered 4/02; purplish green, good 4/02; tag present, plant mia 2 & 4/03
4.00	41	28.15	268																			4.58		1+3A	mia			discovered 4/02; olive, good 4/02; tag present, plant mia 2/03; loose spine clusters in vicinity, plant mia 4/03
5.00	41	28.56	268																			4.17		3+2A	mia			discovered 4/02; green, OK 4/02; tag present, plant mia 2/03; loose spine clusters nearby, plant mia 4/03
5.01	41	28.54	268																						0.97		0	discovered 4/03; seedling or tubercle of 5.00; green, OK 4/03
Data taken and recorded by Jackie Poole 3/3/96, 5/8/96, 2/12/97, 5/5/97, 2/18/98, 5/5/98, 2/15/99, 4/21/99, 2/16/01, 5/02/01,																												
	2/07/02, 4/24/02, 2/5/03 with Sandy Birnbaum, 4/22/03																											
Data entered electronically in the field 2/07/02, 4/24/02																												

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
Stake 1 = R020514A																									
1.00	1	14.45	4	2.00	0	nd	2.30	1	0	3.20	3	0	3.10	4	disp	3.30	3	3	4.30	2	1A, disp	3.21	2fr	2	3.40
1.10	1	12.53	10																						
1.20	1	12.51	11																						
1.30	1	12.43	11																						
1.40	1	12.63	9																						
2.00	1	14.90	10	2.20	0	dead																			
3.00	1	14.94	10	2.70	0	dead																			
4.00	1	14.20	10	5.10	7	6	5.10	5	5	5.80	9	0	Dead												
5.00	1	13.45	10	4.50	3	3	4.60	5	5	4.20	7	6 S	4.40	7	disp	Dead									
5.01	1	13.58	10													0.80	0	0	mia			mia			mia
6.00	1	14.44	16	1.90	0	0	2.00	0	0	3.10	2	1	3.00	2	disp	3.50	3	2	4.10	1	1+1A	3.63	3	3	3.01
7.00	1	14.10	14	3.10	2	1	4.10	3	3	4.70	7	1+1A	4.40	5	disp	4.80	5	4+1A	5.30	8	4+1A	4.25	5fr	5	4.14
7.10	1	13.88	20													2.50	2	1+1A	3.50	5	4A	3.36	3+1fr	1+2A	3.67
8.00	1	14.26	14	3.40	2	2	4.00	2	1	5.40	4	1A	4.00	6	8 disp	5.50	7	7	5.70	4	disp?	4.59	5fr	3+2A	5.61
9.00	1	12.98	15	3.30	2	1	3.10	0	0	3.10	3	2	Dead												
9.01	1	12.83	16																						
10.00	1	14.50	15	5.60	1	1	6.50	8	8	6.70	10	0	5.30	10	1, disp	Dead									
10.01	1	14.18	24													0.70	0	0	0.90	0	0	0.99	0	0	1.19
10.02	1	14.15	24																			1.00	0	0	Dead
10.03	1	14.19	23																			2.17	0	0	2.54

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 1 = R02													
1.00	1	1	1 disp/ dead										discovered 3/17/93; tubercle & spine cluster loose, scarred over 5/97; good 2/98 & 4/99; almost uprooted on edge of hole, green, good 2/00; dead, removed for weevil study but no evidence of weevils 4/00
1.10	1						2.33		1+1A	2.52	1	0	discovered 4/02; hunkered, green, OK 4/02; green, few purplish tubercles, OK 2/03; hunkered, poor, new spine growth or seedling forming at 12 o'clock 4/03
1.20	1						1.68		0	1.58	0	0	discovered 4/02; green, good 4/02; green, OK hunkered 2/03; very hunkered, maybe dead 4/03
1.30	1									0.61		0	discovered 4/03; hunkered, OK 4/03
1.40	1									0.72		0	discovered 4/03
2.00	1												discovered 3/17/93; COD - M, dead 7/14/93
3.00	1												discovered 3/17/93; COD - grubs, dead 7/14/93
4.00	1												discovered 3/17/93; hollow, maybe weevils 2/96
5.00	1												discovered 3/17/93; holes in stem caused by weevils? 5/97
5.01	1												discovered 2/97; mia 98, 99; lots of rooting in area 2/00; plant mia 2 & 4/00, 2 & 4/01
6.00	1	1	disp?	3.06	0	0	3.01	0	0	2.57	0	0	discovered 3/17/93; green, good 4/99; green, good, almost covered by Aristida purpurea 2/00; olive, OK 4/00, 2 & 4/01; hunkered, poor 2/02; popped out, green, OK 4/02; hidden in grass, green, OK 2 & 4/03
7.00	1	3	3	dead									discovered 3/17/93; in shade of pricklypear; pricklypear dead 2/98; tag mia, replaced, probably lost in rooting nearby 2/99; dark green, good 4/99, 2/00; a few yellowish tubercles, OK 4/00; dead, COD weevils 2/01
7.10	1	4	4A	3.26	0	0							loose spine clusters 2/97; good 2/98; next to serious rooting but unharmed 2/99; dark green, good, fruit yellow, flabby 4/99; green, good 2/00; orangish, OK 4/00; green, good 2 & 4/01; dead, weevil exit holes, COD weevils 2/02
8.00	1	4	5	5.97	5	0/dead							discovered 3/17/93; plant has two tags; green, good 4/99, 2 & 4/00, 2/01; dead, COD fly maggots 5/01
9.00	1												discovered 3/17/93; pup from damaged stem 2/94; hollow, maybe weevils 2/96
9.01	1						2.96		2	dead			discovered 4/02; may be associated with dead 9.00; olive green, OK 4/02; dead, collected for weevil study 2/03
10.00	1												discovered 3/17/93; COD unknown, stem hollow, weevils suspected 2/97
10.01	1	0	0	2.00	0	0	1.54	1	0	2.09	2	2	seedling of 10.00; measured in one direction only 2/98; green, good 4/99, 2 & 4/00, 2/01; purplish-green, OK 4/01; hunkered, green, good 2 & 4/02; green, good 2 & 4/03
10.02	1												tag loose, plant OK 4/99; COD unknown 2/00
10.03	1	1	1A	3.62	2	2							hooded during weevil study in summer 99; green, good 4/99, 2 & 4/00, 2 & 4/01; dead, weevil exit holes, COD weevils 2/02

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
10.10	1	15.10	34							2.60	2	2	2.70	4	4 disp	3.20	2	2	3.20	2	2	3.31	3	2	3.56
10.11	1	16.35	39																						3.27
10.12	1	17.40	34																						
10.13	1	17.49	34					Dead																	
10.20	1	18.30	43							3.00	0	0	2.70	1	0	3.50	2	1+1A	3.20	3	3	Dead			
10.21	1	18.25	43																			0.71	0	0	0.74
10.22	1	18.32	43																			1.27	0	0	1.36
10.221	1	18.32	43																						
10.23	1	18.32	43																			1.21	0	0	1.12
10.24	1	18.41	43																			1.75	0	0	1.99
10.25	1	18.41	43																			1.85	0	0	2.07
10.26	1	18.30	43																			0.50		0	0.66
10.27	1	18.38	43																			0.55		0	0.91
10.28	1	18.33	43																			0.41		0	mia
10.29	1	18.42	43																						
10.30	1	16.15	58							3.70	3	1	3.20	4	2 disp	4.70	3	3+1A	3.90	3	1+1A	3.34	1	0	3.08
10.31	1	16.18	58													1.60	0	0	2.40	0	0	1.73	0	0	2.04
10.40	1	~15.20	~65													4.10		5	5.40	10	7	5.21	3+5fr	2+1A	5.39

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
10.10	1	3	3	4.36	4	4A	3.46	0	Dead				around tree; hole dug right beside 5/98; green, squishy, OK, new spine growth 2/99; hooded during weevil study in summer 99; green, good 2/00; green, squishy, OK 4/00; green, good 2 & 4/01; green, squishy, OK 2/02; dead, COD weevils, collected for weevil study 4/02
10.11	1		0	3.83	3	3A	4.34	3	2+1a	dead			discovered 4/00; reddish, OK 4/00, 2/01; green, good, OK 4/01; green, good 2 & 4/02; dead, collected for weevil study, COD weevils and Moneilema 2/03
10.12	1						4.44	0	Dead				discovered 2/02; green, good 2/02; COD weevils, collected for weevil study 4/02
10.13	1						3.86	0	0	4.96	7	1A	discovered 2/02; green, good 2 & 4/02 & 2/03; green, OK 4/03
10.20	1												thru pine; one seedling by end of tag, seven seedlings at plant base 5/97; one seedling (10.21) by end of tag & 3 seedlings (10.22, 10.23, one dead 2/99) by plant base 5/98; parent somewhat hollow, maybe weevils 2/99
10.21	1	0	0	0.89	0	0	0.90	0	0	0.97	0	0	hunkered, dull green, OK 2 & 4/00; green, OK, covered by plantago 2/01; green, good 4/01; hidden in grass, green, OK 2/02; green, OK 4/02, 2 & 4/03
10.22	1	0	0	1.73	0	0	1.93	1	1	dead			leftmost of 10.23; green, good 2/00; hunkered, OK 4/00; green, good 2 & 4/01, 2 & 4/02; dead, COD weevils 2/03
10.221	1						0.77		0	mia			discovered 4/02; green, OK 4/02; tag, no plant 2 & 4/03
10.23	1	0	0	1.59	0	0	2.09	1	Dead				right of 10.22; green, good 2/00; hunkered, OK 4/00; green, good 2 & 4/01, 2/02; body hollow, weevil exit hole, dead, COD - weevils 4/02
10.24	1	1	disp?	3.10	2	1	2.72	1	1A	dead			tag mia, replaced, green, good 4/99; hooded during weevil study in summer 99; green, good 2 & 4/00, 2 & 4/01, 2/02, dead, COD unknown 2/03
10.25	1	0	0	3.04	1	1	2.69	2	2A, Dead				right of 10.24, green, good 4/99; hooded during weevil study in summer 99; green, good 2 & 4/00, 2 & 4/01, 2/02, dead, COD weevils, collected for weevil study 4/02
10.26	1	0	0	0.87	0	0	mia			mia			discovered 4/99; green, good, hunkered 2 & 4/00; green, almost spineless, poor 2/01; normal spines, plant green, OK 4/01; plant and tag mia 2 & 4/02, 2 & 4/03
10.27	1	0	0	1.26	0	0	mia			mia			discovered 4/99; very hunkered, green, good 2/00; very hunkered, OK 4/00, 2/01; coming out, green, good 4/01; plant and tag mia 2 & 4/02, 2 & 4/03
10.28	1			mia			mia						discovered 4/99; plant mia 2 & 4/00, 2 & 4/01, 2 & 4/02
10.29	1						1.33		0	dead			discovered 4/02; green, good 4/02; dead, just spines, COD unknown 2/03
10.30	1	2	1+1disp	3.28	0	0	Dead						thru pine; 1 seedling 2/95; 3 seedlings 5/95; 1 seedlings 2 & 5/96; 3 seedlings 5/98 & 2/99; buried in grass 2/99; 2 seedlings, buried in grass, plant green, good 4/99, 2 & 4/00; seedlings mia, plant green, good, covered by grass 2 & 4/01; dead 2/02
10.31	1	0	0	2.15	0	0	Dead						seedling of 10.30, measured in one direction only 2/98; buried in grass 2/99 & 4/99, green, good 4/99, 2 & 4/00, 2 & 4/01; dead 2/02
10.40	1	6	6	dead									redo tag (recorded as 11.40); measured around pinyon, discovered 5/97; several flowers partially eaten 2/99; green, good 4/99; hooded during weevil study in summer 99; maroonish, good 2/00; dull green, good 4/00; dead, no weevils, COD unknown 2/01

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
10.41	1	15.38	65													2.30		1A	3.30	0	0	3.99	0	0	4.41
11.00	1	16.17	65	4.10	0	0	4.70	2	2	5.20	2	0	3.70	3	3	6.00	4	5	6.00	6	disp?	5.16	2+3fr	4	5.04
11.01	1	16.85	66																			0.81		0	Dead
11.100	1	16.83	76	4.40	2	2	4.30	2	2	2.20	1	1	1.70	3	1+1 disp	2.60	3	2+1A	2.20	0	0	2.27	0	0	2.20
11.101	1	16.66	74.5																						2.78
11.102	1	17.00	74																						
11.103	1	16.58	76																						
11.11	1	16.83	76	0.40	0	0	0.40	0	0	1.60	0	0	1.50	1	1 disp	1.60	0	0	dead						
11.12	1	16.83	76	1.00	0	0	1.00	0	0	1.30	0	0	1.70	1	1 disp	2.10	1	1	2.20	0	0	dead			
11.13	1	16.83	76	2.00	0	0	2.40	1	0	3.10	1	1	3.50	2	2	3.50	4	3+1A	dead						
11.14	1	16.83	76	1.30	0	0	1.30	0	0	2.00	1	0	1.40	0	0	1.20	0	0	1.20	0	0	1.08	0	0	mia
11.15	1	16.83	76	0.50	0	0	0.50	0	0	0.80	0	0	mia	mia	0	0.70	0	0	0.80	0	0	0.98	0	0	0.92
11.16	1	16.83	76	1.10	0	0	1.10	0	0	1.00	0	0	1.10	0	0	1.00	0	0	1.50	0	0	1.23	0	0	1.39
11.17	1	16.88	76	1.00	0	0	1.10	0	0	0.80	0	0	0.60	0	0	0.50	0	0	0.80	0	0	0.70	mia	0	0.66
11.20	1	16.83	76	3.00	0	0	3.00	1	1	Dead	na	na													
11.21	1	16.83	76	1.00	0		dead																		
11.22	1	16.83	76	0.40	0	0	0.50	0	0	mia	mia	mia	mia			mia									
11.23	1	16.83	76	0.50	0	0	0.70	0	0	mia	mia	mia	mia			mia									
11.24	1	16.83	76									nd	nd	0	0	mia			mia			mia			mia
11.30	1	16.71	76	2.50	0	0	3.60	3	nd	4.10	5	3	3.90	6	5	5.60	9	9+1A	dead						
11.31	1	16.83	76	0.50	0	0	0.40	0	0	mia	mia	mia	mia			mia									
11.32	1	16.83	76	0.70	0	0	0.70	0	0	mia	mia	mia	mia			mia									
11.33	1	16.83	76	0.50	0	0	0.80	0	0	mia	mia	mia	mia			mia									

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
10.41	1	2	2	dead									redo tag (recorded as 11.40); measured around pinyon; discovered 5/97; rock on top, removed 2/99; hooded during weevil study in summer 99; green, good 4/99, 2 & 4/00; looks trampled, dead, just spines, COD unknown, not weevils 2/01
11.00	1	1	1	5.68	1?	0	5.48	4	4	5.36	2	1+1A	discovered 3/17/93; in prickly pear; flowers partially eaten 2/99; green, good 4/99, 2/00; partially covered by ant mound, green, OK 4/00; coming out of ant mound, green, good, tiny flower buds 2/01; green, good 4/01, 2 & 4/02, 2 & 4/03
11.01	1												discovered 4/99; just spines left, COD unknown 2/00
11.100	1	0	0	2.30	0	0	Dead						discovered 3/18/93; 12 seedlings 3/93; green, good 4/99; green, OK 2 & 4/00, 2 & 4/01; dead, COD weevils, collected 2/02
11.101	1	1	1A	2.42	0	0	2.07	0	Dead				shrouded 2/00; green, good 2 & 4/00; olive, OK 2 & 4/01; green, OK, tag mia, replaced, hunkered 2/02; dead, COD weevils, collected for weevil study 4/02
11.102	1			2.97	0	0	1.92	0	0	1.94	0	0	discovered 2/01; buried in grass, green, good 2 & 4/01; hunkered, OK 2/02; green, good 4/02; green, hardly any spines, OK, buried 2/03; new spine growth, popped out, green, OK 4/03
11.103	1						1.90		0	1.87	0	dead	discovered 4/02; popped, green 4/02; OK 2/03; root hollow, COD weevils 4/03
11.11	1												discovered 3/18/93; dead, COD unknown 2/98
11.12	1												discovered 3/18/93; red spots 2/98 & 5/98; hollow, maybe weevils 2/99
11.13	1												discovered 3/18/93; dead, COD unknown 2/98
11.14	1			mia			mia						discovered 3/18/93; measured in one direction only 2/98; plant mia 2 & 4/00, 2/01; plant and tag mia 2 & 4/02
11.15	1	0	0	mia			mia			mia			discovered 3/18/93; measured in one direction only 2/98; green, good 2 & 4/00; plant mia 2/01; plant and tag mia 2 & 4/02, 2 & 4/03
11.16	1	0	0	1.19	0	0	mia			mia			discovered 3/18/93; measured in one direction only 2/98; green, good 2 & 4/00; hunkered, green, OK 2/01; popping out, green, good 4/01; plant and tag mia 2 & 4/02, 2 & 4/03
11.17	1	0	0	0.71	0	0	Dead						discovered 3/18/93; measured in one direction only 2/98; relocated 4/99; green, OK 2 & 4/00, 2 & 4/01; dead, COD weevils, collected 2/02
11.20	1												discovered 3/18/93; 3 seedlings 3/93; killed by pin, dead 2/95
11.21	1												discovered 3/18/93; COD - unknown, dead 2/11/94
11.22	1												discovered 3/18/93; prob. killed by pin, 2/95
11.23	1												discovered 3/18/93; prob. killed by pin, 2/95
11.24	1												seedling on top of 11.20 tag, replanted & watered 2/96; uprooted, looks dead 5/96; mia 98, 99, & 00
11.30	1												discovered 3/18/93; not recensused 4/94; COD unknown, 2 seedlings 2/98; seedlings mia 2 & 4/99
11.31	1												discovered 3/18/93; mia 95, 96, 97
11.32	1												discovered 3/18/93; mia 95, 96, 97
11.33	1												discovered 3/18/93; mia 95, 96, 97

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
11.34	1	16.83	76	0.50	0	0	0.60	0	0	mia	mia	mia	mia			mia									
11.35	1	16.83	76	0.40	0		dead																		
11.36	1	16.83	76										0.40	0	mia	mia			mia			mia			
11.37	1	16.83	76										0.30	0	mia	mia			mia			mia			
11.38	1	16.83	76													0.40	0	0	0.60	0	0	mia			mia
11.39	1	16.83	76													0.90		0	0.90	0	0	mia			mia
11.40	1	16.83	76													0.60		0	mia			mia			mia
11.50	1	17.15	78																2.00	1	1A	2.57	1+2fr	2+1A	3.86
11.60	1	17.42	78																			2.43		0	2.62
11.70	1	17.55	78																			2.91		0	3.68
11.80	1	18.04	75?																			2.40		0	2.57
11.90	1	17.92	76?																			1.11		0	1.05
12.00	1	11.60	65	4.70	4	4	2.90	1	0	4.10	2	2	4.30	5	4	5.10	4	3+1A	5.80	8	8	5.42	2+2fr	2+2A	5.34
12.10	1	10.15	71													1.80		0	2.20	1	1	2.01	2	1A	2.61
12.20	1	10.30	71													1.60		0	2.00	2	2A	1.82	0	0	2.62
12.30	1	10.50	70																						
13.00	1	9.57	65	2.10	0	0	2.70	0	0	3.00	1	1	3.00	nd	0	Dead									
14.00	1	9.64	65	2.70	0	0	3.30	1	1	3.20	1	0	Dead												
14.01	1	9.72	69										1.60	0	0	mia			mia			mia		Dead	
15.00	1	6.81	66	5.40	5	5	5.80	5	5	5.00	7	7	4.90	5	5 disp	6.10	5	5	6.10	7	1 disp	5.25	7fr	1+5A, 1 disp; Dead	

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
11.34	1												discovered 3/18/93; mia 95, 96, 97
11.35	1												discovered 3/18/93; COD - unknown, dead 2/11/94
11.36	1												seedling by tag, replanted & watered; plant & tag mia 2/97, 2/99 & 4/99
11.37	1												plant & tag mia 2/97, 2/99 & 4/99
11.38	1			mia									redo tag (recorded as 11.18); measured in one direction only 2/98; plant & tag mia 2 & 4/99, 2 & 4/00, 2 & 4/01
11.39	1			mia									redo tag (recorded as 11.19); discovered 5/97; measured in one direction only 5/98; plant & tag mia 2 & 4/99, 2 & 4/00, 2 & 4/01
11.40	1			mia									redo tag (recorded as 11.20); discovered 5/97; plant & tag mia 2/99, 2 & 4/00, 2 & 4/01
11.50	1	2	1+1A	4.18	3	3	3.13	0	Dead				discovered 2/98; green, good 4/99, 2 & 4/00, 2 & 4/01, 2 & 4/01; almost buried in dirt, green, OK 2/02; dead, COD weevils, collected for weevil study 4/02
11.60	1	1	1	3.12	1	1	Dead						OK, purplish, discovered 4/99; hooded during weevil study in summer 99; dull green, good 2/00; dull green, OK 4/00, 2 & 4/01; dead, COD strange grub 2/02
11.70	1	2	2disp	dead									discovered 4/99; green, good 4/99; stigma pink, flowers dusky yellow, green, good, 2/00; dull green, OK 4/00; dead, COD unknown, not weevils 2/01
11.80	1	2	1disp	3.38	1	1	2.55	0	dead				discovered 4/99; green, good 2 & 4/00, 2 & 4/01; squishy, green, OK, tag mia, replaced 2/02; dead, collected for weevil study 4/02
11.90	1	0	0	1.22	0	0	0.92	0					discovered 4/99; measured in one direction only, under rock, green, good 4/99, 2 & 4/00, either 2 plants or one plant with 2 heads, green, good 2/01; only 1 plant with one head, green, good 4/01; very squishy, red, poor, COD weevils, collected for weevil study 2/02
12.00	1	7	6	6.22	3	2+1A	5.36	5	2	6.87	11	9+1A	discovered 3/17/93; under yucca; great 2/98 & 5/98; something partially ate yucca, Tobusch flowers partially eaten 2/99; green, good, rooting in area 4/99; green, good 2 & 4/00; tag mia, replaced, green, good 2/01; uprooted, much rooting by yuccas, replanted, green, good 4/01; tag mia, replaced, plant green, good 2/02; green, good 4/02, 2 & 4/03
12.10	1	1	1	3.70	3	3	2.21	2	1A	3.14	4	3	discovered 5/97; measured in one direction only 5/98; digging in area, green, good 4/99; green, good 2 & 4/00, 2/01; pale dull green, OK 4/01; tag mia, replaced, plant hunkered, green, OK 2/02; purplish green, OK 4/02; green, good 2/03; hunkered, olive, OK 4/03
12.20	1	2	1disp	dead									discovered 5/97; digging in area, green, good 4/99; hooded during weevil study in summer 99; dark green, good 2/00; one side yellowish, OK 4/00; dead, COD possibly weevils 2/01
12.30	1						2.51		2	3.09	4	3	discovered 4/02; green, good 4/02, 2 & 4/03
13.00	1												2/96 looks dead, gray spines; COD unknown
14.00	1												discovered 3/17/93; dead 2/96
14.01	1												tag & plant mia 2/98; tag found, plant mia 5/98; tag says 14.10; plant found, stem & root solid, COD unknown 4/99
15.00	1												discovered 3/17/93; swarming piss ants; hooded during weevil study in summer 99, bad 7/99; dead, COD unknown, maybe weevils, plant partially removed by weevil researcher, 3 small plants (15.01-15.03) at cage 9/99

Ancistrocactus tobuschii Data for
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PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
15.01	1	6.90	73																						1.77
15.02	1	6.88	73																						0.88
15.03	1	6.87	73																						1.49
15.04	1	6.87	73																						0.36
15.10	1	7.35	65																						
16.00	1	8.67	66	0.90	0	0	1.00	0	0	1.40	0	0	1.00	0	0	1.30	0	0	1.50	0	0	1.41	0	0	1.39
16.10	1	8.70	68																1.90		1	1.88	0	0	2.72
16.20	1	9.22	71																1.20		0	1.76	2fr	0	3.55
16.30	1	9.20	70																						3.88
17.00	1	7.80	67	4.30	2	0	3.90	2	2	4.20	2	0	3.10	2	2 disp	4.90	3	1	5.00	6+A, disp		3.95	3fr	1A, rest	Dead
17.10	1	7.89	75													0.79		0	0.70	mia	0	1.34	0	0	1.51
17.20	1	8.05	75													3.00	nd	2	3.30	2	disp?	mia			mia
18.00	1	8.40	68	3.00	2	2	3.60	2	0	3.50	1	0	3.70	3	disp	4.40	3	3	4.50	4	disp?	3.76	4	2A+2 disp	4.42
18.10	1	8.40	68	0.40	0	0	0.40	0	0	mia	mia	mia	mia			mia									
19.00	1	7.75	68	4.10	3	3	3.60	1	1	3.30	0	0	2.10	0	0	Dead									
19.10	1	7.75	68	0.40	0	0	0.40	0	0	mia	mia	mia	mia			mia									
19.20	1	7.75	68	0.30	0	0	0.40	0	0	mia	mia	mia	mia			mia									

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
15.01	1	0	0	2.45	0	0	2.03	0	0	2.64	2	1+1A	seedling of 15, behind 15.02 & 15.03, discovered 2/00; green, good, shrouded 2 & 4/00; green, good 4/01; tag mia, replaced, green, good 2/02; green, good 4/02, 2 & 4/03
15.02	1	0	0	0.93	0	0	mia			mia			seedling of 15.00, between 15.01 & 15.03, discovered 2/00; dull green, OK, shrouded 2 & 4/00; green, OK 4/01; plant mia 2 & 4/02, 2 & 4/03
15.03	1	0	0	1.90	0	0	1.98	1	1	2.20	0	0	seedling of 15.00, left of 15.04 & in front of 15.02, discovered 2/00; green, good, shrouded 2 & 4/00; green, good 2 & 4/01; tag mia, replaced, plant green, hunkered, OK 2/02; green, good 4/02; green, OK 2 & 4/03
15.04	1	0	0	0.58	0	0	1.15	0	0	1.14	0	0	seedling of 15.00, right of 15.03 & in front of 15.01 & 15.02, discovered 4/00; green, good, shrouded 4/00; green, OK 2 & 4/01; tag mia, replaced, plant green, OK 2/02; green, OK 4/02, 2 & 4/03
15.10	1									4.03	2	2	under edge of pinyon; discovered 2/03; green, OK 2/03, green, good 4/03
16.00	1	0	0	0.95	0	0	Dead						discovered 3/17/93; measured in one direction only 2/98; green, good 4/99; dull green, OK, accidently sat on 2/00; dull green, few spines 4/00; grayish, few spines, root exposed; poor 2/01; looks dead, hard and firmly rooted 4/01; dead, corky inside, COD unknown 2/02
16.10	1	0	0	2.98	0	0	3.72	2	2	4.15	4	3+1A	in hole in rock at edge of pinyon, discovered 5/98; poor 2/99; yellow green, OK 4/99, 2 & 4/00; slightly purplish-green, OK 2/01; dull green, OK 4/01; green, good 2/02; popped, slightly purplish green, good 4/02; odd-shaped (rectangle), green, good 2 & 4/03
16.20	1	2	1	4.70	4	4	3.90	4	4	3.54	2	2	nestled in Selaginella, discovered 5/98; nestled in Selaginella 2/99; dark olive green, OK 4/99; hooded during weevil study in summer 99; dark green, good, popping out 2/00; maroonish 4/00; purplish-green, good 2 & 4/01; almost covered by pine needles, green, good 2/02; purplish, OK 4/02; dark olive, OK 2/03; purple, OK 4/03
16.30	1	3	nd	5.38	5	5	4.23	3	1+2A	dead			green, good 2/00; purplish-green, good 2 & 4/01; tag mia, replaced, plant almost covered by pine needles, green, good 2/02; purplish green, OK 4/02; dead, just spines left, COD unknown 2/03
17.00	1												discovered 3/17/93; apex asymmetrical 2/97; maroon, OK 4/99; dead, COD unknown 2/00
17.10	1	0	0	1.35	0	0	Dead						discovered 5/97; mia 2/98; relocated, between rocks, by flag 5/98; green, good 4/99, 2/00, 4/01; dead with weevil size hole, COD weevils 2/02
17.20	1			mia									under rock; discovered 2/97, but not recorded or tagged until 5/97; measured in one direction only 2/98; gone without a trace 2 & 4/99, 2 & 4/00, 2 & 4/01
18.00	1	1	disp	dead									discovered 3/17/93; ripe fruit reddish ?/93; 1 seedling 3/93; seedling mia 95; 1 flower bud eaten 2/96; looks stepped on or flower partially eaten 2/99; OK, dull olive green 4/99; hooded during weevil study in summer 99; dark green, good 2/00; purplish orange, OK 4/00; dead, COD weevils 2/01
18.10	1												discovered 3/18/93; mia 95, 96, 97
19.00	1												discovered 3/17/93; 4 seedlings 3/93; looks dead, but still firmly rooted 2/96; COD unknown, stem solid, tag removed 2/97
19.10	1												discovered 3/18/93; mia 95, 96, 97
19.20	1												discovered 3/18/93; mia 95, 96, 97

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PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
19.30	1	7.75	68	0.40	0	0	0.40	0	0	mia	mia	mia	mia			mia									
19.40	1	7.75	68	0.30	0	0	0.50	0	0	mia	mia	mia	mia			mia									
20.00	1	9.05	68	1.60	0	0	1.60	0	0	1.50	0	0	1.70	0	0	2.60	3	1+1A	2.60	1	1	2.15	1fr	1A	2.82
21.00	1	9.35	68	2.00	0	0	nd	nd	1	2.70	3	1	2.70	3	3A	4.20	4	3+1A	4.80	4	disp?	3.69	4fr	2A	4.88
21.10	1	9.29	77							2.70	1	0	1.70	2	1 disp	3.30	3+2fr	3+2A	3.50	2	2A	Dead			
21.20	1	9.30	72													2.80	2	1	3.50	2	2	3.24	2fr	1+1A	Dead
21.30	1	9.86	72													1.10	0	0	2.00	0	0	2.07	1fr	1 disp	2.31
21.40	1	9.88	72													1.20	0	0	1.60	0	0	1.68	0	0	2.14
22.00	1	8.50	68	2.60	1	1	2.70	2	2	2.50	2	0	2.40	0	0	3.10	2	2	3.60	2	2	2.96	2fr	2	3.02
23.00	1	8.47	68	3.00	1	1	3.00	2	0	3.00	2	0	3.60	3	disp	3.90	3	4	3.60	3	disp?	2.77	1+2fr	1	3.85
24.00	1	12.42	69	2.50	1	1	3.10	1	0	2.40	3	1	2.80	3	3, disp	3.70	5	4+1A	3.60	2	2	3.15	1	0, removed	Dead
24.10	1	14.90	82	3.30	1	1	3.60	3	3	2.00	3	0	2.40	2	2,disp	3.20	3+2	3+2	3.80	1+1fr	0	L 2.23 R 2.58	L 1fr R 2fr	L 1 R 2	L 2.20 R 2.07
24.11	1	14.94	82													0.90	0	0	0.80	0	0	0.60	0	0	0.86
24.12	1	14.95	82													1.10	0	0	1.00	0	0	0.90	0	0	1.23
24.13	1	14.96	82													1.30	0	0	1.70	0	0	1.97	2fr	2	1.57

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
19.30	1												discovered 3/18/93; mia 95, 96, 97
19.40	1												discovered 3/18/93; mia 95, 96, 97
20.00	1	1	1A	3.15	0	0	Dead						discovered 3/17/93; hunkered down in Selaginella & lichens 2/99; popping out, dull green, OK 4/99; green, good 2 & 4/00; pale yellowish-green, OK 2/01; apex shifted toward ground, dull olive, OK 4/01; dead, just spines left, COD unknown 2/02
21.00	1	4	3+2A	5.25	5	2+3A	4.07	0	0	dead			discovered 3/17/93; by rock 3/93; not censused 2/94; refound 4/94; measured in one direction only 2/98; olive 2/99; olive, OK 4/99; green with a few yellow tubercle tips, good 2 & 4/00; yellowish-green, OK 2 & 4/01; tag mia, replaced, plant apex spineless, green, OK 2/02; goldish at base, new growth at apex, OK 4/02; dead, COD weevils 2/03
21.10	1												between rocks; looks dead, gray spines, but firmly rooted 5/98; fairly solid but small chambers, killed by weevils 2/99
21.20	1												green, good 4/99; only spines left, COD unknown 2/00
21.30	1	0	0	mia			mia			mia			very nestled in; measured in one direction only 2/98; very nestled in, tag chewed, replaced 5/98; hunkered down in Selaginella 2/99; popping out, green, good 4/99, 2 & 4/00; plant mia 2 & 4/01, plant and tag mia 2 & 4/02, 2 & 4/03
21.40	1	0	0	dead									very nestled in; measured in one direction only 2/98; very nestled in 5/98 & 2/99; popping out, green, good 4/99, 2 & 4/00; dead, COD unknown, no weevil galleries 2/01
22.00	1	1	0	3.23	1	1	Dead						discovered 3/17/93; squished? 3/93; measured in one direction only 2/98; hunkered down in Selaginella 2 & 4/99, 2/00; green, good 2/00; hunkered, OK 4/00; hunkered, green, good 2 & 4/01; tag mia, dead, rotten and corky inside, no evidence of weevils, COD unknown 2/02
23.00	1	2	2	3.70	1	2	Dead						discovereed 3/17/93; green, good 4/99, 2 & 4/00, 2 & 4/01; fly pupa case, COD flies 2/02
24.00	1												discovered 3/17/93; 1 flower eaten 2/95; flowers partially eaten 2/99; OK, dull green 4/99; hooded during weevil survey in summer 99; very poor, removed by weevil researcher, COD weevils 9/99
24.10	1	L2	Rnd	L0 R2A	L2.40 R3.15	L2 R2	L2 R2	Dead						discovered 3/18/93; damaged 2/94; 2 seedlings 2/94; 2 seedlings at base 2/96; 3+ pups, adult partially eaten by small mammal; adult hunkered down, OK, two apical meristems, each flowering, five seedlings or pups at base (#24.11-15), maybe 2 or 3 more seedlings not yet tagged 5/97; 2 apical meristems measured as one, 2 or 3 more seedlings 2/98; maybe one seedling between 24.11 and 24.12, maybe one seedling in front of right head of 24.10 2/99; reddish, OK 4/99; orangish, OK 4/00; L-purplish, OK, R-green, OK 2/01; L-yellowish-green, OK, R-green, OK 4/01; both heads dead, COD weevils 2/02
24.11	1	0	0	1.90	1	1	1.31	0	mia	mia			seedling or pup of 24.10; measured in one direction only 2/98; green, good 4/99, 2 & 4/00; purplish-green, OK 2/01; green, good 4/01; hunkered, squishy, green, OK 2/02; two very tiny (<3mm) seedlings to left 2/02; plant and tag mia 4/02, 2 & 4/03
24.12	1	0	0	2.10	1	0	Dead						seedling or pup of 24.10; measured in one direction only 2/98; green, good 4/99, 2 & 4/00; purplish-green, OK 2/01; green, good 4/01; dead, COD weevils 2/02
24.13	1	0	0	1.88	0	0	Dead						seedling or pup of 24.10; measured in one direction only 2/98; maroonish, OK 4/99; green, OK 2 & 4/00; green, OK 2/01; green, good 4/01; dead, COD weevils 2/02

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PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
24.131	1	14.96	82																						
24.14	1	14.97	82													0.70	0	0	1.10	0	0	1.17	0	0	1.24
24.15	1	14.98	82													0.90	0	0	1.50	0	0	1.30	0	0	1.42
24.16	1	14.97	82																			0.82		0	0.94
24.17	1	14.98	82																			0.55		0	0.81
24.18	1	14.97	82																			0.99		0	0.59
24.19	1	14.98	82																			0.85		0	0.70
24.191	1	14.99	82																			0.90		0	1.09
24.20	1	14.92	84													2.50	2	1+1A	2.80	2	0	2.81	1+1fr	1+1A	3.43
24.30	1	14.98	84													0.90	0	0	0.37	0	0	1.29	0	0	2.06
24.31	1	14.88	87																						
24.32	1	14.68	86																						
24.33	1	14.83	88																						
24.40	1	14.97	82																			1.60		0	1.38
25.00	1	7.29	79	2.40	1	1	3.30	1	1	3.50	2	1	3.50	2	2,disp	4.00	3	2+1A	3.60	2	disp?	2.81	1fr	0	3.49
26.00	1	7.12	72	0.90	0	0	1.10	0	0	3.40	1	1	2.90	0	0	3.40	2	1	3.60	2	disp?	3.00	1	0	3.36
26.01	1	7.29	70																						
26.10	1	~7.10	72													nd		0	1.30	0	0	1.24	0	0	1.32

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PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
24.131	1			0.85	0	0	Dead						discovered 2/01; green, OK 2 & 4/01; dead, COD weevils 2/02
24.14	1	0	0	2.30	1	1	Dead						seedling or pup of 24.10; measured in one direction only 2/98, 2/00; green, good 2 & 4/00, 2 & 4/01; dead, COD weevils 2/02
24.15	1	0	0	1.48	0	0	1.78	0	0	mia			seedling or pup of 24.10; measured in one direction only 2/98, 2/00; green, good 2 & 4/00, 2 & 4/01; very hunkered, green, OK 2/02; hunkered, poor 4/02; plant and tag mia 2 & 4/03
24.16	1	0	0	1.18	0	0	Dead						between the 2 heads of 24.10 & between 24.15 and 24.12, 24.13 is left; discovered 4/99; green, good 2 & 4/00; hunkered, just spines showing 2 & 4/01; dead, COD weevils 2/02
24.17	1	0	0	0.83	0	0	0.55	0	mia	mia			between 24.10L and 24.11, discovered 4/99; one measurement only 2/00; green, OK 2 & 4/00; hunkered, green, OK 2 & 4/01; very hunkered, poor 2/02; plant and tag mia 4/02, 2 & 4/03
24.18	1	0	0	1.38	0	0	0.57	0	mia	mia			right of 24.17, in front of 24.10, discovered 4/99; one measurement only 2/00; OK 2 & 4/00; green, good 2 & 4/01; hunkered, poor 2/02; plant and tag mia 4/02, 2 & 4/03
24.19	1	0	0	1.10	0	0		0	mia	mia			behind 24.18, right of 24.10 left, discovered 4/99; one measurement only 4/99, 2/00, 2/01; OK 2 & 4/00; green, OK 2 & 4/01; very hunkered, poor 2/02; plant and tag mia 4/02, 2 & 4/03
24.191	1	0	0	0.70	0	0		0	mia	mia			behind 24.19, right of 24.10 left; discovered 4/99; green, good 2 & 4/00; one measurement only, green, OK 2/01; green, good 4/01; olive, poor 2/02; plant and tag mia 4/02, 2 & 4/03
24.20	1	2	2	4.83	3	3	Dead						green, good 4/99, 2 & 4/00, 2 & 4/01; uprooted, hollow inside but no evidence of weevils, dead, COD unknown 2/02
24.30	1	1	1A	2.38	2	1	nd	0	dead				green, good 4/99, 2 & 4/00; purplish green, OK 2 & 4/01; too hunkered to measure, only spines above soil, dead? 2/02; dead, COD weevils, collected for weevil study 4/02
24.31	1			0.50		0	0.45	0	0	mia			by upper left edge of 24.3 tag, discovered 4/01; green, OK 4/01; very hunkered, green, OK 2/02; green, OK 4/02; plant mia 2 & 4/03
24.32	1						0.54	0	0	0.65	0	0	discovered 2/02; hunkered seedling near dead plant, poor 2/02; green, OK 4/02; tag mia, replaced, green, OK 2 & 4/03
24.33	1						0.44		0	mia			discovered 4/02; green, OK 4/02; plant mia 2 & 4/03
24.40	1	0	0	1.53	0	0	1.44	0	0	dead			right of 24.10 cluster, discovered 4/99; green, good 2 & 4/00, 2 & 4/01; very hunkered and buried in litter, green, OK 2/02, hunkered, poor 4/02; dead, collected for weevil study 2/03
25.00	1	2	disp?	3.48	3	3	Dead						discovered 3/17/93; very orange 2/98, green, good 2/99 & 4/99, dark green, a few maroon tubercles, OK 2 & 4/00, purplish-green, OK 2/01, green, good 4/01, dry and sandy inside, no chambers or puparia, dead, COD unkown 2/02
26.00	1	0	0	dead									discovered 3/17/93; seedling by tag, seedling mia 2/96; seedling refound & tagged (26.1); flowers partially eaten 2/99; olive, OK 4/99; sinking into ground, olive, OK 2/00; stepped on, green, good 4/00; dead, COD unknown 2/01
26.01	1			0.85	0	0	mia			mia			discovered 2/01; under dead body of parent, dull green, OK 2/01; just spines showing, OK 4/01; tag and plant mia 2 & 4/02, 2 & 4/03
26.10	1	0	0	1.43	0	0	mia			mia			measured in one direction only, tagged 2/98; green, good 4/99, 2 & 4/00; olive, OK 2 & 4/01; tag and plant mia 2 & 4/02, 2 & 4/03

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PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
27.00	1	7.47	72	4.00	3	3	4.10	2	2	DEAD	na	na													
28.00	1	7.47	72	2.30	1	1	2.50	0	0	2.50	0	0	Dead												
29.00	1	7.91	70	2.70	1	1	2.60	1	0	2.00	1		2.60	2	2 disp	4.10	5	3+2A	4.70	5	3	4.30	5fr	2	5.03
29.10	1	7.60	82																			2.89	1+2fr	2	3.03
30.00	1	8.42	75	5.20	4	4	5.50	2	1	4.80	5	0	4.60	3	3+1 disp	6.20	5	1+1A	6.30	4	4	5.48	4+1fr	4+1A	5.27
31.00	1	6.40	74	1.90	0	0	2.10	0	0	2.50	1	0	2.10	1 and 1	0	2.90	2	0	mia			mia			mia
32.00	1	8.63	76	2.40	1	1	2.40	1	1	2.30	2	1A	2.10	2	0	2.70	1	mia	mia			mia			
32.10	1	8.65	93													2.80		1	2.60	1	1	1.95	0	0	2.14
32.11	1	8.67	93																						
33.00	1	10.62	80	2.70	1	1	2.60	0	0	2.00	1	2	2.00	2	1A, 1	2.90	1	1A	3.30	1	0	2.56	2fr	0, disp? Removed	Dead
34.00	1	11.60	90	2.10	0	0	2.00	0	0	1.20	0	0	mia			mia			mia						
35.00	1	11.37	82	1.80	0	0	1.70	0	0	1.20	0	0	1.10	0	0	1.70	0	0	1.60	0	0	1.32	0	0	1.93
35.10	1	10.98	83																						2.96
35.20	1	11.30	82																						
35.30	1	11.64	83																						
35.40	1	11.62	83																						
35.50	1	11.62	83																						
35.60	1	10.88	87																						
36.00	1	11.50	82	1.70	0	0	1.70	0	0	1.80	0	0	2.20	1	1	2.70	1	1	3.10	1	1	2.86	1	1 disp	3.00

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PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
27.00	1												discovered 3/17/93; only spines left
28.00	1												discovered 3/17/93; 3 seedlings 3/93; 4 seedlings 2/94; 2 seedlings 2 & 5/95; all seedlings mia 2/96
29.00	1	5	4+1disp	5.20	5	3	Dead						discovered 3/17/93; light green, OK 4/99; reddish green, OK 2 & 4/00, 2/01; hunkered, OK 4/01; rotten, bottom fell off, dead, COD possibly flies 2/02
29.10	1	1	1A	dead									under rock, flowers partially eaten 2/99; green, good 4/99, 2 & 4/00; dead COD weevils 2/01
30.00	1	4	2+2disp	5.58	3	1+2A/ dead							discovered 3/17/93; 4 seedlings 3/93; 0 seedlings 2/95;short flowers 2/95; visited by honeybee 2/96; upper tubercles have spine clusters removed 2/97; buried in grass 2/99; stink bugs, green, good 4/99; green, good 2 & 4/00; purplish-green, OK 2/01; feels hollow and squishy, filled with maggots 4/01
31.00	1												discovered 3/17/93; tag & plant mia 2/98, 5/98, 4/99, 2 & 4/00
32.00	1												discovered 3/17/93; lots of rooting in vicinity, nail found, plant & tag mia 5/97, 2/98, 5/98 & 2/99
32.10	1	0	0	2.70	1	1	2.38	1	0	2.62	0	0	discovered 5/97; hunkered down in Selaginella 2/99; popping out, green, good 4/99; pulling back in Selaginella, maroonish, OK, shrouded 2/00; shroud loose and removed, plant green, good 4/00; olive, OK 2 & 4/01; tag mia, replaced, plant dark green, hunkered, OK 2/02; purplish green, OK 4/02; purplish-black, poor 2/03; hunkered, green, OK 4/03
32.11	1			0.63	0	0	0.71	0	0	mia			seedling of 32.1, discovered 2/01; not tagged, olive, OK 2 & 4/01; green, OK 2 & 4/02; plant mia 2 & 4/03
33.00	1												discovered 3/17/93; reddish 2 & 5/97; green 2/98; hunkered down in Selaginella 2/99; maroon, OK 4/99; hooded during weevil study in summer 99; bad 7/99; looks dead, removed by weevil researcher, dead, COD maybe weevils 9/99
34.00	1												discovered 3/17/93; plant & tag mia; tag relocated 5/98
35.00	1	0	0	2.95	2	0	mia			mia			discovered 3/17/93; hunkered down in Selaginella; popping out 2/97; back out, tag moved, replaced 5/97; measured in one direction only 2/98; really hunkered down 2/99; popping out, dull green, OK 4/99; green, good, popping out, 2 & 4/00; OK 2/01; green, OK 5/01; tag and plant mia 2/02, 2 & 4/03
35.10	1	1	1A	4.45	7?	2+1A	Dead						green, good, popping out of Selaginella 2 & 4/00; tag mia, replaced, purplish-green, OK 2/01; tag loose, replaced, small chunk eaten out of one side, scarred over, dull purplish-green, OK 4/01; tag mia, just spines left, COD unknown 2/02
35.20	1			1.35	0	0	mia			mia			discovered 2/01; hunkered, green, OK 2 & 4/01; plant and tag mia 2 & 4/02, 2 & 4/03
35.30	1			1.34		0	1.07	0	0	1.29	0	0	discovered 4/01; green, good 4/01; very, very hunkered, covered by Selaginella, OK, tag mia, replaced 2/02; green, good 4/02; green, OK 2 & 4/03
35.40	1			0.33		0	mia			mia			discovered 4/01; green, good 4/01; plant and tag mia 2 & 4/02, 2 & 4/03
35.50	1			0.76		0	0.90	mia	0	1.06	0	0	discovered 4/01; green, good 4/01; plant and tag mia 2/02; green, good 4/02; green, OK 2 & 4/03
35.60	1						2.39		0	2.45	1	1	discovered 4/02; hunkered in Selaginella, green, good 4/02, 2 & 4/03
36.00	1	1	1A	dead									discovered 3/17/93; hunkered down in Selaginella 2/99; popping out, dull green, OK 4/99; green, good, popping out 2 & 4/00; dead, COD weevils/galleries 2/01

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PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
37.00	1	11.15	82	1.80	0	0	1.90	0	0	1.90	0	0	1.60	0	0	2.40	0	0	2.90	2	1	2.52	1fr	1	2.73
37.10	1	10.98	92													2.80		1	2.60	1	1A	2.23	0	0	2.67
37.20	1	11.01	95																						
38.00	1	10.32	82	4.50	2	2	3.80	2	1	3.10	0	0	3.00	0	0	4.20	0	1 1A	4.60	4	1	4.17	0	0	4.71
38.10	1	11.56	110													2.30	2	1	2.70	1	disp?	2.44	1fr	1 disp	2.42
38.20	1	11.75	108													1.70	0	0	1.80	0	0	1.35	0	0	1.52
38.30	1	11.86	106													2.10	0	0	2.40	0	0	2.18	1fr	1A	2.79
38.40	1	11.72	106													1.50	0	0	1.10	0	0	1.38	0	0	1.53
38.50	1	11.99	105																						1.78
38.60	1	11.43	104																						
38.70	1	12.56	102																						
39.00	1	10.05	96	4.30	0	0	4.20	1	1	3.30	0	0	Dead												
39.10	1	10.05	96	0.40	0	0	0.60	0	0	0.80	0	0	0.70	0	0	1.30	0	0	1.30	0	0	1.15	mia	0	1.27
39.20	1	10.05	96	0.40	0	0	0.50	0	0	0.40	0	0	0.60	0	0	0.40	0	0	Dead						
39.30	1	10.05	96	0.40	0	0	0.40	0	0	0.40	0	0	0.40	mia	0	0.40	0	0	Dead						
39.40	1	10.05	96	0.40	0	0	0.50	0	0	0.40	0	0	0.50	0	0	mia			mia			mia			
39.50	1	10.05	96							0.20	0	mia	0.50	mia	0	mia			mia			mia			

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
37.00	1	1	1disp	2.86	0	0/ remove							discovered 3/17/93; maroon, OK 4/99; olive, OK 2/00; ants swarming fruit, plant maroonish, OK 4/00; dull gray-green, OK-poor 2/01; active weevil feeding, removed for weevil study 5/01
37.10	1	0	0	dead									discovered 5/97; spines gray, body olive, bad 2/99; gray spines, olive body, OK 4/99 & 2/00; new spine growth, dull green, OK 4/00; dead, dry and powdery inside, COD unknown 2/01
37.20	1			2.26	0	0		0	dead				discovered 2/01; green, OK 2 & 4/01; olive, OK 2/02; dead, collected for weevil study, COD weevils 4/02
38.00	1	1	1	dead									discovered 3/17/93; green, good 4/99; buried in grass, accidently trampled, green, good 2/00; dull green, OK 4/00; dead, headless weevil on outside of cactus, nothing inside, collected for weevil research 2/01
38.10	1	0	0/dead										green with a few orange tubercle tips, OK 4/99; hooded during weevil study in summer 99; spines gray, body dull dark green, some tubercles gold, digging beside, shrouded 2/00; shroud missing, dead, COD unknown 4/00
38.20	1	0	0	1.57	0	dead							measured in one direction only 2/98; not looking good, spines gray, body dark green 2/99; OK, dark green, new spines 4/99; dark green, OK, pulling into soil 2 & 4/00; shrouded 2/00; shroud missing 4/00; hunkered, maroonish, OK 2/01; collected for weevil study 5/01
38.30	1	0	0	3.42	1	1	3.38	2	2	3.74	1	0	green, good 4/99, 2 & 4/00; rock on top, removed 2/00; dark blue-green, good 2 & 4/01; tag mia, replaced, blue green, OK 2 & 4/02; green, OK 1 flower partly eaten 2/03; green, good 4/03
38.40	1	0	0	1.50	0	0	mia			mia			measured in one direction only 2/98; hunkered down in dirt 2/99; hunkered in dirt, green, good 4/99, 2 & 4/00, 2 & 4/01; plant and tag mia 2 & 4/02, 2 & 4/03
38.50	1		0	1.90	0	0	1.34	0	mia	dead			discovered 4/00; green, good 4/00; dark green, good 2/01; reddish-green, OK 4/01; tag mia, replaced, plant hunkered, green, OK 2/02; plant and tag mia 4/02; just spines left, COD unknown 2/03
38.60	1			3.06	3	1	Dead						discovered 2/01; green, good 2/01; galleries in root nodules, dead, collected for weevil study, COD unknown 2/02
38.70	1			2.59	0	0	Dead						discovered 2/01; between two rocks, green, good 2 & 4/01; under rock, galleries in root nodules, dead, collected for weevil study, COD weevils 2/02
39.00	1												discovered 3/17/93; 2 seedlings 3/93; 7 seedlings 2/94; dead, tag removed, grub hole & hollow stem 2/96
39.10	1	mia	0	1.13	0	0	mia			mia			discovered 3/18/93; measured in one direction only 2/98; plant & tag mia 2/99; relocated, retagged, green, good 4/99; tag and plant mia 2/00; relocated, hunkered, green, OK 4/00; covered by vegetation, green, OK 2 & 4/01; plant mia 2 & 4/02; plant and tag mia 2 & 4/03
39.20	1												discovered 3/18/93; may be dead, looks gray 5/97; dead, COD unknown 2/98
39.30	1												discovered 3/18/93; mia in 2/96; relocated & measured in 5/96; maybe dead, looks gray 5/97; dead, COD unknown 2/98
39.40	1												discovered 3/18/93; accidentally removed when parent removed, replanted & watered; plant & tag mia 2/97, 2 & 5/98; plant mia, tag relocated 2/99; plant & tag mia 4/99
39.50	1												tag missing; mia 2/96; relocated & measured 5/96; plant & tag mia 2/97, 2/99 & 4/99

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
39.60	1	10.05	96													0.40	0	0	0.50	0	mia	mia			mia
39.70	1	10.05	96													0.40	0	0	0.40	0	0	mia			mia
39.80	1	10.13	96																						
40.00	1	18.89	89	2.40	0	0	2.70	1	1	3.00	1	1	2.90	2	2	3.20	0	0	3.20	2	2	3.36	0	0	3.31
40.10	1	17.35	83										3.20	4	3.disp	4.70	5	3.2A	4.50	2	2	3.72	2.1fr	2	4.55
40.20	1	17.30	85																4.60	6	disp?	4.49	7.2fr	9	6.01
40.30	1	17.93	89																			1.26		0	1.36
40.31	1	17.91	89																						
40.40	1	17.96	89																			1.79		0	1.77
40.50	1	18.85	83																						2.87
40.60	1	18.85	84																						1.04
40.70	1	18.87	84																						2.12
41.00	1	18.62	90	5.60	3	3	5.20	3	3	4.40	3	8	4.10	13	3	4.30	2	2	4.30	0	0	Dead			
41.01	1	18.60	90	0.50	0	0	nd	nd	nd	mia	mia	mia	0.50	0	0	0.60	0	0	1.30	0	0	Dead			
41.02	1	18.58	90	0.50	0	0	nd	nd	nd	mia	mia	mia	1.10	mia	0	0.50	0	0	0.90	0	0	0.55	0	0	mia
41.03	1	18.58	90													0.40	0	0	0.80	0	0	Dead			
41.04	1	18.62	90													0.70	0	0	nd	0	0	Dead			
41.05	1	18.65	90																1.10	0	0	0.69	0	0	1.04

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
39.60	1			mia				mia	0	mia			may be dead, looks gray 5/97; mia 5/98; plant & tag mia 2 & 4/99, 2 & 4/00, 4/01, 2/02; buried but green, good 4/02' plant and tag mia 2 & 4/03
39.70	1			mia			mia						may be dead, looks gray 5/97; plant & tag mia 2 & 4/99, 2 & 4/00, 4/01, 2 & 4/02
39.80	1			0.77		0	0.82	0	0	0.77	0	0	discovered 4/01; one measurement only, green, OK 4/01; by rock, hunkered, OK 2 & 4/02; buried but green, OK 2 & 4/03
40.00	1	2	1	3.76	1?	0	3.51	3	1+1A	dead			discovered 3/17/93; green, good 4/99, 2 & 4/00; green, good, one tiny flower bud? 2/01; green, good 4/01, 2 & 4/02; dead, rooting in area 2/03
40.10	1	3	3disp	dead									visited by honeybee; green, good 4/99; dark green, good 2 & 4/00; dead, COD weevils (galleries & exit holes) 2/01
40.20	1	7	4	4.58	0	0	Dead						discovered 2/98; 2 flowers partially eaten 2/99; green, good 4/99; two apical meristems, but still appears to be one stem, green, great 2/00, one fruit partially eaten, green, good 4/00; green, OK 2 & 4/01; corky inside, dead, COD unknown 2/02
40.30	1	0	0	2.61	1	1	1.78	0	Dead				discovered 4/99; under rock, green, good 4/99, 2 & 4/00; dull green, OK 2/01; green, good 4/01; tag mia, replaced, maybe dead, squishy 2/02; dead, collected for weevil study, COD weevils 4/02
40.31	1			1.54	0	0	1.17	0	Dead				discovered 2/01; dull green, OK 2/01; new spine growth on side, green, OK 4/01; tag mia, replaced, plant green, OK 2/02; dead, collected for weevil study, COD weevils 4/02
40.40	1	0	0	3.13	2	2A	2.58	0	Dead				discovered 4/99; green, good, 4/99, 2 & 4/00; 2 & 4/01; tag mia, replaced, green, OK 2/02; dead, collected for weevil study 4/02
40.50	1	1	1	3.83	2	2	Dead						discovered 2/00; green, good 2 & 4/00; dark green, OK 2/01; green, good 4/01; greatly hollowed, two nodules, dead, COD weevils, collected for weevil study 2/02
40.60	1	0	0	1.63	0	0	Dead						discovered 2/00; green, loose, good 2 & 4/00; green, good 2 & 4/01; hollowed, reddish lump at bottom, dead, collected for weevil study, COD weevils 2/02
40.70	1	0	0	3.69	3	3+1A	Dead						discovered 2/00; green, loose, good 2 & 4/00; tag mia, replaced, green, one brown tubercle, OK 2/01; pale green, good 4/01; solid, green tubercles, dead, COD weevils, collected for weevil study 2/02
41.00	1												discovered 3/17/93; 8 seedlings 3/93, 10 seedlings 4/94, some seedlings 2/95, 1 seedling 2/96 & 2/97 (41.04), not looking good, 4 new seedlings 2/98; looks dead, one seedling dead 5/98; hard, dry, COD unknown 2/99
41.01	1												couldn't distinguish to recensus 2/94; hard, dry, solid, COD unknown 2/99
41.02	1			mia			mia						couldn't distinguish to recensus 2/94; mia 2/96; relocated & measured 5/96; measured in one direction only 2/98; hunkered 4/99; plant mia 2 & 4/00, 2 & 4/01, 2/02
41.03	1												measured in one direction only 2/98; hard, dry & solid, COD unknown 2/99
41.04	1												too many seedlings in the area to tell which one was 41.04 2/98; hard, dry, solid, COD unknown 2/99
41.05	1	0	0	1.45	0	0	Dead						behind 41.06; measured in one direction only 2/98, 2/00; tagged 2/98; green, good 2 & 4/00, 2 & 4/01; stem hard and dry, dead, COD unknown 2/02

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
41.06	1	18.65	90																1.20	0	0	0.77	0	0	0.92
41.07	1	18.56	90																			0.39		0	mia
41.08	1	18.60	90																						
41.10	1	18.53	90	0.50	0											0.80	0	0	1.00	0	0	0.74	0	0	0.75
41.20	1	18.56	91?	0.50	0																				
41.30	1	18.70	88																						
42.00	1	18.45	91	1.40	0	0	1.30	0	0	1.10	0	0	1.10	0	0	1.60	0	0	1.80	0	0	1.75	0	0	2.29
43.00	1	18.50	91	1.00	0	0	1.10	0	0	1.10	0	0	1.40	0	0	1.70	0	0	1.50	0	0	2.09	0	0	2.16
44.00	1	18.50	92	1.70	0	0	1.70	0	0	1.90	0	0	1.90	1	1 disp	2.90	2	1+1A	3.60	1	disp	3.44	1	1	3.50
45.00	1	18.32	86	1.90	0	0	1.80	1	0	2.30	2	2	2.40	2	1+1disp	3.20	2	3	3.40	3	disp	3.09	2+1fr	3	Dead
45.10	1	20.47	95										1.30	2	2A	3.20	1	1	2.90	1	1	2.77	0	0	2.94
45.11	1	21.06	97																						
45.20	1	21.33	93										2.90	3	1A	4.60	5	4+1A	4.60	5	5	4.04	2+4fr	disp?	4.58
45.21	1	21.33	95													0.70	0	0	1.50	0	0	1.52	0	0	2.20
45.30	1	21.82	94										3.00	5	1	5.10	6	4+2A	5.70	9	4	4.84	1+5fr	3 disp; Dead	
45.31	1	21.88	94																			0.77		0	0.82
45.32	1	21.89	94																			0.75		0	0.78

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
41.06	1	0	0	1.29	0	0	1.50	0	0	dead			in front of 41.05; measured in one direction only 2/98, 2/02; tagged 2/98; green, OK 2 & 4/00, 2 & 4/01; tag mia, replaced, plant green, OK 2/02; partially buried, green, OK 4/02; dead, weevil chamber, COD weevils 2/03
41.07	1			mia			mia						discovered 4/99; measured in one direction only, OK 4/99; plant mia 2 & 4/00, 2 & 4/01, 2 & 4/02
41.08	1			1.03		0		0	Dead				originally tagged as 41.07; discovered 4/01; green, OK 4/01; tag mia, replaced, maybe dead, hard, loose 2/02; dead, collected for weevil study, COD small grub 4/02
41.10	1	0	0	0.99	0	0	Dead						discovered 3/18/93; couldn't distinguish to recensus 2/94; measured in one direction only 2/98; green, good 4/99, 2 & 4/00; under grass, green, OK 2 & 4/01; dead, COD weevils, collected for weevil study 2/02
41.20	1												discovered 3/18/93; couldn't distinguish to recensus 2/94
41.30	1						0.86		0	dead			discovered 4/02; green, good 4/02; dead, rooting in area 2/03
42.00	1	0	0	2.36	0	0	Dead						discovered 3/17/93; very in the ground 2/96; measured in one direction only 2/98; green, good 4/99, 2 & 4/00, 2 & 5/01; reddish inside, top hollow, moist nodule at bottom, root walls eaten all the way to the epidermis, dead, COD weevils, collected for weevil study 2/02
43.00	1	0	0	2.56	0	0	Dead						discovered 3/17/93; wedged under rock, measured in one direction only & 2/98; green, good 4/99, 2 & 4/00, 5/01; one entire green tubercle, dead, collected for weevil study, COD weevils 2/02
44.00	1	2	2	3.54	0	0	Dead						discovered 3/17/93; green, good 4/99, 2 & 4/00; yellowish-green, OK 2/01; green, good 5/01; hollowed, two nodules, dead, COD weevils, collected for weevil study 2/02
45.00	1												discovered 3/17/93; hole in stem; no hole 2/96; dull green, OK 4/99; collected, killed by weevil 2/00
45.10	1	1	1	dead									orangish, OK 4/99, 2/00; olive, OK 4/00; dead, COD weevils (exit holes) 2/01
45.11	1			1.97	0	0	1.69	0	0	dead			discovered 2/01; green, OK 2/01; green, good 5/01; hunkered, green, OK 2/02; popped, green, good 4/02; dead, COD unknown 2/03
45.20	1	2	disp?	dead									flowers partially eaten 2/99; green, good 4/99; green with maroonish tubercle tips, good 2/00; green, good 4/00; dead, COD weevils (galleries & exit holes) 2/01
45.21	1	1	1A	dead									measured in one direction only 2/98; green, good 4/99; hooded during weevil study in summer 99; hood missing 9/99; dull green, OK 2/00; purplish, OK 4/00; just spines left, COD unknown 2/01
45.30	1												tag says 41.30; buds pinkish, lower tubercles orangish 5/97; retagged 98; spines dull gray, poor, flowers partially eaten 2/99; olive, OK 4/99; dead, killed by weevil 6/99
45.31	1	0	0	0.89	0	0	mia			mia			discovered 4/99; measured in one direction only 4/99; OK 4/99; yellow-green, OK 2 & 4/00, 2 & 5/01; plant mia 2 & 4/02; tag present, plant mia 2 & 4/03
45.32	1	0	0	0.55	0	dead							discovered 4/99; measured in one direction only 4/99; OK 4/99; yellow-green, OK 2 & 4/00; barely visible, poor 2/01; dead, just spines left, COD unknown 5/01

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
45.33	1	21.90	94																			0.59		0	0.62
45.34	1	21.91	94																			1.38		0	1.50
45.35	1	21.70	97																						
45.36	1	21.71	97																						
45.37	1	21.98	97																						
45.40	1	18.15	92										1.50		0	2.40	2	2	2.60	2	2	2.34	1+1fr	2, Dead	
45.50	1	17.67	92										1.40		0	2.20	1	0	2.70	0		2.65	1fr	1	3.30
45.51	1	17.92	93																						
45.52	1	18.03	93																						
45.53	1	18.11	94																						
45.60	1	22.20	96													3.10	2	2	3.80	3	3	3.41	1+2fr	1+1A, Dead	
45.70	1	20.65	95																3.70	4	disp	3.32	4	0	3.58
45.71	1	20.63	95																						
45.80	1	20.58	95																2.30	1	1	1.88	1	disp?	2.28
45.81	1	20.55	95																						
45.90	1	20.59	95																2.50	1	0	1.92	1	disp?	Dead
45.91	1	20.55	96																1.20	0	0	1.15	0	0	1.32
45.92	1	20.55	96																1.40	0	0	0.96	0	0	1.09

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
45.33	1	0	0	0.47	0	dead							discovered 4/99; measured in one direction only 4/99, 2/00; OK 4/99; yellow-green, OK 2 & 4/00; barely visible, poor 2/01; dead, just spines left, COD unknown 5/01
45.34	1	0	0	2.20	0	0	mia			mia			discovered 4/99; green, good 4/99; yellow-green, OK 2/00; olive, OK 4/00; yellowish-green, OK 2 & 5/01; plant mia 2/02; plant and tag mia 4/02; tag present, plant mia 2 & 4/03
45.35	1			1.45	0	0	1.37	0	0	dead			left of 45.36, discovered 2/01, green, OK 2/01; green, good 5/01; grayish green, poor 2/02; green, good 4/02; dead, collected for weevil study 2/03
45.36	1			1.10	0	0	1.13	0	0	dead			right of 45.35, discovered 2/01, green, under rock, OK 2 & 5/01; green, OK 2/02; green, good 4/02; dead, collected for weevil study, COD weevils 2/03
45.37	1						0.82		0	dead			discovered 4/02; hunkered, green, OK 4/02; dead, collected for weevil study, COD weevils 2/03
45.40	1												discovered 5/96; flowers partially eaten 2/99; dark green, OK 4/99; dead, killed by weevil 6/99
45.50	1	1	disp?	dead									discovered 5/96; measured in one direction only 2/98; under rock 2/99; green, good 4/99; hooded during weevil study in summer 99; dull green, OK 2 & 4/00; dead, COD weevils (chambers, exit holes) 2/01
45.51	1			1.74	0	0	Dead						discovered 2/01; in grass, lanky, green, OK 2/01; green, good 5/01; solid, dead, collected for weevil study, COD unknown 2/02
45.52	1			3.09	1	1	2.95	1	0	mia			discovered 2/01; in grass, green, good 2 & 5/01; tag mia, replaced, plant green, good 2/02; squishy, green, OK 4/02; feral hog rooting in area, plant and tag mia 2 & 4/03
45.53	1			2.77		0	Dead						discovered 5/01; green, good 5/01; root hollowed, wet and orangish, larva inside, dead, COD weevils, collected for weevil study 2/02
45.60	1												one small seedling by tag 2/97, seedling mia 2/99; olive green, OK, spines gray 4/99; dead, killed by weevil 6/99
45.70	1	2	1+1disp	4.26	3	3	3.52	0	Dead				discovered 2/98; all flowers partially eaten 2/99; dull dark green, OK 4/99; green, good 2 & 4/00; dark purplish-green, OK 2/01; dull, dark green, OK 5/01; purplish green, OK 2/02; dead, collected for weevil study 4/02
45.71	1						1.92		0	1.43	0	dead	discovered 4/02; green, OK 4/02; green, OK 2/03; mature weevil in root, COD weevils, collected for weevil study, COD weevils 4/03
45.80	1	1	0	2.72	0	0	1.93	1	0	dead			discovered 2/98; flowers partially eaten 2/99; green, good 2 & 4/00; olive-green, OK 2/01; dull green, OK 5/01; green, good 2/02; hunkered, green, OK 4/02; dead, weevil chambers, COD weevils 2/03
45.81	1									0.54		0	discovered 4/03; reddish, root exposed, OK 4/03
45.90	1												discovered 2/98; dead, COD unknown 2/00
45.91	1	0	0	1.68	0	0	1.77	0	0	mia			discovered 2/98; in rock crevice, right of tag, one measurement only 2/98, 2/99, 2/00, 2/01, 2/02; green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02; tag present, plant mia 2 & 4/03
45.92	1	0	0	1.55	0	0	1.34	0	0	1.35	0	0	discovered 2/98; in rock crevice, right of tag, one measurement only 2/98, 2/99, 2/00, 2/01, 2/02; green, good 4/99, 2 & 4/00, 2 & 5/01, 2/02; buried, green, OK 4/02; green, OK 2/03; one measurement only, green, OK 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
46.00	1	12.30	90	1.90	0																				
46.10	1	11.96	101																						2.10
47.00	1	14.20	90	3.50	1	1	3.20	0	0	2.70	0	0	3.60	2	1+1disp	Dead									
47.20	1	37.80	92							3.30	5	3	2.80	nd	1A	4.40	4	4A	3.20	3	2+1A	2.84	1+2fr	2	2.51
48.00	1	8.93	102	2.20	0	0	2.20	0	0	2.00	1	0	2.20	4	1 disp	2.80	2	2	2.80	2	2	2.30	1fr	disp?	2.85
48.10	1	7.52	123										1.80	1	0	2.00	0	0	2.30	0	0	2.19	0	0 Dead	
48.11	1	8.53	113																			1.22			2.24
48.12	1	8.60	113																			2.11			3.02
48.13	1	8.65	113																			1.98			2.42
48.14	1	8.65	113																			1.22			1.72
48.15	1	8.65	113																			1.54			2.21
48.16	1	8.65	112																			1.84			2.19
48.17	1	8.67	113																			2.44			3.32
48.171	1	8.81	115																						
48.172	1	8.76	115																						
48.18	1	8.58	112																			1.83			2.29

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
46.00	1												discovered 3/17/93; COD - grubs, dead 7/14/93
46.10	1		0	2.71	2	2	2.01	1	1A	2.31	0	0	discovered 4/00; green, good 4/00; tag mia, replaced, slightly reddish-green, OK 2/01; slightly purplish-green, OK 5/01; tag mia, replaced, plant very hunkered, OK 2/02; slightly reddish green, OK 4/02; olive, OK 2 & 4/03
47.00	1												discovered 3/17/93; between rocks, only measured in one direction; COD unknown, stem hollow, no insects but maybe weevils 2/97
47.20	1	0	0	3.32	3	3	3.22	3	3	2.60	mia	2	very maroon, looks bad 5/97; maroon, OK, behind juniper 2/98, 2 & 4/99; totally maroon, poor 2/00; purplish, OK 4/00; dark olive 2/01; pale green, OK 5/01; purplish, OK 2/02; green with few red tubercle tips 4/02; mia 2/03; purple, OK 4/03
48.00	1	0	0	dead									discovered 3/17/93; green, good 4/99, 2/00; stepped on?, purplish, OK 4/00; dead, COD weevils (galleries, chambers, exit holes) 2/01
48.10	1												discovered 5/96; hunkered, OK 4/99; hooded during weevil study in summer 99; dead, COD unknown 9/99
48.11	1	0	0	2.16	0	0	Dead						discovered 9/99; green, good, hunkered 9/99, 2 & 4/00; tag mia, replaced 4/00, 2/01; hunkered, dark green, OK 2 & 5/01; dead, collected for weevil study, COD weevils 2/02
48.12	1	0	0	2.85	1	1	Dead						discovered 9/99; green, good, hunkered 9/99, 2 & 4/00; tag mia replaced, hunkered, green, OK 2/01; ants swarming, partly covered with ant dirt, green, OK 5/01; dead, collected for weevil study, COD weevils 2/02
48.13	1	1	1	2.18	0	0	Dead						left of 48.14, 48.15, 48.16 and in front of 48.17, discovered 9/99; green, a few orange tubercles, OK hunkered 9/99; dark green, OK 2 & 4/00; tag mia replaced, reddish, hunkered, ants swarming, poor 2/01; very hunkered, green with some red tubercle tips, poor 5/01; dead, collected for weevil study, COD weevils 2/02
48.14	1	0	0	1.22	0	0	Dead						right of 48.13 & left of 48.15 & 48.16 & in front of 48.17, green, OK 9/99, 2 & 4/00, tag mia, replaced, ants swarming, hunkered, poor 2/01; very hunkered, green, poor 5/01; dead, collected for weevil study, COD weevils 2/02
48.15	1	0	0	2.21	1	0	Dead						right of 48.13 & 48.14, left of 48.16 & in front of 48.17, green, good 9/99, 2 & 4/00; tag mia, replaced, ants swarming, dark green, OK 2/01; almost covered with ant dirt, green, OK 5/01; dead, collected for weevil study 2/02
48.16	1	0	0	2.21	0	0/dead							right of 48.13, 48.14 & 48.15, & in front of 48.17, green, good 9/99, 2 & 4/00; tag mia, replaced, hunkered, poor 2/01; looked dead but not infested, COD researchers 5/01
48.17	1	2+1A	1+2A	2.86	1	0	Dead						behind 48.13 - 48.16, dull green, a few orange tubercles, OK 9/99; dark purplish green, OK 2/00; green, good 4/00; ants building mound on plant, plant green, OK 2/01; partly covered with ant dirt, green, OK 5/01; dead, collected for weevil study, COD weevils 2/02
48.171	1			0.40		0	0.59	mia	0	0.55	mia	0	discovered 5/01; green, OK 5/01; tag and plant mia 2/02; hunkered, olive, OK 4/02; tag and plant mia 2/03; olive, OK 4/03
48.172	1									0.56		0	discovered 4/03; green, good 4/03; **CHECK TAG IN '04, MAY BE LABELED 47.172**
48.18	1	1	1disp	dead									discovered 9/99; green, good 9/99, 2 & 4/00; dead, COD unknown 2/01

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
48.19	1	8.59	113																						1.75
48.20	1	9.73	124																2.40	2	2A	2.42	2	2	1.60
48.21	1	9.06	120																			1.38			1.21
48.211	1	9.20	119																						0.92
48.212	1	9.15	119																						0.62
48.213	1	9.14	119																						
48.214	1	8.80	118																						
48.215	1	7.64	117																						
48.216	1	7.87	117																						
48.217	1	7.66	119																						
48.22	1	7.63	110																			0.86			0.98
48.23	1	7.65	112																			0.71			0.70
48.24	1	7.66	112																			0.65			0.93
48.25	1	7.65	112																			0.89			1.00
48.26	1	7.69	112																			0.55			0.86
48.27	1	7.81	112																			1.61			2.08
48.28	1	7.94	111																			1.45			1.62
48.29	1	8.23	112																						0.68
48.291	1	8.30	112																						

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
48.19	1		0	1.60	0	0	Dead						discovered 4/00; olive, OK 4/00; tag mia, replaced 2 & 5/01; hunkered, poor 2/01; hunkered, green, OK 5/01; dead, collected for weevil study, COD weevils 2/02
48.20	1	0	0	dead									discovered 2/98; green, good 4/99; green, good, hunkering 2 & 4/00; dead, stem hollow, COD unknown 2/01
48.21	1	0	0	2.12	1	0/dead							discovered 9/99; green, good, under rock 9/99, 2 & 4/00; tag mia, replaced, plant dark green, OK, ants swarming 2/01; dead, galleries and chambers, COD weevils 5/01
48.211	1		0	1.12	0	dead							hunkered, OK 2 & 4/00; tag mia, replaced 4/00, 2/01; olive, hunkered, OK 2/01; dead, COD weevils in root 5/01
48.212	1		0	1.05	0	dead							discovered 4/00; green, good 4/00; tag mia, replaced, olive, hunkered, OK 2/01; dead, COD unknown 5/01
48.213	1			0.72	0	dead							in front of 48.213, discovered 2/01; hunkered, olive, OK 2/01; dead, COD unknown 5/01
48.214	1			2.49	0	0/dead							discovered 2/01; dark olive, poor 2/01; dead, galleries, chambers, puparia, COD weevils 5/01
48.215	1			1.69	0	0	Dead						discovered 2/01; hunkered, dark green, OK 2 & 5/01; reddish, entire bottom broke off, dead, COD unknown 2/02
48.216	1			1.93	0	0	mia			mia			discovered 2/01; olive, OK 2/01; green, good 5/01; spine clusters in vicinity, tag and plant mia 2 & 4/02; plant and tag mia 2 & 4/03
48.217	1			1.36	0	0	mia			mia			discovered 2/01; between small rocks, light green, OK 2/01; very hunkered, poor 5/01; spine clusters in vicinity, tag and plant mia 2 & 4/02, 2 & 4/03
48.22	1	0	0	0.91	0	0	Dead						discovered summer 99; hunkered 9/99, 2 & 4/00; tag mia, replaced 4/00; hunkered, olive, OK 2 & 5/01; hollow with some orange mush inside, dead, COD weevils 2/02
48.23	1	0	0	1.21	0	dead							measured in one direction only, right of 48.24 & 48.25, discovered summer 99; hunkered 9/99, 2 & 4/00; tag eaten, replaced 4/00, 2/01; hunkered, olive, OK 2/01; dead, gallery, COD weevils 5/01
48.24	1	0	0	1.10	0	dead							discovered summer 99; between 48.23 & 48.25; hunkered 9/99, 2 & 4/00; tag eaten, replaced 4/00, 2/01; hunkered, olive, OK 2/01; possible puparia, COD weevils? 5/01
48.25	1	0	0	1.29	0	0		mia	Dead				discovered summer 99; left of 48.23 & 48.24, hunkered 9/99; hunkered, green, good 2 & 4/00; tag eaten, replaced 4/00, 2/01; hunkered, olive, OK 2 & 5/01; plant and tag mia 2/02; body solid, dead, COD unknown 4/02
48.26	1	0	0	0.60	0	dead							discovered in summer 99; measured in one direction only, hunkered 9/99; hunkered, OK 2/00; green, OK 4/00; tag loose, replaced 4/00; hunkered, olive, OK 2/01; dead, COD unknown 5/01
48.27	1	2	1	2.07	0	dead							discovered summer 99; green, good 9/99; hunkered, OK 2/00; green, OK 4/00; tag loose, replaced, plant yellowish-green, OK 2/01; dead, weevil larva inside, COD weevils 5/01
48.28	1	0	0	1.56	0	dead							discovered summer 99; green, good 9/99, 2 & 4/00; tag loose, replaced 4/00, hunkered, olive, half red, OK 4/01; dead, hollow, COD weevils 5/01
48.29	1		0	0.86	0	0		mia	0	mia			discovered 4/00; hunkered, OK 4/00; hunkered, olive, OK 2 & 5/01; tag and plant mia 2/02; green, good 4/02; tag present, plant mia 2 & 4/03
48.291	1						1.14		0	1.22	0	0	discovered 4/02; green, good 4/02; green, OK 2 & 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
48.30	1	10.23	124																2.90	3	disp	2.81	3+2fr	5	3.64
48.31	1	10.58	124																			1.26		0	1.76
48.32	1	9.78	122																						2.11
48.40	1	10.08	125																1.90	3	disp	1.92	1fr	1	Dead
48.50	1	10.52	130																2.40	1	0	2.40	1fr	1 disp	3.34
48.60	1	10.49	128																			1.01	0	0	1.35
48.70	1	10.64	131																			0.89	0	0	1.19
48.80	1	10.32	129																			1.26	0	0	1.19
48.81	1	10.11	129																						
48.90	1	10.35	129																			1.34	0	0	1.12
48.91	1	5.11	146																						
48.92	1	9.95	130																						
49.00 R.E.'s data	1	11.05	105	3.20	0																				
49.00	1	25.04	121													5.30	8	8	5.60	6	all disp.	4.82	1+5fr	6	4.94
49.10	1	25.00	121													1.40	0	0	1.80	0	0	1.99	1	1	1.93
49.20	1	25.10	122																			1.70		0	0.91
49.30	1	22.06	119																			0.83			0.78

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
48.30	1	3	1	4.49	7	7A/ dead							discovered 2/98; measured in one direction only 2/98 & 2/99; hooded during weevil study in summer 99; dull green, OK 4/99, 2/00; olive, OK 4/00; tag loose, replaced, ants swarming, gray spines, green body, OK 2/01; COD weevils 5/01; one seedling replanted in hole 5/01
48.31	1	0	0	1.96	0	dead							discovered 4/99; green, good 4/99; hooded during weevil study in summer 99; covered by loose prickly pear pad, removed, green, good 2/00; olive, OK 4/00, 2/01; dead, COD weevils 5/01
48.32	1		nd	2.90	1	0	Dead						discovered 4/00; green, good 4/00; tag mia, replaced, plant olive, OK 2 & 5/01; dead, COD weevils 2/02
48.40	1												measured in one direction only, discovered 2/98; hunkered down in Selaginella 2 & 4/99; solid, dry, COD unknown 2/00
48.50	1	2	disp?	3.29	2	1+1A	Dead						discovered 2/98; dull green, OK 4/99; reddish green, OK 2/00; ants swarming; plant green, good 4/00, 2 & 5/01; dead, COD weevils 2/02
48.60	1	0	0	dead									hunkered in Selaginella 2/99; popping out green, good 4/99, 2 & 4/00; slimy orange inside, dead, COD unknown 2/01
48.70	1	0	0	1.46	0	dead							green, good, tag mia, replaced 4/99; hunkered 2 & 4/00; ants swarming, hunkered, maroonish, poor 2/01; dead, COD weevils 5/01
48.80	1	0	0	0.82	0	0	Dead						hunkered in Selaginella 2/99; green & good 4/99; green, good, hunkered 2 & 4/00; tag mia, replaced 2/01; plant hunkered, green, OK 2 & 5/01; dead, COD weevils? 2/02
48.81	1			2.55	1	1	Dead						discovered 2/01; green, good 2 & 5/01; dead, COD weevils 2/02
48.90	1	0	0	1.59	0	0	Dead						hunkered in Selaginella 2/99; popping out, OK, green, good 4/99; hunkered, OK 2 & 4/00, 2/01; hunkered, green, OK 5/01; dead, COD weevils? 2/02
48.91	1			1.45	0	0	2.01	1	1		mia	dead	discovered 2/01; pale olive, OK 2 & 5/01; tag mia, replaced; plant green, hunkered, good 2 & 4/02; mia 2/03; dead, just spines left, COD unknown 4/03
48.92	1									1.12		0	discovered 4/03; green, OK 4/03; **MISTAKENLY TAGGED 48.91 - CHANGE TAG IN 2004**
49.00 R.E.'s data	1												discovered 3/17/93; COD - grubs, dead 7/14/93
49.00	1	3	1+2disp	dead									discovered 2/97; tag eaten, retagged 5/97; hooded during weevil study summer 1999; green, good 4/99, 2 & 4/00; dead, COD weevils (galleries) 2/01
49.10	1	1	1A	dead									measured in one direction only 2/98; flowers partially eaten 2/99; green, good 4/99, 2 & 4/00; dead, COD Moneilema?, one large chamber 2/01
49.20	1	0	0	dead									discovered 4/99; hunkered, green, good 2 & 4/00; dead, COD Moneilema?, one large chamber 2/01
49.30	1	0	0	1.64	2	2	1.83	1	1	dead			discovered summer 99; looks dead, but firmly rooted 9/99; green, new spine growth, OK 2 & 4/00; tag mia, replaced 4/00, 2 & 5/01; olive, OK 2 & 5/01; hunkered, green, OK 2/02; green, good 4/02; dead, COD weevils 2/03; seedling beside 2/03; seedling mia 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
49.40	1	22.10	118																			2.07			1.86
49.50	1	22.24	118																			1.56			1.73
49.51	1	22.30	118																						
49.52	1	22.20	118																						
49.60	1	22.17	115																						0.64
49.70	1	22.27	120																						
49.80	1	22.40	118																						
49.90	1	22.19	116																						
49.91	1	22.30	116																						
50.00	1	7.55	112	2.80	2	2																			
50.10	1	25.75	120													2.30	0	0	3.40	3	2	4.52	3+4fr	7	Dead
50.20	1	25.81	120													1.60	0	0	2.90	2	1	2.80	1+2fr	3	3.86
50.30	1	25.87	119													0.70	0	0	1.00	0	0	0.93	0	0	1.64
50.40	1	26.01	118																			2.81		3	Dead
50.41	1	24.32	124																						
50.42	1	24.36	124																						
50.50	1	26.10	118																			2.51		1	2.42

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
49.40	1	0	0	2.86	3	3	2.64	2	1	dead			slightly orangish, discovered 7/99; slightly orangish OK 9/99; maroonish, OK, shrouded 2/00; shroud loose, removed 4/00; plant green, good 4/00; tag mia, replaced 2 & 5/01, 2/02; pale green, OK 2/01; green, OK 5/01; hunkered, green, OK 2/02; green, good 4/02; dead, collected for weevil study, COD weevils 2/03
49.50	1	0	0	2.29	1	1A	2.43	1	1	3.13	1	0	discovered 9/99; army green, OK 9/99, 2/00; green, good 4/00; pale olive, OK 2/01; green, good 5/01; tag mia, replaced, plant green, good 2 & 4/02; green, good 2 & 4/03
49.51	1						0.59	0	0	mia			discovered 4/02; green, good 4/02; tag present, plant mia 2 & 4/03
49.52	1						0.49	0	0	mia			discovered 4/02; green, good 4/02; tag present, plant mia 2 & 4/03
49.60	1		0	mia			0.61	mia	0	0.75	mia	0	discovered 4/00; hunkered, OK 4/00; plant and tag mia 2 & 5/01, 2/02; relocated, retagged, green, hunkered, OK 4/02; tag and plant mia 2/03; green, OK 4/03
49.70	1			1.52	0	0	1.55	0	0	mia			discovered 2/01; olive, OK 2/01; tag mia, replaced5/01, 2/02; pale green, good 5/01; hunkered, green, OK 2/02; green, good 4/02; tag and plant mia 2/03; tag relocated, loose, replaced, plant mia 4/03
49.80	1			2.31	1	1	2.51	1	1	2.59	2	1+1A	discovered 2/01; edge of grass clump, green, good 2/01; tag mia, replaced, plant green, good 5/01; green, good 2 & 4/02; tag mia, replaced, green, good 2/03; olive, OK 4/03
49.90	1			0.84		0	1.00	0	0	0.76	0	0	discovered 5/01; hunkered in Selaginella, green, OK 5/01; tag mia, replaced, plant hunkered, green, OK 2/02; good 4/02; green, OK hunkered 2 & 4/03
49.91	1			0.56		0	0.74	0	0	0.99	mia	0	discovered 5/01; red at base, green above, OK 5/01; tag mia, replaced, plant grayish green, OK 2/02; good 4/02; tag and plant mia 2/03; between small rocks, green, good 4/03
50.00	1												discovered 3/17/93; sickly 3/93; COD - unknown, dead 7/14/93; seedling near carcass 2/94
50.10	1												in seed ring; measured in one direction only 2/98 &2/99; green, good 4/99; very poor, removed by WC, no evidence of weevils 2/00
50.20	1	4	1+1A	3.51	3	1+1A	3.77	5	4A	mia			in seed ring; measured in one direction only 2/98 & 2/99; green, good 4/99, 2 & 4/00, 2 & 5/01; tag mia, replaced, seed ring moved, plant green, good 2/02; green, good 4/02; plant and tag mia 2 & 4/03
50.30	1	0	0	2.40	0	0	2.52	1	1	dead			in seed ring; measured in one direction only 2/98; green, good 4/99; dull green, OK 2/00; green, good 4/00, 2 & 5/01; hunkered, green, good 2 & 4/02; dead, COD weevils, hollow root 2/03
50.40	1												discovered 4/99; very poor, removed by WC, seven seedlings, dead, maybe weevils 2/00
50.41	1			0.95		0	0.97	0	0	dead			discovered 5/01; green, good 5/01; tag mia, replaced, plant getting overgrown by crustose lichen, green, OK 2 & 4/02; dead - dry, solid, COD unknown 2/03
50.42	1			1.84		0	Dead						discovered 5/01; green, good 5/01; dead, COD Moneilema 2/02
50.50	1	2	1	3.20	2	2	2.97	3	1A	mia			left of 50.60 & 50.61; discovered 4/99; dark green, OK 2/00; maroonish, OK 4/00; olive, OK, several seedlings behind it 2/01; dark olive, OK 5/01; tag mia, replaced, plant hunkered, olive, OK 2 & 4/02; tag present, plant mia 2 & 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
50.51	1	26.12	118																			1.15		0	0.98
50.511	1	26.05	118																						
50.512	1	25.96	118																						
50.513	1	25.89	118																						
50.514	1	25.97	118																						
50.515	1	25.98	118																						
50.516	1	25.98	118																						
50.517	1	25.98	118																						
50.518	1	25.99	118																						
50.52	1	26.11	118																						
50.53	1	26.10	118																						
50.54	1	26.10	118																						
50.55	1	26.11	118																						
50.56	1	26.10	118																						
50.57	1	26.08	118																						
50.60	1	26.12	118																			2.45		1	2.02
50.61	1	26.10	118																			1.78		0	1.64
50.70	1	26.19	118																			1.77		0	1.56
50.80	1	26.34	118																			1.99		0	2.09
50.90	1	26.25	116																						

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
50.51	1	0	0	0.50	0	0	0.58	0	0	dead			left of 50.60 & 50.61, behind 50.52; discovered 4/99; one measurement only 2/02; dark green, OK 2/00; hunkered, OK 4/00; green, OK 2/01; green, OK 5/01; tag mia, replaced, plant hunkered, green, OK 2 & 4/02; dead, just spines left 2/03
50.511	1						0.64		0	dead			discovered 4/02; OK 4/02; dead, spines left 2/03
50.512	1						0.73		0	0.70	mia	0	discovered 4/02; olive, OK 4/02; plant and tag mia 2/03; rock on top, removed, plant green, OK 4/03
50.513	1						0.57		0	0.54	mia	0	discovered 4/02; green, OK 4/02; plant and tag mia 2/03; hunkered, OK 4/03
50.514	1						0.44		0	dead			in front of 50.515 - 50.518, discovered 4/02; OK 4/02; dead, COD unknown 2/03
50.515	1						0.43		0	0.36	0	dead	behind 50.514 and left of 50.516, discovered 4/02; OK 4/02; green, OK 2/03; hollow, COD weevils 4/03
50.516	1						0.48		0	dead			behind 50.514 and between 50.515 & 50.517, discovered 4/02; green, good 4/02; dead, COD unknown 2/03
50.517	1						0.55		0	dead			behind 50.514 and right of 50.516, discovered 4/02; green, good 4/02; dead, COD unknown 2/03
50.518	1						0.66		0	dead			behind 50.514 - 50.517, discovered 4/02; hunkered, green, OK 4/02; dead, COD unknown 2/03
50.52	1			0.43		0	0.88	0	0	mia			at 7 o'clock on 50.50, in front of 50.51, discovered 5/01; one measurement only 5/01, 2/02; OK 5/01; tag mia, replaced, plant hunkered, green, OK 2/02; green, OK 4/02; plant mia 2 & 4/03
50.53	1			0.71		0	0.75	0	0	mia			at 8 o'clock on 50.50, left and above 50.51 & 50.52, discovered 5/01; one measurement only 5/01, 2/02; OK 5/01; very hunkered 2/02; green, OK 4/02; tag present, plant mia 2 & 4/03
50.54	1			0.51		0	0.54	0	0	0.40	0	0	left of 50.53, in front of 50.54, discovered 5/01; one measurement only 2/02; OK 5/01; very hunkered 2/02; green, OK 4/02; green, OK 2/03; covered with dirt, poor 4/03
50.55	1			0.36		0	0.53	mia	0	mia			behind 50.54 and left of 50.51 & 50.52, discovered 5/01; tag and plant mia 2/02; green, OK 4/02; plant and tag mia 2 & 4/03
50.56	1			0.35		0	0.32	mia	0	dead			at 9 o'clock on 50.50, discovered 5/01, OK 5/01; tag and plant mia 2/02; green, OK 4/02; dead, COD unknown 2/03
50.57	1			0.32		0	mia			dead			at 11 o'clock on 50.50, discovered 5/01; green, OK 5/01; tag and plant mia 2 7 4/02; just spines left, COD unknown 2/03
50.60	1	0	0	dead									right of 50.50 & 50.51, discovered 4/99; getting squeezed, dark green, OK 2 & 4/00; just spines left, COD unknown 2/01
50.61	1	0	0	dead									right of 50.50 & 50.51, discovered 4/99; dark green, OK 2/00; green, good 4/00; just spines left, COD unknown 2/01
50.70	1	0	0	1.69	0	0	1.61	0	0	dead			discovered 4/99; green, good 2 & 4/00, 2 & 4/01; hunkered, green, OK 2/02; hunkered, poor 4/02; dead, COD weevils, hollow center, tag mia 2/03
50.80	1	0	0	2.68	3	3	2.59	1	1	dead			discovered 4/99; hooded during weevil study in summer 99; olive green, OK 2 & 4/00; tag chewed, replaced, plant olive, OK 2 & 5/01; hunkered, green, OK 2/02; poor 4/02; dead, spider in it, COD weevils 2/03
50.90	1						0.89		0	dead			discovered 4/02; green, good 4/02; dry, hard, COD unknown 2/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
51.00 R.E.'s data	1	26.05	105	3.60	1	1																			
51.00	1	26.02	107	?	?	?	?	?	?	3.50	3	0	3.50	4	2 disp	4.30	5	4+1A	4.30	3	disp	3.74	0	0	4.10
51.01	1	26.02	107													0.90	0	0	0.80	0	0	0.79	0	0	1.04
51.02	1	26.02	107													0.60	0	0	0.70	0	0	0.97	0	0	0.77
51.03	1	26.02	107													0.50	0	0	mia			mia			mia
51.04	1	26.02	107													0.70	0	0	0.90	0	0	0.89	0	0	1.03
51.05	1	26.02	107													0.30	0	0	mia			mia			mia
51.06	1	26.02	107													0.40	0	0	0.40	0	0	mia			mia
51.07	1	26.02	107																						
51.10	1	26.23	107							0.50	0	0	mia			0.80	0	0	1.30	0	0	1.24	0	0	0.98
51.11	1	26.21	107																						
51.20	1	25.96	108										0.90	0	0	1.30	0	0	1.80	0	0	1.47	0	0	2.14
51.30	1	26.25	108										0.80	0	0	1.20	0	0	1.30	0	0	1.28	0	0	1.49
51.40	1	26.21	107													0.90	0	0	1.00	0	0	1.00	0	0	1.34
51.41	1	26.23	107																						
51.50	1	26.13	107													0.90		0	0.80	0	0	0.76	0	0	0.94

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
51.00 R.E.'s data	1												discovered 3/17/93; COD - unknown; dead 2/11/94
51.00	1	2	disp?	4.43	5	5	4.37	1	1	mia			5 seedlings 5/95; 4 seedlings at base 2/96; 3 seedlings 2/97 (51.01-51.03); poor, spines dull gray, body olive 2/99; spines dull gray, body olive, OK 4/99, 2/00; reddish, OK 4/00; olive, OK 2/01; flabby, maroon, poor 5/01; grayish purple, OK 2/02; olive with light orange tubercles 4/02; plant & tag mia 2 & 4/03
51.01	1	0	0	1.22	0	0	1.53	1	0	1.42	0	dead	measured in one direction only 2/98 & 2/99; OK 4/99; hooded during weevil study in summer 99; dull green, OK 2 & 4/00; green, OK 2/01; green, good 5/01; green, OK 2/02; green, good 4/02; reddish, poor, tag mia and replaced 2/03; hollow, COD weevils 4/03
51.02	1	0	0	1.18	0	0	1.30	0	0	mia			between 51.01 & 51.04, measured in one direction only 2/98; OK 4/99, 2 & 4/00; green, OK 2 & 5/01, 2/02; green, good 4/02; plant mia 2 & 4/03
51.03	1												mia 98, 99, 00
51.04	1	0	0	1.55	0	0	1.62	0	0	mia			behind 51.01 & 51.02, measured in one direction only 2/98 & 2/99; OK 4/99, 2 & 4/00; green, OK 2 & 5/01, 2/02; green, good 4/02; plant mia 2 & 4/03
51.05	1												mia 98, 99, 00
51.06	1			0.77	0	0	0.98	0	0	mia			between & left of 51.02 & 51.04, measured in one direction only 2/98; mia 4/99, 2 & 4/00; green, OK 2 & 5/01, 2/02; green, good 4/02; plant mia 2 & 4/03
51.07	1			0.49		0	mia			mia			between and right of 51.01 & 51.02, discovered 5/01; one measurement only, green, OK 5/01; plant mia 2 & 4/02; plant mia 2 & 4/03
51.10	1	0	0	1.22	0	0	1.38	0	0	1.36	0	dead	5 seedlings 5/95; tag & plant mia 2/96; needs tag 2/97; tag moved & replaced 5/97; measured in one direction only 2/98; OK 2 & 4/00; hunkered, OK 2 & 5/01; green, OK 2/02; green, good 4/02; green, OK 2/03; chamber and exit hole, COD weevils 4/03
51.11	1									0.42		0	discovered 4/03; back left edge of 51.10 tag; green, OK 4/03
51.20	1	0	0	2.61	2	2	2.62	1	0	dead			measured in one direction only 2/98 & 2/99; hunkered down 2/99 & 4/99; popping out, OK 2/00; green, good 4/00; olive, OK 2 & 5/01; almost buried, only spines and flower showing 2/02; green, good 4/02; dead, weevil chambers, COD weevils; dead seedling beside 2/03
51.30	1	0	0	2.00	1	1	1.94	0	0	dead			tag mia, retagged 5/97; measured in one direction only 2/98; tag mia, replaced; green, good 4/99, 2 & 4/00; olive, OK 2 & 5/01, 2/02; green, good 4/02; larvae, COD weevils, collected for weevil study 2/03
51.40	1	0	0	1.59	0	0	1.21	0	0	1.55	0	0	nestled in, measured in one direction only 2/98; nestled in 2/99; OK 4/99, 2 & 4/00; hunkered, green, OK 2 & 5/01, 2/02; green, good 4/02; green, OK 2 & 4/03
51.41	1						0.82		0	0.64	0	mia	discovered 4/02; green, good 4/02; olive, poor 2/03; plant mia 4/03
51.50	1	0	0	1.17	0	0	0.66	0	0	dead			discovered 5/97; measured in one direction only 2/98; OK 4/99, 2 & 4/00; green, OK 2 & 5/01; tag mia, replaced, plant very hunkered, OK 2/02; green, OK 4/02; dead, COD unknown 2/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
51.60	1	26.15	107													0.60		0	mia			0.52	mia	0	0.81
51.70	1	26.27	108													0.60		0	0.70	0	0	0.79	mia	0	0.94
51.71	1	26.29	108																						
51.80	1	25.94	108													1.10		0	1.30	0	0	1.49	0	0	1.73
51.81	1	25.99	108													0.90		0	mia			mia			0.80
51.82	1	26.02	108													1.20		0	1.60	0	0	1.38	0	0	1.33
51.83	1	26.03	108													1.20		0	1.20	0	0	1.37	0	0	1.56
51.90	1	26.59	106													2.40		1	2.30	1	0	2.47	0	0	2.09
51.91	1	26.45	106																						
52.00	1	42.30	124	4.80	2	2	4.60	2	1	5.10	9	1+4	4.30	3	0	4.90	5	5	4.90	3	3	4.09	0	1A	Dead
52.10	1	42.30	124	0.30	0	0	0.60	0	0	mia		na	0.60	0	0	0.50	0	0	0.80	0		0.59	0	0	0.85
52.11	1	42.30	124										0.60	0	0	mia			mia			mia			
52.20	1	8" East of 52								2.00	0	0	1.80	1	0	3.00	2	2	3.40	3	3	2.93	3fr	2 disp removed	Dead
52.30	1	42.46	128										1.60	0	0	2.20	0	1	1.90	2	2	1.98	1fr	0	1.90
52.40	1	42.26	124										1.60	1	1	1.60	1	1	1.80	1	disp	1.45	0	0	1.77

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
51.60	1	0	0	0.69	0	0	0.68	0	Dead				discovered 5/97; relocated, OK 4/99, 2 & 4/00; green, OK 2 & 5/01; tag mia, replaced, plant hunkered, OK 2/02; body solid, dead, COD unknown 4/02
51.70	1	0	0	0.90	0	0	1.50	0	0	1.78	0	0	discovered 5/97; nestled in, measured in one direction only 2/98; OK 4/99; poor, grayish, hard, maybe dead 2/00; green, OK 4/00, 2 & 5/01; hunkered, green, OK 2/02; green, good 4/02; olive, OK 2/03; very hunkered, poor 4/03
51.71	1						1.18		0	0.99	0	0	discovered 4/02; green, good 4/02; green, poor 2/03; hunkered, poor 4/03
51.80	1	0	mia	2.72	mia	0	2.79	0	0	1.88	0	dead	discovered 5/97; measured in one direction only 2/98; hooded during weevil study in summer 99; green, good 4/99, 2/00; plant mia 4/00 & 2/01; purplish-green, OK 5/01; tag mia, replaced, plant almost covered by skullcap, green, good 2/02; green, good 4/02; hunkered, OK 2/03; hard, dry, solid, COD unknown 4/03
51.81	1	0	0	1.04	0	0	1.11	0	0	dead			discovered 5/97; poor, hard, maybe dead 2/00; green, OK 4/00; almost covered by gravel, green, OK 2/01; hunkered, green, OK 5/01, 2/02, partially buried, poor 4/02; dead, COD unknown 2/03
51.82	1	0	0	1.72	0	0	1.14	0	Dead				discovered 5/97; OK 4/99, 2 & 4/00; green, OK 2 & 5/01; hunkered, green, OK 2/02; dead, collected for weevil study, COD weevils 4/02
51.83	1	0	0	2.11	0	0	1.76	0	Dead				discovered 5/97; OK 4/99, 2 & 4/00; green, OK 2 & 5/01; hunkered, green, OK 2/02; dead, collected for weevil study, COD weevils 4/02
51.90	1	1	1A	2.70	1	1	2.92	2	1+1A	dead			discovered 5/97; tag mia, replaced, slightly trampled 2/99; hunkered, poor, maroonish 4/99, 2/00; new spine growth, olive, OK 4/00, 2 & 5/01; dark green, OK 2/02; reddish green, good 4/02; dead, collected for weevil study, COD unknown 2/03
51.91	1									2.15	0	dead	discovered 2/03; green, OK 2/03; weevil chambers and exit holes, COD weevils 4/03
52.00	1												discovered 3/17/93; 2 seedlings 3/93; flowers eaten 2/95; 7 seedlings, 4 scars 5/95; brownish green, 2 seedlings at base 2/98; 3 seedlings at base 5/98; getting maroonish 1 seedling at base 2/99; getting maroonish, 2 seedlings at base 4/99; removed by JMP, larvae inside 2/00; six seedlings (2 uprooted), placed rock in hole 2/00; all mia 4/00, parent dead, killed by weevil
52.10	1	0	0	1.69	0	0		1	1A	mia			discovered 3/18/93; seedling 1" from 52.00 3/93; seedling still there 2/94; measured in one direction only 2/98 & 2/99; green, good 4/99; hunkered, OK 2 & 4/00; green, good 2 & 5/01; tag mia, replaced, plant green, good 2/02; green, good 4/02; unrecognizable chewed tag, plant mia 2 & 4/03
52.11	1												seedling in rock crack below 52.10
52.20	1												OK, maroonish 4/99; hooded during weevil study in summer 99; looks dead, maybe weevils, removed by weevil researcher 9/99
52.30	1	1	1	2.25	1	1	2.56	2	2A	2.18	0	dead	green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02; green, OK 2/03; weevil chamber and exit hole, COD weevils 4/03
52.40	1	0	0	1.72	0	0	1.85	0	0	1.77	2	dead	measured in one direction only 2/98 & 2/99; green, good 4/99, 2 & 4/00; green, OK 2 & 5/01; developing second apex, green, good 2/02; formerly larger plant, damaged, new apical meristem, green, OK 4/02; olive, OK 2/03; weevil chambers and exit holes, COD weevils 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
52.50	1	42.37	124																						1.68
53.00	1	48.55	133																						
53.10	1	48.50	133																						
54.00	1	48.38	133																						
54.01	1	48.45	133																						
55.00	1	52.75	134																						
56.00	1	52.50	135																						
57.00	1	52.65	135																						
58.00	1	52.69	135																						
58.01	1	52.64	135																						
58.02	1	52.68	135																						
58.10	1	52.75	135																						
59.00	1	52.70	135																						
60.00	1	52.72	135																						
61.00	1	52.60	135																						
62.00	1	52.77	136																						
62.01	1	52.80	136																						
63.00	1	52.65	136																						
64.00	1	48.12	134																						
65.00	1	48.00	134																						
66.00	1	47.96	134																						
67.00	1	47.91	134																						

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
52.50	1	0	0	mia			mia			2.25	0	dead	discovered 2/00; green, good 2 & 4/00; plant mia 2 & 5/01; plant and tag mia 2 & 4/02; olive, OK 2/03; weevil chamber and exit hole, COD weevils 4/03
53.00	1			2.54	2	2	1.98	0	Dead				discovered 2/01; purplish, OK 2/01; green, OK 5/01; tag mia, replaced, plant hunkered, green, OK 2/02; dead, COD weevils 4/02
53.10	1						0.67	0	0	0.89	0	0	discovered 2/02; green, OK 2/02; green, good 4/02; green, OK 2 & 4/03
54.00	1			2.73	1	1	Dead						discovered 2/01; dark blue-green, OK 2/01; green, good 5/01; just spines left, COD unknown 2/02
54.01	1			0.85		0	0.71	0	0	dead			discovered 5/01; green, OK 5/01; tag mia, replaced, plant hunkered, green, OK 2/02; hunkered, poor 4/02; COD unknown 2/03
55.00	1			1.62	0	dead							discovered 2/01; split onpen, green, poor 2/01; dead, COD unknown 5/01
56.00	1			2.93	1	1A	2.66	3	1+2A	dead			discovered 2/01; olive, OK 2 & 5/01, 2/02; green, good 4/02; hard, dry, COD unknown 2/03
57.00	1			0.83	0	dead							discovered 2/01; hunkered, green, OK 2/01; COD unknown 5/01
58.00	1			2.50	0	0	2.56	0	1	2.88	0	dead	discovered 2/01; olive, OK 2 & 5/01; green, OK 2/02; green, good 4/02 & 4/03; hard, dry, solid, COD unknown 4/03
58.01	1						1.02	0	0	0.97	0	0	discovered 2/02; green, OK 2/02; green, good 4/02; hunkered, OK 2 & 4/03
58.02	1						0.60		0	mia			at 10:00 on 58.00, discovered 4/02; green, good 4/02; plant and tag mia 2 & 4/03
58.10	1									0.57	0	dead	discovered 2/03; green, OK 2/03; chamber and exit hole, COD weevils 4/03
59.00	1			2.06	0	dead							discovered 2/01; COD maggots 5/01
60.00	1			1.90	0	dead							discovered 2/01; olive, OK 2/01; dead, COD maggots 5/01
61.00	1			1.53	0	0	1.46	0	0	2.39	0	dead	discovered 2/01, under rock, olive, OK 2 & 5/01; squashed flat under rock, green, OK 2/02; green, OK 4/02; olive, OK 2/03; weevil, larvae inside; COD weevils 4/03
62.00	1			2.39	1	1A	2.45	0	0	mia			discovered 2/01; olive, OK 2 & 5/01; green, OK 2/02; green, good 4/02; tag present, plant mia 2 & 4/03
62.01	1			0.46	0	0	mia			mia			discovered 2/01; green, OK 2 & 5/01; plant mia 2 & 4/02; tag and plant mia 2 & 4/03
63.00	1			2.31	0	0	2.25	0	0	dead			discovered 2/01; dark green, OK 2 & 5/01; green, OK 2/02; green, good 4/02; dead, COD weevil chambers 2/03
64.00	1			0.81	0	0	0.90	0	0	dead			discovered 2/01; hunkered, green, OK 2 & 5/01; tag mia, replaced, plant under rock, green, OK 2/02; hunkered, OK 4/02; dead, COD unknown 2/03
65.00	1			1.41	0	0	1.46	0	0	dead			wedged between two rocks, discovered 2/01; green, good 2 & 5/01, 2/02; green, good 4/02; dead, COD unknown 2/03
66.00	1			3.78	3	3	3.74	4	3+1A	3.68	0	dead	discovered 2/01; reddish-green, OK 2 & 5/01; tag mia, replaced, plant reddish green, OK 2/02; olive, poor 2/03; weevil inside, COD weevils 4/03
67.00	1			1.41	0	0	1.52	0	Dead				between rocks, discovered 2/01; olive, OK 2 & 5/01; tag mia, replaced, plant green, OK 2/02; hollow, dead, COD weevils 4/02

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
68.00	1	47.89	134																						
68.10	1	47.86	134																						
69.00	1	47.80	134																						
70.00	1	47.80	134																						
70.10	1	47.70	134																						
70.20	1	47.72	134																						
71.00	1	47.78	134																						
71.10	1	47.81	134																						
72.00	1	47.87	134																						
73.00	1	47.80	134																						
74.00	1	47.83	134																						
75.00	1	47.65	134																						
76.00	1	47.55	134																						
77.00	1	47.52	135																						
78.00	1	47.08	135																						
79.00	1	48.47	136																						
80.00	1	48.33	136																						
Stake 2 = GPS2; R021620A; R020915A																									
1.00	2	~53.30	172																						
2.00	2	~53.31	172																						
2.01	2	53.38	172																						

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
68.00	1			2.70	0	0	2.75	3	2+1A	dead			discovered 2/01; dull green, some reddish tubercle tips, OK 2 & 5/01; tag mia, replaced, plant olive, OK 2/02; green, good 4/02' dead, just spines left, COD unknown 2/03
68.10	1						0.40		0	mia			to the left of upper end of tag 68.00, untagged, discovered 4/02; plant mia 2/03; tag and plant mia 4/03
69.00	1			2.00	0	0	2.03	0	0		mia	dead	left of 70.00, discovered 2/01; purplish, OK 2/01; olive, OK 5/01; tag mia, replaced, plant green, OK 2/02; green, good 4/02; tag present, plant mia 2/03; just spines left, COD unknown 4/03
70.00	1			1.97	0	0	1.90	0	0	dead			discovered 2/01; green, good 2 & 5/01; tag mia, replaced, plant olive, OK 2/02; green, good 4/02; dead, COD unknown 2/03
70.10	1						0.90		0	0.83	0	0	discovered 4/02; green, good 4/02; hunkered, poor 2/03; green, OK 4/03
70.20	1						1.05		0	1.10	0	0	discovered 4/02; green, good 4/02; one measurement only, between two rocks, green, OK 2 & 4/03
71.00	1			1.28	0	0	1.18	0	0	dead			discovered 2/01; dark olive, OK 2 & 5/01; tag mia, replaced, plant green, OK 2/02; green, good 4/02; dead, collected for weevil study, COD probably weevils 2/03
71.10	1						0.73		0	dead			discovered 4/02; green, good 4/02; dead, just spines, COD unknown 2/03
72.00	1			1.81	0	0	2.02	1	1	1.82	0	0	discovered 2/01; green, OK 2 & 5/01; tag mia, replaced, plant green, OK 2/02; green, good 4/02' olive, OK 2/03; green, OK 4/03
73.00	1			1.09		0	Dead						discovered 5/01; green, OK 5/01; just spines left, dead, COD unknown 2/02
74.00	1			1.16		0	1.28	0	0	0.85	0	mia	discovered 5/01; green, OK 5/01; tag mia, replaced, plant green, good 2/02; green, good 4/02; hunkered, poor 2/03; plant mia 4/03
75.00	1			2.07		0	mia			0.85	0	dead	discovered 5/01; in grass clump; green, good 5/01; plant and tag mia 2 & 4/02; olive, OK 2/03; weevil chamber and exit hole, COD weevils 4/03
76.00	1			0.65		0	mia			mia			discovered 5/01; green, OK 5/01;plant and tag mia 2 & 4/02, 2 & 4/03
77.00	1			0.94		0	0.92	0	0		mia	dead	discovered 5/01; green, OK 5/01; olive, OK 2/02; green, good 4/02; plant and tag mia 2/03; relocated tag and plant, weevil chamber, COD weevils 4/03
78.00	1			0.98		0	mia			mia			discovered 5/01; green, good 5/01; tag and plant mia 2 & 4/02, 2 & 4/03
79.00	1			1.27		0	1.46	0	0	dead			wedged between three rocks, discovered 5/01; one measurement only, green, good 5/01; green, good, tag mia, replaced 2/02; green, good 4/02; dead, COD weevils 2/03
80.00	1			0.73		0	mia			mia			discovered 5/01; green, OK 5/01; plant and tag mia 2 & 4/02, 2 & 4/03
Stake 2 = GPS													
1.00	2			3.63		4A	3.65	4	4	3.48	3	1+1 disp	right of 2.00, discovered 5/01; green, good 5/01; tag mia, replaced, plant green, good 2/02; green, good 4/02 & 2/03; light purplish green, OK 4/03
2.00	2			3.14		3A	4.13	5	5	3.64	4	3	left of 1.00, discovered 5/01; green, good 5/01; green, good, tag mia, replaced 2/02; green, good 4/02 & 2/03; pale green, OK 4/03
2.01	2						0.55		0	0.68	mia	0	at 11:00 from 2.00?, untagged, discovered 4/02; plant mia 2/03; green, good 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
3.00	2	~53.40	172																						
3.01	2	53.10	172																						
3.02	2	53.10	172																						
3.03	2	53.10	172																						
3.04	2	53.10	172																						
4.00	2	59.00	175																						
5.00	2	52.97	169																						
6.00	2	53.10	170																						
53.00	2	2.86	298	2.50	0	0	2.60	1	1	1.90	0	0	2.30	0	0	3.60	1	1	2.70	0	0	2.43	0	0	2.88
54.00	2	1.97	316	3.00	2	2	2.80	1	0	3.00	3	3	3.40	2	2 disp	4.10	2	2	3.80	2	2disp	3.35	2fr	dead removed	
55.00	2	3.12	340	3.50	3	3	3.60	2	2	2.30	0	0	Dead												
56.00	2	4.31	338	2.80	0	0	2.70	1	1	2.40	1	1 scar	2.60	1	1A	3.30	2	2	3.60	2	2	3.56	1fr	1	4.10
56.01	2	4.40	341																						
56.10	2	4.36	337																			1.42			2.17
57.00	2	4.25	340	1.30	0	0	1.30	0	0	1.30	0	0	1.40	0	0	2.30	1	1A	3.00	1	1	2.30	0	0	2.64
57.10	2	4.10	346										2.60	3	disp	3.50	3	3	3.50	2	disp	4.01	2+1fr	3	4.20
57.20	2	3.24	350																						2.14
58.00	2	6.39	332	0.60	0		Dead																		
58.10	2	6.52	350																						
59.00	2	7.53	336	1.90	0	Dead																			

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
3.00	2			4.15		2+6A	3.72	3	3	dead			discovered 5/01; olive, OK 5/01; dark green, good, tag eaten, replaced 2/02; green with reddish tubercle tips 4/02; dead, COD unknown 2/03
3.01	2						1.02		0	0.39	0	0	at 11:00 on 3.00, discovered 4/02; green, good 4/02; purplish, poor, uprooted 2 & 4/03
3.02	2						0.48		0	dead			at 11:30 on 3.00, discovered 4/02; green, good 4/02; dead, COD unknown 2/03
3.03	2						0.71		0	dead			at 12:00 on 3.00, discovered 4/02; green, good 4/02; dead, COD unknown 2/03
3.04	2						0.83		0	0.37	0	0	placed behind 3.01, at 1:00 on 3.00, discovered 4/02; green, good 4/02; purplish, poor, uprooted 2 & 4/03
4.00	2						6.40		1+4A	dead			discovered 4/02; olive, OK 4/02; dead, collected for weevil study 2/03
5.00	2									1.02		0	discovered 4/03; hunkered in spike moss, green, good 4/03
6.00	2									0.57		0	discovered 4/03; hunkered in spike moss, reddish, OK 4/03
53.00	2	0	0	3.30	4	3+1A	Dead						discovered 3/17/93; looks bad 2/96; new spines 5/96; looks OK, green, covered by soil & litter from heavy rains 2/97; uncovered 2/98; OK 5/98 & 2/99; green, good 4/99; shrouded 2/00; shroud missiing 4/00; olive, OK 2 & 4/01; dead, weevil exit holes, COD weevils 2/02
54.00	2												discovered 3/17/93; ants swarming fruit 5/96; dug up as it looked dead, spines dull gray, squishy, but partially green with roots, replanted 2/99; removed for weevil study, killed by weevils 4/99
55.00	2												discovered 3/17/93; looks bad 5/95; hollow, just spines 2/96
56.00	2	0	0	4.09	4	3+1A	Dead						discovered 3/17/93; 1 scar 5/95; fruit yellowish, soft, plant OK, a few orange tubercles 4/99; hooded during weevil study in summer 99; dull green, OK 2 & 4/00; dull green, OK, sort of collapsed on one side 2 & 4/01; dead, collected for weevil study, COD Monellema 2/02
56.01	2			0.38	0	0	mia			0.68	mia	0	coming up at edge of tag, discovered 2/01; not tagged, green, good 2/01; green, OK 4/01; tag and plant mia 2 & 4/02 & 2/03; covered by litter, green, OK 4/03
56.10	2	0	0	2.83	1	1A	3.11	0	0	3.09	0	0	discovered summer 99; olive green, OK, squishy, tagged 9/8/99; dull green, OK 2/00; green, good 4/00, 2 & 4/01, 2/02; green, good 4/02; green, OK , partially covered by litter 2/03; green, good 4/03
57.00	2	0	0	2.80	0	0	2.59	0	0	3.13	0	0	discovered 3/17/93; very hunkered down 2/99; coming out, green, good 4/99, 2 & 4/00; dull green, OK slightly hunkered 2 & 4/01, 2/02; green, good 4/02; green, good partly covered by litter 2 & 4/03
57.10	2	1	1disp	4.54	3	2+1A	Dead						green, good 4/99, 2 & 4/00; green with one reddish tubercle tip, OK 2 & 4/01; dead, one large hole in upper root, no exit hole, COD Monellema? 2/02
57.20	2		0	2.87	2	1+1A	3.75	1	1	3.65	2	2	discovered 4/00; reddish, OK 4/00, 2/01; olive, OK 4/01; olive, good 2/02; green, good 4/02; purplish, OK 2/03; pale olive, OK 4/03
58.00	2												discovered 3/17/93; COD - unknown, dead 2/11/94
58.10	2									1.61		0	discovered 4/03; green, good 4/03
59.00	2												discovered 3/17/93; COD - grubs, dead 8/18/93

Ancistrocactus tobuschii Data for
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PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
60.00	2	7.92	344	1.40	0	0	1.50	0	0	1.80	1	1	1.90	0	1 disp	2.80	1	1A	3.10	1	1	2.93	1+1fr	3	3.52
60.10	2	7.83	346													0.80		0	1.30	0	0	1.39	0	0	1.43
60.11	2	7.97	345																						
60.20	2	9.15	344																			1.80			2.21
60.30	2	10.91	340																			1.52			2.04
60.40	2	10.95	337																			1.08			2.05
60.41	2	10.96	337																			1.28			2.10
60.42	2	10.95	337																						
60.50	2	11.09	337																			1.14			1.58
60.51	2	11.10	337																			1.05			1.43
60.52	2	11.09	337																						0.77
60.600	2	11.07	337																			0.73			1.30
60.601	2	11.10	337																			0.75			0.91

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
60.00	2	1	2	2.59	1	1A	2.41	2	2A	3.26	2	1+1A	discovered 3/17/93; tag loose, retagged 2/99; green, good 4/99; maroonish, OK 2 & 4/00; tag mia, replaced, plant hunkered, green, OK 2/01; popping out, green, good 4/01; hunkered, green, good 2/02; green, good 4/02; dark olive, good tag mia, retagged 2/03; green, OK 4/03
60.10	2	0	0	2.02	0	0	2.84	2	1+1A	dead			discovered 5/97; measured in one direction only 2/98; tag loose, replaced 2/99; green, good 4/99; hunkered, green, good 2 & 4/00; tag loose, replaced, yellowish-green, OK 2/01; green, good 4/01; very hunkered, green, good, tag mia, replaced 2/02; green, good 4/02; dead, just spines left, COD unknown 2/03
60.11	2			0.40	0	0	mia				mia	dead	coming up ~1cm down slope from tag 60.10, discovered 2/01; not tagged, green, OK 2 & 4/01; plant and tag mia 2 & 4/02, 2/03; relocated, just spines left, COD unknown 4/03
60.20	2	1fr	1disp	3.21	3	3	2.75	3	2	dead			discovered summer 99; green, good; tagged 9/8/99; reddish green, OK 2/00; green, good 4/00; reddish-green, good 2 & 4/01; maroonish olive, good 2/02; purplish green, OK 4/02; dead, only spines, COD unknown 2/03
60.30	2	1	1	2.73	0	0	1.55	0	0	dead			discovered summer 99; hunkered 9/99; hunkered, green, good 2 & 4/00; popping out, dull green, OK 2/01; hole eaten in center, scarred over, dull dark green, poor 4/01; very hunkered, green, OK, tag mia, replaced 2/02; green, good 4/02; just spines left, COD unknown 2/03
60.40	2	0	0	2.40	1	1	2.23	1	0	mia			discovered summer 99; left of 60.41; hunkered 9/99; popping out, green, good 2 & 4/00, 2 & 4/01; tag mia, replaced, plant hunkered, green, good 2/02; green, good 4/02; mia 2/03; tag and plant mia 4/03
60.41	2	1fr	1A	2.77	2	0	1.03	0	0	dead			discovered summer 99; right of 60.40, hunkered 9/99; popping out, green, good 2 & 4/00, 2/01; center eaten, scarred over, hard, tan, very poor 4/01; extremely hunkered, pulled 1cm below soil level, OK, tag mia, replaced 2/02; green, good 4/02; dead, just spines left, COD unknown 2/03
60.42	2									0.42	0	0	in root hole of 60.4; discovered 2/03; green, OK 2 & 4/03
60.50	2	0	0	1.88	0	0	1.33	0	0	1.85	2	1A	left of 60.51 & 60.52, discovered summer 99; hunkered 9/99; popping out, green, good 2 & 4/00, 2/01; hunkered, green, OK 4/01; tag mia, replaced, plant very hunkered, green, OK 2/02; green, good 4/02; green, good 2/03; green, OK 4/03
60.51	2	0	0	1.82	0	0	1.29	0	0	1.90	0	0	right of 60.50 & 60.52, discovered 9/99; hunkered 9/99; popping out, green, good 2 & 4/00, 2/01; hunkered, green, OK 4/01; very hunkered, green, OK, tag mia, replaced 2/02; green, good 4/02; green, OK 2 & 4/03
60.52	2	0	0	0.93	0	0	0.83	0	0	0.64	0	0	between 60.50 & 60.51, discovered 2/00; green, OK 2 & 4/00, 2 & 4/01; very hunkered, green, OK, tag mia, replaced 2/02; green, good 4/02; green, OK 2 & 4/03
60.600	2	0	0	1.48	0	0	1.23	0	0	2.11	0	0	right of 60.604 & left of 60.50, discovered 9/99; hunkered 9/99; hunkered, green, good 2 & 4/00; purple-green, hunkered, OK 2/01; green, OK 4/01; tag mia, replaced 2 & 4/01, 2/02; green, hunkered, OK 2/02; green, good 4/02, 2 & 4/03
60.601	2	0	0	1.32	0	0	Dead						behind 60.612; discovered 9/99; measured in one direction only 9/99; hunkered 9/99; hunkered, green, good 2 & 4/00; purplish-green, hunkered, OK 2/01; popping out, green, good 4/01; tag mia, replaced 2 & 4/01; just spines left, dead, COD unknown 2/02

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
60.602	2	11.08	337																			1.26			1.40
60.603	2	11.08	337																			1.38			1.34
60.604	2	11.06	337																			1.10			1.63
60.605	2	11.07	337																			0.83			1.04
60.606	2	11.08	337																			0.53			0.78
60.607	2	11.11	337																			0.91			1.25
60.608	2	11.12	337																			0.65			0.70
60.609	2	11.12	337																			0.62			0.82
60.610	2	11.12	337																			0.37			0.69
60.611	2	11.12	337																			0.86			1.13
60.612	2	11.09	337																						1.01
60.613	2	11.12	337																						0.19

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
60.602	2	0	0	1.64	0	0	0.54	0	0	0.81	0	0	right of 60.603; discovered 9/99; measured in one direction only 9/99; hunkered 9/99; hunkered, green, good 2 & 4/00; purplish-green, OK 2/01; mostly eaten to soil surface, only 2 tubercles left, tan color very poor 4/01; tag mia, replaced 2 & 4/01, 2/02; grayish, hunkered, poor 2/02; olive, good 4/02; olive, OK part of lower stem exposed 2/03; green, OK 4/03
60.603	2	0	0	2.25	0	0	0.92	0	0	1.07	0	0	left of 60.602, discovered 9/99; hunkered 9/99; hunkered, green, good 2 & 4/00; popping out, green, good 2/01; mostly eaten to soil level, only 2 tan colored tubercles left, very poor 4/01; tag mia, replaced 2 & 4/01, 2/02; hunkered, green, OK 2/02; green, good 4/02; olive, OK 2/03; green, good 4/03
60.604	2	0	0	2.11	1	0	0.62	0	0	mia			12 o'clock, left of 60.600 and in front of 60.605, 60.602 & 60.603; discovered 9/99; hunkered 9/99; hunkered, green, good 2 & 4/00; popping out, purplish-green, good 2/01; eaten to soil level, remaining body gold, very poor 4/01; tag mia, replaced 2 & 4/01, 2/02; very hunkered, poor 2/02; hunkered, poor 4/02; plant mia 2 & 4/03
60.605	2	0	0	mia			mia			mia			10 o'clock between 60.604 & 60.606; discovered 9/99; hunkered 9/99; green, good 2 & 4/00; plant and tag mia, replaced tag 2 & 4/01; plant and tag mia 2 & 4/02, 2 & 4/03
60.606	2	0	0	0.78	0	0	0.87	0	0	1.02	0	0	9 o'clock behind 60.605, left of 60.603, discovered 9/99; hunkered 9/99; hunkered, green, good 2 & 4/00; tag mia, replaced 2 & 4/01; popping out, green, good 2 & 4/01, 2/02; hunkered, green, OK 2/02; green, good 4/02; green, OK 2/03; green, good 4/03
60.607	2	0	0	1.77	0	0	mia			mia			behind 60.606 & 60.603, in front of 60.608; discovered 9/99; hunkered 9/99; dull green, hunkered, OK 2 & 4/00, 2/01; tag mia, replaced 2 & 4/01; popping out, green, good 4/01; tag and plant mia 2 & 4/02, 2 & 4/03
60.608	2	0	0	0.96	0	0	0.70	0	0	1.08	0	0	left of 60.609 and right of 60.610; discovered 9/99; hunkered 9/99; green, good 2 & 4/00; reddish-green, OK 2/01; tag mia, replaced 2 & 4/01, 2/02; green, good 4/01; hunkered, OK 2/02; green, good 4/02; green, OK 2/03; green, good 4/03
60.609	2	0	0	1.23	0	0	0.65	0	0	1.16	0	0	right of 60.608 and behind 60.607, discovered 9/99; hunkered 9/99; green, good 2 & 4/00; tag mia, replaced 2 & 4/01, 2/02; green, OK, hunkered 2/01; green, good 4/01; hunkered, green, OK 2/02; green, good 4/02; purplish, OK 2 & 4/03
60.610	2	0	0	0.69	0	0	0.74	0	Dead				left of 60.608, discovered 9/99; measured in one direction only 9/99; hunkered 9/99; behind 60.607 and left of 60.611; hunkered, green, good 2/00; green, good 4/00; tag mia, replaced 2 & 4/01, 2/02; reddish-green, OK, hunkered 2/01; hunkered, green, good 4/01; very hunkered, only spines showing 2/02; body solid, dead, COD unknown 4/02
60.611	2		0	1.37	0	0	1.30	0	0	0.65	0	0	right of 60.610 and behind 60.601, discovered 9/99; hunkered 9/99; green, good, hunkered 2 & 4/00; tag mia, replaced 2 & 4/01, 2/02; olive green, OK 2/01; green, good 4/01; olive, OK 2/02; green, good 4/02; green, OK 2/03; green, good 4/03
60.612	2	0	0	0.92	0	0	mia			mia			behind 60.600, right of 60.602, in front of 60.601, discovered 2/00; green, good 2 & 4/00; tag mia, replaced 2 & 4/01; purplish-green, OK, hunkered 2 & 4/01; tag and plant mia 2 & 4/02, 2 & 4/03
60.613	2	0	0	mia			0.62	0	0	0.88	0	0	discovered 2/00; between and behind 60.610 & 60.608; green, good 4/00; tag mia, replaced 2 & 4/01, 2/02; plant mia 2 & 4/01; relocated, green, OK 2/02; green, OK 4/02 & 2/03; green, good 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
60.70	2	11.09	337																			1.40			1.55
61.00	2	7.87	346	0.60	0	0	nd	nd	0	mia	mia	mia	mia			mia			mia			mia			mia
61.10	2	7.87	346	0.40	0	0	0.50	0	0	0.90	0	0	1.00	0	0	1.40	0	0	1.80	0	0	1.73	0	0	1.72
61.20	2	7.87	346	0.40	0	0	0.40	0	0	0.50	0	0	0.40	0	0	0.70	0	0	1.10	0	0	1.82	0	0	1.97
61.30	2	7.87	346	0.60	0	0	0.60	0	0	1.00	0	0	1.30	0	0	1.60	1	1A	mia			0.88	mia	0	1.00
61.40	2	7.87	346	0.80	0	0	0.70	0	0	mia	mia	mia	0.60	0	0	0.80	0	mia	mia			mia			
61.50	2	7.87	346	0.80	0	0	0.80	0	0	mia	mia	mia	mia		0	1.10	0	0	2.30	1	1A	2.19	1fr	1	2.48
61.60	2	8.19	355							0.80	0	0	1.20	mia	0	mia			mia			mia			
61.70	2	8.05	346													1.10	0	0	1.40	0	0	1.55	0	0	1.66
61.80	2	7.50	344													0.60		0	1.10	0	0	0.71	0	0	Dead
61.90	2	7.95	346													0.60		0	mia			0.89	mia	0	0.80
62.00	2	7.89	346	1.20	0	0	0.90	0	0	0.80	0	0	1.30	0	0	1.80	0	0	2.20	1	1A	2.58	0	0	2.47
62.10	2	7.80	346										1.50	0	0	1.20	0	0	1.80	0	0	1.70	0	0	2.46
62.20	2	7.90	355																			2.12		0	2.09
63.00	2	7.91	348	0.60	0		0.40	0	Dead																
64.00	2	8.27	355	4.60	3	3	4.80	3	2	4.50	5	0	4.70	7	disp.	Dead									
65.00	2	8.18	356	5.90	6	5	5.50	3	0	4.60	4	2	4.30	5	2, disp	Dead									

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
60.70	2	0	0	2.23	1	1	1.98	1	0	2.78	1	1A	discovered 9/99; hunkered 9/99; hunkered, green, good 2 & 4/00, 2 & 4/01, 2/02; tag mia, replaced 2/02; green, good 4/02& 2/03; tag mia, replaced 2/03; hunkered, green, OK 4/03
61.00	2												discovered 3/17/93; not censused 2/94; refound 4/94; plant & tag mia 2 & 5/96, 2 & 5/97, 2 & 4/00
61.10	2	1	1A	2.22	0	0	1.99	1	1	2.53	1	0	discovered 3/18/93; nestled in, measured in one direction only 2/98; nestled in 2/99; green, good 4/99; nestled in, green, good 2 & 4/00, 2 & 4/01; very hunkered, green, OK, tag eaten, replaced 2/02; green, good 4/02; green, good 2/03; hunkered, dark green, good 4/03
61.20	2	1	1A	2.36	0	0	2.73	1	1	dead			discovered 3/18/93; measured in one direction only 2/98; green, good 4/99; dark green, good 2 & 4/00, 2 & 4/01, 2/02; tag eaten; replaced 2/02; green, good 4/02; dead, just spines left, COD unknown 2/03
61.30	2	0	0	0.84	0	0	0.91	0	0	1.15	0	mia	discovered 3/18/93; nestled in 2/96; tag & nail loose 2/98 & 2/99; relocated, green, good, tag & nail loose 4/99; hunkered, green, good 2 & 4/00; tag and nail loose, replaced, plant very hunkered, green, OK 2 & 4/01; very hunkered, green, OK 2/02; green, good 4/02; hunkered, green, OK 2/03; plant mia 4/03
61.40	2												discovered 3/18/93; retagged 2/97; plant & tag mia 5/97, 2/98, 5/98, 2/99 & 4/99
61.50	2	1	1	mia			2.64	2	2	2.32	0	dead	discovered 3/18/93; tag mia 2/96; relocated & retagged 5/96; nestled in 2/98 & 2/99; green, good 4/99; nestled in, green, good 2 & 4/00; tag and nail loose, plant mia 2 & 4/01; relocated, green, good, tag mia, replaced 2/02; green, good 4/02; green, good 2/03; weevil inside, COD weevils 4/03
61.60	2												under rock, mia 2/96; relocated 5/96; tag loose, not at same measurement 2/97
61.70	2	0	0	1.80	0	0	2.28	2	1	dead			between rocks; measured in one direction only 2/98, 2/99, 2/00; green, good 4/99, 2 & 4/00; purplish-green, good 2/01; green, good 4/01; purplish green, good 2/02; green, good 4/02; dead, collected for weevil study, COD weevils 2/03
61.80	2												in rock crack; discovered 5/97; tag mia, retagged 2/99; green, good 4/99; just spines left, COD unknown 2/00
61.90	2	0	0	mia			mia			mia			discovered 5/97; tag & plant mia 2/98 & 5/98; tag back, but plant still mia 2/99; relocated, green, good 4/99; nestled in, green, good 2 & 4/00; tag and plant mia 2 & 4/01, 2 & 4/02, 2 & 4/03
62.00	2	1	1disp	2.41	0	0	mia			mia			discovered 3/17/93; 7 seedlings 3/93; under rock 2/94; 5+ seedlings 2/94; no seedlings 2/96; green, good 4/99, 2 & 4/00; hunkered, green, OK 2 & 4/01; tag and plant mia 2 & 4/02, 2 & 4/03
62.10	2	0	0	2.49	0	0	2.37	0	0	2.27	0	0	loose in soil 2/96; still loose, healthy 2/97 & 5/97, 2 & 4/99; still loose, green, good 2 & 4/00; green, good 2 & 4/01, 2 & 4/02; green, good but loose 2 & 4/03
62.20	2	0	0	2.24	0	0	1.68	0	Dead				discovered in shin oak clump 4/99; green, good 4/99, 2 & 4/00; olive, OK 2 & 4/01; looks dead but firmly rooted 2/02; dead, collected for weevil study, COD unknown 4/02
63.00	2												discovered 3/17/93; sickly appearance 4/93 & 2/94; COD - unknown, dead 4/22/94
64.00	2												discovered 3/17/93; COD unknown, stem hollow, no insects 2/97
65.00	2												discovered 3/17/93; 1 fruit with hole & seeds dispersed 5/96; COD unknown, stem solid

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
65.10	2	6.09	340													1.90		0	2.30	2	1A	2.45	1A	0	3.34
65.20	2	6.13	339													0.60		0	0.90	0	0	0.89	0	0	1.25
66.00	2	6.48	356	1.10	0	0	1.40	0	0	1.80	1	0	2.10	nd	1	3.20	2	nd	3.30	3	3	3.01	2fr	2	4.53
66.10	2	7.80	6																			0.68		0	0.65
66.20	2	7.80	6																			0.49		0	0.56
67.00	2	4.63	356	3.00	1	1	3.10	0	0	2.70	1	0	2.80	nd	disp	3.70	1	1	3.70	1	disp	3.14	2fr	2	4.42
67.10	2	4.43	354													3.00		0	2.90	1	disp	3.11	2fr	2	3.93
68.00	2	4.72	358	1.90	0	0	1.90	0	0	2.00	0	0	2.10	1	1A	2.80	0	0	2.90	1	1A	3.35	0	0	3.49
69.00	2	4.70	358	1.20	0	0	mia		0	1.60	0	0	1.50	0	0	2.20	0	0	2.20	0	0	2.41	0	0	2.13
70.00	2	4.26	0	0.90	0	0	1.10	0	0	1.40	0	0	2.00	0	0	2.20	1	1	2.60	0	0	2.10	0	0	2.39
71.00	2	4.13	358	0.80	0	0	0.90	0	0	0.90	0	0	1.10	0	0	2.10	0	0	2.00	1	1	2.42	0	0	2.82
72.00	2	4.16	0	1.10	0	0	nd	nd	0	1.20	0	0	1.00	0	0	1.70	0	0	1.60	0	0	1.74	0	0	1.25
73.00	2	4.23	2	1.50	0	0	1.70	0	0	1.80	0	0	1.90	0	0	2.40	0	0	2.30	0	0	2.46	0	0	2.28

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
65.10	2	1	1	4.21	2	1+2A	4.14	2	2	4.18	1	0	discovered 5/97; hooded during weevil study in summer 99; green, good 4/99, 2 & 4/00; dark green, good 2/01; maroonish-green, OK 4/01, 2/02; maroonish-green, good 4/02; olive, OK 2/03; purplish, OK 4/03
65.20	2	0	0	1.37	0	0	1.34	0	0	1.26	0	0	discovered 5/97; really hunkered down 2/99; popping out, green, good 4/99, 2/00; hunkering, green 4/00; popping out, dark green, OK 2 & 4/01; hunkered, purple, OK 2/02; green, good 4/02; hunkered, olive, OK 2 & 4/03
66.00	2	2	3	3.88	0	1A	3.91	3	3	4.52	2	2	discovered 3/17/93; maybe stepped on 2/98; hunkered in Selaginella, OK 2/99; green, good 4/99, 2 & 4/00; good 2 & 4/01, 2/02; green, good 4/02; green, good 2/03; getting covered with juniper litter, green, OK 4/03
66.10	2	0	0	dead									discovered 4/99, left of 66.20, at edge of seed ring; OK 4/99; loose, light green, OK, under leaves 2 & 4/00; COD unknown 2/01
66.20	2	0	0	0.40	0	mia	0.54	mia	0	0.51	0	0	discovered 4/99; right of 66.10, at edge of seed ring; OK 4/99; loose, light green, OK, under leaves 2 & 4/00, 2/01; plant mia 4/01, 2/02; olive, OK 4/02; hunkered 2 & 4/03
67.00	2	0	0	5.33	2	1+1A	4.99	4	3+1A	4.70	4	4	discovered 3/17/93; buried in leaves 2/99; popping out, green, good 4/99, 2 & 4/00; tag mia, replaced 4/00; olive green, OK 2/01; green, good 4/01, 2 & 4/02, 2 & 4/03
67.10	2	2	1+1A	4.11	3	1+2A	3.87	2	2	4.50	3	3	discovered 5/97; buried in leaves 2/99; green, good 4/99, 2 & 4/00; reddish-green, OK 2/01; olive and gold, poor 4/01; purplish green, OK 2/02; green with pale maroonish tubercle tips 4/02; green, good 2/03; green with some pale reddish tubercle tips 4/03
68.00	2	0	0	2.93	1	1A	2.90	0	0	3.41	0	0	discovered 3/17/93; tag moved & slightly chewed, replaced 2/97; tag replaced 2/98; almost buried, green, good 4/99, 2 & 4/00; coming out, green, good 2 & 4/01; green, OK 2/02; green, good 4/02; olive, OK 2/03; green, good 4/03
69.00	2	0	0	2.26	0	0	2.32	0	0	2.09	0	0	discovered 3/17/93; plant nor tag seen 8/93, 2/94; found 4/94; buried in leaves 2/97 & 2/98; tag mia, replaced 2/98; plant loose in leaves but rooted 2/99; almost buried, green, OK 4/99; totally buried, very loose, green, good 2/00; coming out, green, good 4/00, 2/01; almost buried in leaves, green, good 4/01; totally buried in leaves, green, OK 2/02; green, good 4/02; purplish, poor, barely rooted 2/03; olive, OK varely rooted 4/03
70.00	2	1	1	2.50	0	0	2.76	1	1A	2.84	0	0	discovered 3/17/93; buried in leaves 2/97 & 2/98; buried in leaves, tag mia, retagged 2/99; good, green 4/99; coming out, good, green 2 & 4/00, 2 & 4/01; almost buried in leaves, green, good 2/02; green, good 4/02; green, OK, very loosely rooted 2/03; pale reddish green, OK 4/03
71.00	2	0	0	3.37	1	1	3.41	1	1	dead			discovered 3/17/93; buried in leaves 2/97 & 2/98; green, good 4/99, 2 & 4/00, 2 & 4/01; almost buried in leaves, green, OK 2/02; green, good 4/02; dead, just spines left; COD unknown 2/03
72.00	2	0	0	1.21	0	0	1.29	0	0	1.59	0	0	discovered 3/17/93; not censused 2/94; refound 4/94; buried in leaves 2/97, 2/98 & 2/99, tag mia, retagged 2/99; totally buried, green, almost spineless 4/99; popping out, green, OK 2 & 4/00, 2 & 4/01; totally buried, green, OK 2/02; green, good 4/02; green, OK 2 & 4/03
73.00	2	0	0	2.40	0	0	2.32	0	0	2.23	0	0	discovered 3/17/93; buried in leaves 2/97, 5/97, 2/98 & 2/99, tag mia, retagged 2/99; green, good 4/99; pale green, OK 2/00; green, good 4/00; getting buried in leaf litter, green, OK 2 & 4/01, 2/02; green, good 4/02; totally buried, green, good 2/03; partly out, green, OK 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
74.00	2	3.81	2	1.20	0	0	1.50	0	0	1.60	0	0	1.80	0	0	2.30	0	0	2.30	0	0	2.59	0	0	2.84
75.00	2	4.20	2	0.90	0																				
76.00	2	3.18	0	2.60	1	1	2.80	1	0	Dead															
76.10	2		?							1.60	0	0	mia			mia			mia						
77.00	2	3.40	6	1.00	0	0	0.90	0	0	0.90	0	0	1.10	0	0	1.50	0	0	1.50	0	0	1.52	0	0	1.76
78.00	2	3.48	10	0.90	0	0	1.10	0	0	1.40	0	0	1.70	0	0	2.10	0	0	2.40	1	1	1.91	0	0	2.43
79.00	2	3.97	30	1.90	0	0	2.40	0	0	2.80	1	1S	2.50	nd	1 disp	3.30	1	1A	2.70	1	1	2.60	1fr	1	3.53
79.01	2	3.90	34																						
79.02	2	4.04	39																						
79.03	2	4.05	39																						
80.00	2	5.10	0	2.40	0	0	2.70	1	1	2.60	2	2	3.50	nd	2	4.00	2	1+1A	4.30	1	1	4.03	0	1	4.07
81.00	2	3.90	34													1.80	0	0	2.60	1	1A	2.90	0	0	3.31
81.10	2	4.33	34																						
82.00	2	1.80	78																						
82.01	2	1.80	78																						
82.02	2	1.77	78																						
82.03	2	1.83	78																						
83.00	2	14.12	91																						
83.10	2	14.33	91																						

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
74.00	2	0	0	2.99	0	0	2.69	0	0	3.31	0	0	discovered 3/17/93; buried in leaves 2/97; buried in leaves & grass 2/98 & 2/99; good 4/99; pale green, OK 2 & 4/00; almost buried in leaves, green, good 2 & 4/01, 2/02; tag mia, replaced 2/02; green, good 4/02; green, good, almost buried 2 & 4/03
75.00	2												discovered 3/17/93; carcass very dessicated, COD - unknown, dead 8/18/93
76.00	2												discovered 3/17/93; Dead 95
76.10	2												pup of 76.00; mia 96, 97 & 98
77.00	2	0	0	2.36	0	0	2.42	0	0	2.10	0	0	discovered 3/17/93; green, good, new spine growth 4/99; green, OK 2 & 4/00; green, good 2 & 4/01, 2 & 4/02; green, OK 2 & 4/03
78.00	2	0	0	3.05	1	1A	3.10	1	1	3.04	0	0	discovered 3/17/93; green, good, new spine growth 4/99; dull green, OK 2/00; green, good 4/00; olive, OK 2/01; green, good 4/01, 2 & 4/02; green, OK 2/03; green, good 4/03
79.00	2	0	0	dead									discovered 3/17/93; tag moved, replaced 5/97; green, good 4/99; yellowish green, OK 2/00; green, good 4/00; COD unknown but not weevils 2/01; three seedlings (79.01-79.03)
79.01	2			0.35	0	0	mia			mia			left of 79.02, seedling of 79.00 (plant 79 removed & replaced with rock), discovered 2/01; not tagged, green, OK 2 & 4/01; plant mia 2 & 4/02; plant and tag mia 2 & 4/03
79.02	2			0.66	0	0	0.68	0	0	0.68	0	0	right of 79.01, seedling of 79.00 (plant 79 removed & replaced with rock), discovered 2/01; not tagged, green, OK 2 & 4/01; olive, OK 2/02; under leaf litter; green, good 4/02; green, OK 2/03; green, good 4/03
79.03	2			0.32	0	0	0.25	0	0	0.30	0	0	behind 79.01 & 79.02, seedling of 79.00 (plant 79 removed & replaced with rock), discovered 2/01; not tagged, green, OK 2 & 4/01; green, OK 2/02; under leaf litter, green, good 4/02; green, OK 2/03; green, good 4/03
80.00	2	1fr	1; Dead										discovered 3/17/93, barely rooted 2/98; uprooted, replanted 2/99; dark green, OK 4/99; very loose, green, good; tag mia, replaced 2/00; up rooted, removed for weevil study; no evidence of weevils, COD unknown 4/00
81.00	2	1	1A	3.92	2A+1	1+2A	3.80	3	3	3.44	1	1	tag moved & chewed, retagged 5/97; good 4/99; green, good 2 & 4/00, 2 & 4/01; green, OK, tag mia, replaced 2/02; green, good 4/02 & 2/03; rock on top, removed 2/03; hunkered, green, OK 4/03
81.10	2						1.58		0	1.35	0	0	discovered 4/02; green, good 4/02; green, OK, totally buried 2/03; hunkered, green, poor 4/03
82.00	2			3.01	4	4	mia			dead			discovered 2/01; olive, OK 2/01; green, good 4/01; plant and tag mia 2 & 4/02; just spines left, COD unknown 2/03
82.01	2									0.46	0	0	seedling of 82.00; discovered 2/03; green, good 2/03; reddish, OK 4/03
82.02	2									0.68	0	0	seedling of 82.00; discovered 4/03; green, good 4/03
82.03	2									0.37	0	0	seedling of 82.00; discovered 4/03; green, OK 4/03
83.00	2			5.30	3	2+1A	Dead						discovered 2/01; olive-green, OK, flowers stepped on 2/01; tag mia replaced, plant green, OK 4/01; dead, collected for weevil study, COD unknown 2/02
83.10	2			1.52		0	1.78	0	0	1.94	0	0	discovered 4/01; green, good 4/01; almost buried by rocks, green, good 2/02; green, good 4/02, 2 & 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Ray's Site

PL #	ST#	DIST	ANGLE	93DM	93FL	93FR	94DM	94FL	94FR	95DM	95FL	95 FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM
84 00	2	2.24	87																						
Data taken and recorded by Ray Emmett 1993-1995																									
Data taken by Gena Janssen and recorded by Jackie Poole 2/21/96, 2/18/98																									
Data taken and recorded by Jackie Poole 5/96, 2/13/97, 5/6/97, 5/5/98, 2/16/99, 4/20/99, 6/99, 9/99, 2/9-10,15-16/00, 4/25-26/00,																									
	2/7-9/01,4/26/01, 5/1/01, 2/5,8-9/02, 4/22-25/02 with Linda Hedges & Randy Rosales, 2/4/03 with Sandy Birnbaum, 4/24-25/03																								
Weevil research conducted by Bill Calvert (WHC).																									

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Ray's Site

PL #	ST#	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
84_00	2			1.98		0	2.16	2	2	dead			discovered 4/01; amongst rocks, green, good 4/01, 2/02; tag mia, replaced 2/02; green, good 4/02; dead, just spines left, COD unknown 2/03
Data taken an													
Data taken by													
Data taken an													
	2/7-9												
Weevil researc													

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Sardine Site

PL #	STK#	DIST	ANGLE	03DM	03FL	03FR	NOTES				
Stake is ~ 50m north of water tank, which is ~50m north of old deer blind, which is along old road, which is ~ 30m north of											
South gate road ~ 0.1 mile west of South gate ; GPS= R042419A; 3275357N 362064E											
1.00		11.13	219	2.93		3	discovered by Randy Rosales; green, OK 4/03				
Data taken and recorded by Jackie Poole 4/24/03											

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Shag Carpet Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 1 is straight up from trough, mid-slope; GPS3 = R020815A																												
1.00	1	24.80	189	3.90	3fr	2+1 disp	3.30	0	1	3.40	2	2	3.27	1+2fr	3	3.55	1	1A	4.32	4	2	3.79	2	2	3.44	0	0	heavily shaded by three awn 2/97; green, good 4/99; goldish-green, OK 2/00; green, good 4/00, 2 & 5/01; dull green, OK 2 & 4/02; olive, OK 2/03; uprooted, replanted, purplish green, OK 4/03
1.10	1	24.80	189	2.80	0	0	2.60	0	0	2.40	0	0	mia			Dead												heavily shaded by three awn 2/97; gone without a trace 2 & 4/99, only spines left, COD unknown 2/00
2.00	1	22.48	194	4.30	0	0	4.40	0	0	Dead																		looks grayish, but still firm 2/97; new spine growth 5/97, weevils tunnels, dead 2/98
2.01	1	22.56	194				1.00	0	0	0.90	0	0	1.31	0	0	Dead											-	no hooked spines, may not be AT 2/97; looks like At 2/98; under rock, green, good 4/99; tag mia, just spines left, COD unknown 2/00
3.00	1	8.78	265	2.60	1fr	1disp	3.10	0	0	2.60	1	1	2.69	1fr	1 disp	2.56	0	0	2.73	0	0	2.54	1	0	dead			tag mia, replaced 2/97; purplish, OK 4/99; spines dull gray, body purple, poor 2/00; new spine growth, orangish, OK 4/00; reddish, OK 2/01; dark green, OK 5/01; hunkered, purplish, OK 2 & 4/02; dead - collected for weevil study, COD weevil hole in root 2/03
3.10	1	8.80	265	1.80	0	0	2.30	0	0	2.00	0	0	2.20	0	0	2.22	1	1A	2.22	0	0	2.38	0	0	2.56	1	1	tag mia, replaced 2/97; green, good 4/99; flowers paritally eaten, plant dark green, OK 2 & 4/00; purplish-green, OK 2/01; hunkered, green, OK 5/01, 2 & 4/04; olive, OK 2 & 4/03
3.20	1	3.90	262				1.30	0	0	1.20	mia	0	1.51	0	0	1.81	0	0	2.01	0	0	2.46	mia	0	mia			no hooked spines, may not be A. tobuschii 2/97; starting to develop hooks 5/97; rock atop, removed 5/98; green, good 4/99; goldish-green, OK 2/00; olive, OK 4/00; green, good 2 & 5/01; plant & tag mia 2/02; green & good 4/02; plant and tag mia 2/03 (check distance and angle if found in spring); plant and tag 4/03
3.30	1	8.91	269				0.60	0	0	0.90	0	0	mia			mia			mia									no hooked spines, may not be A tobuschii 2/97; loose in soil, root exposed 5/97, bad 5/98, plant mia 99, 00, 01

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Shag Carpet Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
3.40	1	8.63	263							1.30	0	0	1.48	0	0	1.46	0	0	1.60	0	0	1.69	0	0	1.81	0	0	measured in one direction only, discovered 2/98; green, good 4/99, 2/00; olive, OK 4/00; under rock, green, OK 2 & 5/01; purplish, OK 2 & 4/02; green, OK 2 & 4/03
3.50	1	8.25	263							2.80	1	1A	2.70	2fr	1 disp	2.78	1	disp?	3.51	3	3A	3.74	4	2+2A	3.54	2	2	stepped on, discovered 2/98; green, good 2 & 4/00, 2 & 5/01, 2 & 4/02; reddish green, OK 2 & 4/03
3.501	1	8.26	262																			1.26		0	1.41	0	0	discovered 4/02; green, good 4/02, 2 & 4/03
3.51	1	8.26	265										1.15		0	1.58	0	0	1.66	0	0	1.63	0	0	1.90	0	0	discovered 4/99; OK 4/99; tag mia, retagged, under rock, green, good 2 & 4/00, 2 & 5/01, 2 & 4/02; green, OK 2 & 4/03
3.60	1	7.33	265							2.00	1	1	2.21	0	0	2.36	1	1	2.82	0	0	2.77	2	2	2.89	1	1	discovered 2/98; green, good 4/99; OK 2/00; green, OK 4/00, 2 & 5/01, 2 & 4/02; olive, OK 2/03; green, good 4/03
3.70	1	7.33	262							1.10	0	0	1.39	0	0	1.83	0	0	1.51	0	0	1.44	0	0	1.46	0	0	measured in one direction only, to the right of 3.80, discovered 2/98; measured in one direction only 2/99, 2/00; green, good 4/99, 2 & 4/00; green, OK 2 & 5/01, 2 & 4/02; purplish, OK 2/03; green, good 4/03
3.80	1	7.33	262							0.80	0	0	0.95	0	0	Dead												measured in one direction only, to the left of 3.70, discovered 2/98; green, good 4/99; just spines left, COD unknown 2/00
3.90	1	8.7	260																			1.78		1	1.73	1	1	discovered 4/02; green, good 4/02; green, OK 2 & 4/03
3.91	1	9.28	261																			2.83		1	2.36	1	1	discovered 4/02; green, OK 4/02 & 2/03; green, good 4/03
4.00	1	24.46	83	3.50	3fr	2+1 disp	3.60	1	1	3.30	3	3 disp	3.18	3	3	3.32	1	disp?	3.21	0	0	dead						dull green, OK 4/99; maroonish, spines dull gray, poor 2/00; orange, poor 4/00; new apical growth; gray a base, purplish-green, OK 2 & 5/01; dead, COD Moniliema, collected 2/02
4.10	1	21.29	77	1.70	1fr	1 disp	2.40	1	1	2.30	1	1	2.13	1+2fr	3	2.38	1	1disp	3.26	3	3	3.29	3	3	dead			reddish, OK 4/99, 2/00; reddish-green, OK 4/00, 2 & 5/01, 2 & 4/02; dead, just spines left, COD unknown 2/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Shag Carpet Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
4.20	1	19.03	~77				2.00	0	0	1.90	1	1	1.54	1fr	1	2.07	0	0	2.33	0	0	1.98	1	0	dead			tag mia, retagged 5/97; olive green, OK 4/99; light reddish-green, loose, poor 2/00; reddish-green, OK 4/00; rock fell on top, removed, green, OK 2 & 5/01; orangish olive, OK 2/02; green, OK 4/02; hard, dry, COD unknown 2/03
5.00	1	5.02	65							4.50	6	5+1A	2.72	2fr	2	3.56	3	3	4.17	3	1	4.29	4	5	4.72	9	4+1A+1 disp	discovered 2/98; green, good 4/99; green, good, flowers partially eaten 2 & 4/00; green, good 2 & 5/01, 2 & 4/02; rock removed from top, green, good 2/03; green, OK 4/03
6.00	1	~42.30	~75																6.45	10	8+2A	6.30	7	4+5A	dead			discovered 2/01; purplish-green, good 2 & 5/01, 2 & 4/02; dead, collected for weevil study, COD unknown 2/03
7.00	1	~22.00	~84																3.14	3	2+1A	2.46	1	1	mia			discovered 2/01; dark olive, OK 2 & 5/01; green, good 2 & 4/02; plant and tag mia 2 & 4/03
7.10	1	21.67	76																						2.30	3	3	discovered 2/03; slightly purplish green, good 2/03; hunkered, green, OK 4/03
7.20	1	21.67	77																						1.33	1	1	to the left of 7.10; discovered 2/03; purplish green, OK 2 & 4/03
7.21	1	21.89	78																						1.49		0	discovered 4/03; green, good 4/03
7.22	1	21.90	77																						1.48		1A	discovered 4/03; reddish olive, OK 4/03
7.23	1	21.93	78																						0.46		0	discovered 4/03; green, OK 4/03
7.30	1	21.80	80																						3.64	2	2	discovered 2/03; green, good 2 & 4/03
7.40	1	21.92	82																						1.63	0	0	discovered 2/03; olive, OK 2 & 4/03
7.50	1	20.87	84																						1.81	2	2A	discovered 2/03; green, good 2 & 4/03
7.51	1	20.84	84																						1.29		0	discovered 4/03; hunkered, green, OK 4/03
7.52	1	20.95	84																						0.94		0	discovered 4/03; hunkered, green, OK 4/03
7.60	1	20.88	84																						1.21	0	0	to the left of 7.50; discovered 2/03; green, good 2 & 4/03
7.70	1	20.88	84																						0.71	0	0	behind 7.50; discovered 2/03; green, good 2 & 4/03
7.80	1	20.68	85																						1.54		0	in rock crack; discovered 4/03; green, good 4/03
8.00	1	~21.96	~84																1.68	0	0	1.47	1 fr	1		mia	dead	discovered 2/01; under rock, green, good 2 & 5/01; 2 & 4/02; plant and tag mia 2/03; just spines left, COD unknown 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Shag Carpet Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
9.00	1	7.72	348																4.12		4A	4.04	4	4	4.49	4	1	discovered 5/01; olive, OK 5/01; olive, good 2 & 4/02; muddy olive, OK 2/03; tag mia, replaced, plant olive with some orangish tubercle tips, OK 4/03
9.01	1	8.01	348																						1.76	0	0	discovered 2/03; purplish green, OK 2/03; tag mia, replaced, plant hunkered, green, OK 4/03
10.00	1	3.80	310																						2.31	1	1	discovered 2/03; purplish green, OK 2/03; ants swarming fruits, plant green, OK 4/03
11.00	1	8.53	336																						1.48		0	discovered 4/03; green, good 4/03
12.00	1	8.65	339																						1.43		0	discovered 4/03; green, good 4/03
13.00	1	7.49	343																						1.04		0	discovered 4/03; green, good 4/03
Stake 2 is at top of hill, in opening beyond junipers and oaks; GPS4 = R020817A																												
5.00	2	9.57	322	3.60	1+5fr	disp	4.10	6	1+2disp	4.00	5	5	4.03	6fr	4	3.28	1+1fr	2disp	4.22	5	3A	4.20	6	6	dead			bad 5/96; green, healthy, 4 flowers partially eaten, tag mia, replaced 2/97; purplish with orange tubercle tips, small ants on fruits 4/99; goldish, poor 2/00; reddish-olive, OK 4/00; reddish-olive, poor 2/01; purplish-green, OK 5/01; 2 & 4/02; dead, COD weevils 2/03
5.01	2	9.58	322																						0.94	0	0	discovered 2/03; green, good 2/03; hunkered, green, OK 4/03
Data taken and recorded by Jackie Poole on 2/13/97 & 5/6/97; 5/5/98; 2/16/99, 4/21/99, 2/15/00, 4/26/00, 2/9/01, 5/2/01, 2/08/02, 4/23/02,																												
2/7/03 with Sandy Birnbaum, 4/24/03																												
Data taken by Gena Janssen and recorded by Jackie Poole on 2/18/98																												
Data entered electronically in the field 2/08/02, 4/23/02																												

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Stuart Cave

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
The **reference point** is a pink-topped rebar, ~50 paces Northwest of the largest pinon, 2.1 mi North ot the lodge on main road																												
	to north gate, or 0.2 mi Northeast of road intersection below Green Cave; GPS9 = R020622B																											
1.00	45	9.63	250										1.22			1.46	0	0	1.87	0	0	2.36	nd	1	2.11	0	dead	measured over Vasey oak; discovered summer 99; green, good 9/99, 2 & 4/00, 2 & 5/01, 2 & 4/02; purplish green, OK 2/03; weevil chambers and exit holes; COD weevils 4/03
1.10	45	9.18	245																1.60	0	0	mia			mia			discovered 2/01; dark reddish-green, OK 2/01; green, good 5/01; one spine cluster in vicinity, plant mia 2 & 4/02, 2 & 4/03
2.00	45	11.88	250										3.08			2.68	1	0	dead									discovered summer 99; measured over Vasey oak, wedged between rocks 9/99; measured in one direction only 9/99, 2/00; olive green with some orange tubercles, OK 9/99, 2 & 4/00; just spines left, COD unknown 2/01
3.00	45	11.54	253										2.38			2.70	1	1A	dead									measured over Vasey oak; discovered summer 99; purplish, OK 9/99, 2 & 4/00; just spines left, COD unknown 2/01
4.00	45	11.57	254										1.22			1.87	0	0	mia	mia	dead							measured over Vasey oak; discovered summer 99; one measurement only 2/00; green, hunkered, OK 9/99, 2 & 4/00; plant mia 2/01; spine clusters and hole in vicinity, COD unknown 5/01
5.00	45	11.61	254										2.74			3.04	0	1	2.66	0	0	dead						measured over Vasey oak; discovered summer 99; one measurement only 9/99, 2/00; dark green, OK under rock 9/99 & 2/00; purplish, OK 4/00; green, OK 2/01; purple, OK 5/01; weevil larvae inside, COD Monoliema, dead 2/02
6.00	45	11.66	254										2.37			3.33	2	1+1disp	3.22	2	0	dead						measured over Vasey oak; discovered summer 99; one measurement only 2/00; green, good, under rock 9/99, 2 & 4/00, 2 & 5/01; weevil exit holes and chambers, COD weevils; dead 2/02
7.00	45	12.12	256										2.59			3.16	2	2disp	dead									measured over Vasey oak; discovered summer 99; green, good, under rock 9/99; dark green, good 2 & 4/00; COD unknown, just spines left 2/01
8.00	45	12.31	258										1.41			1.51	0	0	dead									measured over Vasey oak; discovered summer 99; green, hunkered, OK 9/99; olive, OK 4/00; just spines left, COD unknown 2/01

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Stuart Cave

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
45.10	45	11.85	62	6.30	7 fr	1A, disp	7.30	7	6	6.30	4	4	5.71	1+3fr	3+1A	6.11	4	2+2A	5.11	0	0	5.87	0	1	4.50	6	6	green, good 4/99, 2 & 4/00, 2 & 5/01, 2/02; has formed two new apical meristems, one with fruit, green, OK 4/02; green, good, forming another head 2 & 4/03
45.11	45	12.05	64	0.70	0	0	0.80	0	0	0.90	0	0	1.24	0	0	1.10	0	0	1.31	0	0	1.20	0	0	1.28	0	0	OK 4/99; dull green, OK 2 & 4/00; green, OK 2 & 5/01; buried in juniper litter, green, OK 2/01; buried in juniper litter, olive, OK 4/02; green, good 2/03; hunkered, green, OK 4/03
45.12	45	12.10	63	2.40	1 fr	4	2.90	1	1	3.40	2	2	3.20	0	0	3.35	1	1	3.50	0	0	3.07	0	0	2.89	0	dead	very shaded by juniper 2/99; green, good 4/99, 2 & 4/00, 2 & 5/01; olive, OK 2/02; green with red tubercle tips, OK 4/02; looks dead, still rooted 2/03; dry, solid, hard, COD unknown 4/03
45.13	45	11.97	62	1.00	0	0	1.00	0	0	1.80	0	0	1.45	0	0	1.04	mia	0	1.04	mia	0	1.08	0	0	1.06	0	0	almost buried in juniper litter 2/99; totally buried, green, good 4/99; mia 2/00; totally buried, green, good 4/00; plant and tag mia 2/01; buried in juniper litter, green, OK 5/01; purplish-green, OK 2/02; olive, OK 4/02; covered by leaf litter, purplish, OK 2 & 4/03
45.14	45	11.43	64	2.40	0	0	2.70	0	0	3.50	2	2	3.45	3	3	mia			mia			mia						under rock; green, good 4/99; plant mia 2 & 4/00, 2 & 5/01, 2 & 4/02
45.15	45	12.18	68	1.60	1 fr	1	2.20	2	2	2.40	2	2	2.26	1+1fr	2A	2.69	2	2A	3.19	2	2A	2.85	2	2	2.62	1	1	under prickly pear; tag mia, retagged 2/97; one measurement only 2/00; maroonish, OK 4/99; dull green, OK 2/00; getting covered by litter, green, OK 4/00; very maroonish, poor 2/01; green, OK 5/01; olive, OK 2/02; green with reddish tubercle tips, OK 4/02; green with red tubercle tips, OK 2 & 4/03
45.16	45	~14.00	~59																			3.16	3	2+1A	3.61	3	1+2A	discovered 2/02; green, good 2 & 4/02; green, good 2 & 4/03
45.20	45	~39.05	~140	7.70	7 fr	disp	7.80	10	11	7.50	10	4	Dead															measured through junipers; plant reddish, spines dying 2/98; hollow, probably weevils 2/99
45.21	45	~39.08	~139	1.70	0	1	1.70	1	1	2.00	0	0	Dead															measured through junipers; hollow, probably weevils 2/99
45.24	45	39.90	~136				2.40		3	Dead																		discovered 5/97, just a spine cup, COD unknown 2/98
45.25	45	39.70	~137				1.10		0	1.00	0	0	Dead															discovered 5/97, COD unknown 2/99

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Stuart Cave

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
45.30	45	1.00	206	2.40	1fr	disp	2.80	2	3	3.20	3	3	3.25	1+2fr	2	3.35	1+1A	1A	3.70	2	1+2A	4.15	4	2+1A	3.71	2	2+1A	ants swarming fruits 5/98; green, good 4/99; hooded during weevil study in summer 99; dull green, OK 2 & 4/00, 2 & 5/01; tag loose, replaced, plant maroonish green, good 2/02; olive, good 4/02; green, good 2 & 4/03
45.31	45	0.74	246	1.80	0	0	2.30	3	2	2.50	3	2+1A	3.05	1+2fr	3	3.32	3	2+1A	3.11	1	1	3.26	2	2A	3.25	3	4	tag moved, retagged 2/97; green, good 4/99; hooded during weevil study in summer 99; dull green, OK 2 & 4/00, 2 & 5/01; dark green, good 2 & 4/02; green, good 2 & 4/03
45.40	45	~7.60	~215	8.10	6+ 15 fr	1+1A disp	8.60	14	29	7.60	7	3+1A	Dead															measured through Vasey oaks & persimmons; 3 flowers with petals eaten 2/96; very purplish 2/98; hollowish; weevils? 2/99
45.41	45	7.55	211	1.10	0	0	2.00	0	0	2.20	2	0	2.71	2+1fr	3	3.20	3	0	3.63	2	1+2A	4.04	4+1fr	4+1A	5.26	5	6+2A	measured through Vasey oaks & persimmon; green, good 4/99; accidently stepped on 2/00; purplish, OK 4/00, 2 & 5/01; purplish green, good 2 & 4/02; dark purplish-green, good 2 & 4/03
45.42	45	7.63	223	4.80	2+ 1fr	2	5.40	2	6	5.20	0	0	4.20	0	0	4.36	3	2+1A	3.91	0	0	3.92	0	0	3.80	0	0	measured through Vasey oaks & persimmon; loose on lower side 2/98; almost buried in juniper litter, very shaded 2/99; out of litter, green, good 4/99; hooded during weevil study in summer 99; green, good one flower eaten 2/00; dark green, good 4/00, 2/01; dark purplish-green, OK 5/01; uprooted, but main root still in ground, upper stem green, poor 2/02; poor but new apical growth 4/02; laying on side, barely rooted, purplish-green, OK 2 & 4/03
45.43	45	~8.73	~219				3.50	3	4	Dead																		measured over Vasey oaks & persimmon; COD unknown 2/98
45.44	45	8.92	223				4.90	4	5	4.70	5	2	4.59	4fr	3	4.47	3	1+1A+ 1disp	4.73	4	0	4.94	4	2+2A	4.91	7	4+4A	measured over Vasey oaks & persimmon; under juniper; green, good though shaded 4/99; hooded during weevil study in summer 99; purplish-green, good, flowers pinkish 2/00; green, good 4/00; purplish-green, OK 2/01; dark green, good 5/01; one flower partially eaten, plant purple, OK 2/02; green, good 4/02; purple, good 2 & 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Stuart Cave

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
45.45	45	9.32	233				1.80	1	0	1.90	2	2A	1.90	1+1fr	3	2.41	2	2A	3.32	5	1+5A	3.73	4	4A	3.30	3	2+2A	measured over Vasey oaks & juniper; green, good 4/99; hooded during weevil study in summer 99; dull green, OK 2 & 4/00; green, good 2 & 5/01, 2 & 4/02; pale reddish-green, OK 2/03; green, OK 4/03
45.46	45	7.45	207							2.50	1	1A	2.70	2	1+1A	2.71	1	1disp	2.51	0	0	2.54	1	1	2.63	1	1	measured over Vasey oaks; green, good 4/99; dark green, good 2 & 4/00, 2 & 5/01; dark olive, OK 2/02; green, good 4/02; green, good 2/03; green, OK 4/03
45.50	45	~7.40	~234	4.40	5+ 4fr	4+3A	5.40	5	6	Dead																		measured over Vasey oaks, death by weevil larvae, larvae killed 2/98
45.51	45	6.92	240	3.00	2+ 1fr	3	3.40	2	3	3.40	2	2	4.10	3	2+1A	3.42	2	2	3.52	1	1A	3.30	4?	2	3.39	2	0	measured over Vasey oaks; tag mia, retagged 2/97; tag loose 2/99; maroonish, OK 4/99; dull gray green, OK 2 & 4/00; green, good 2/01; maroonish, OK 5/01; tag loose, replaced, purplish, OK 2/02; dark green, good 4/02; olive, OK 2/03; dark olive, OK 4/03
45.52	45	7.37	254				1.70		1	1.80	1	0	1.76	1+1fr	1+1A	2.09	1	1A	dead									measured over Vasey oaks; discovered 5/97; one very small bud 2/98; hunkered down 2/99; maroon, OK 4/99; hooded during weevil study in summer 99; purplish-gray 7/26 to 8/9/99, may not be due to hood placement; reddish-purple, OK 2 & 4/00; COD unknown 2/01
Stake 45A is behind a coyotillo between a prickly pear and a small juniper, ~8 meters from road edge; R020622A																												
1.00	45A	4.19	117																2.92		1A	3.47	nd	3	3.48	0	0	discovered 5/01; green, good 5/01, 4/02; purplish-green, OK 2/03; blackish green, squishy, poor 4/03
2.00	45A	4.93	84																			1.15	0	0	1.30	0	0	discovered 2/02; pushing out of crustose lichen and Selaginella, green, OK 2 & 4/02; hunkered, purplish-olive, OK 2/03; hunkered, green, OK 4/03
45.22	45A	4.29	101	1.30	0	0	1.50	1	2	1.70	1	1A	1.56	0	0	2.17	1	1disp	3.24	2	1+1A	dead						measured through junipers; maroonish, OK 4/99; covered with caliche road dust, dull green 2/00; maroonish, OK 4/00; olive, OK 2 & 5/01; weevil chamber and exit hole, COD weevils, dead 2/02

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Stuart Cave

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
45.23	45A	4.19	102	1.60	0	0	2.30	2	2	2.20	0	0	2.43	2+1fr	1+2A	3.65	3	1disp	4.52	3	3+2A	5.32	4	3+5A	5.31	0	dead	measured through junipers 4/99; green, good 4/99, 2/00 (covered with caliche road dust); & 4/00; green, good 2 & 5/01; dark green, good 2 & 4/02; dark green, good 2/03; weevil chambers and exit holes, COD weevils 4/03
45.26	45A	5.10	103				1.20		0	1.20	0	0	1.43	0	0	2.32	1	1disp	2.98	2	1+1A	4.26	3	3+1A	4.05	0	0	discovered 5/97; buried in dirt 2/98; hunkered down in gravel 2/99; green, good, popping out 4/99, 2/00 (covered with caliche road dust); green, good 4/00, 2/01; olive, OK 5/01; green, good 2 & 4/02; green, OK 2/03; green, good 4/03
Data taken and recorded by Jackie Poole 3/3/96, 5/8/96, 2/12/97, 5/5/98, 2/15/99, 4/23/99, 9/15/99,																												
	2/8/00 with Craig Scofield & Bill Calvert, 4/28/00, 2/7,9/01, 5/01/01, 2/6/02, 4/24/02, 2/5/03 with Sandy Birnbaum,																											
	4/22/2003																											
Data taken by Gena Janssen and recorded by Jackie Poole 2/18/98																												
Data taken by Dave Stuart and recorded by Jackie Poole 5/5/97																												

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Tank Hill Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Tank Hill site is ~0.1-0.2 miles Southwest of water tank on top of hill, 1.0 miles Southwest of lodge on main road to residence																												
Stake 44A is 131 degrees to the tank on the hill, North end of road; GPS5 = R020616A																												
1.00	44A	62.88	257										3.13	1+1fr	1+disp	mia			mia			mia						plant gone without a trace 2 & 4/00; 2 & 4/01, 2 & 4/02
44.00	44A	47.77	78	2.60	2 fr	2A	2.50	3	2	2.40	1	1	2.70	1	2	2.61	1	disp?	3.02	3	3A	2.78	3	3A	3.10	3	4	yellowish, bad 5/97; dark green, pulled into Selaginella 2/98, 4/99; hunkered, maroonish, OK 4/00; olive, OK 2 & 4/01, 2 & 4/02, 2 & 4/03
44.10	44A	48.54	78	3.00	2 fr	2A	4.00	3	4	4.20	3	3	4.56	4fr	4	4.70	2	2	5.77	4	2+2A	5.94	5	4+1A	5.96	7	6+3A	fruits turning red 5/97; green & good 2/98; OK 4/99; some reddish tubercle tips, OK 4/00; green, good 2 & 4/01, 2 & 4/02, 2 & 4/03
44.11	44A	47.76	78	6.00	0	mia	mia			mia			mia															check tag, may be marked 44.10, if so change to 44.11, tag mia also 2/97, 2/98, 5/98, 2/99 & 4/99
44.20	44A	23.19	80	4.80	4 fr	1A, rest disp	Dead																					COD unknown, only scattered spines left 2/97
44.30	44A	59.64	248	2.50	2 fr	Dead																						Plant gone, root & a few spines left; tag removed
44.40	44A	57.17	248	3.40	2 fr	Dead																						Plant gone, root & a few spines left; tag removed
44.80	44A	60.39	250	2.40		disp	3.10	2	2	3.10	1	1	mia			Dead												orangish 5/98; tag & plant missing 2/99, 4/99; tag still mia, COD unknown 2/00
44.81	44A	~60.51	250													0.52	0	0	0.68	0	0	0.65	0	0	0.67	0	0	seedling of 44.80, on left of 44.82, discovered 2/00; green, good 2/00; reddish, hunkered, OK 4/00, 2/01; green, OK 4/01; very hunkered, almost buried, green, OK 2 & 4/02; hunkered, green, OK 2 & 4/03
44.82	44A	~60.51	250													0.53		0	0.62	0	0	0.65	0	0	0.92	0	dead	seedling of 44.80, on right of 44.81, discovered 4/00; hunkered, green, OK 2 & 4/01; very hunkered, almost buried, purplish green, OK 2/02, & 4/02; reddish, OK 2/03; hollow, but no sign of weevils, COD unknown 4/03
44.83	44A	~60.53	250													0.49		0	0.58	0	0	mia			0.43	0	mia	seedling of 44.80, discovered 4/00; hunkered, green, OK 2 & 4/01; plant mia 2 & 4/02; purplish, OK 2/03; plant mia 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Tank Hill Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
44.84	44A	~60.59	250																nd		0	0.61	0	0	mia			discovered 4/01; hunkered, green, OK 4/01; hunkered, olive, OK 2 & 4/02; plant mia, tag present 2 & 4/03
44.85	44A	~60.60	250																nd		0	mia			0.79	0	0	discovered 4/01; green, OK 4/01; plant mia 2 & 4/02; green, OK 2 & 4/03
Stake 44B is South of road, below hill, 85 degrees to tank; GPS6 = R020617A																												
1.00	44B	27.70	190													3.49		21+1disp	4.08	3	3A	dead						discovered 2/00; olive-green, good 2 & 4/00, 2/01; hunkered, green, OK 4/01; dead, old weevil galleries, COD weevils 2/02
2.00	44B	18.63	247																1.88		0	2.35	2	1+1A	2.99	2	3	discovered 4/01; green, good 4/01; purplish olive, OK 2 & 4/02; green, good 2 & 4/03
3.00	44B	18.70	247																1.55		0	0.85	0	dead				discovered 4/01; olive, OK 4/01; very hunkered, maybe dead, tag loose, replaced 2/02, dead, COD unknown, collected for weevil study 4/02
4.00	44B	18.77	247																1.45		0	1.66	0	0	2.40	1	1	discovered 4/01; green, good 4/01; olive, OK 2/02; green, good 4/02, 2 & 4/03
5.00	44B	18.99	247																1.73		0	1.64	0	0	2.18	1	1	discovered 4/01; maroonish-green, OK 4/01, 2 & 4/02; green, good 2/03; hunkered, OK 4/03
5.10	44B	18.13	242																			0.78		0	0.79	0	0	discovered 4/02; green, OK 4/02; olive, OK 2 & 4/03
44.50	44B	25.75	206	5.70	2	1 disp	6.30	6	9	5.60	6	6	5.17	3+2fr	5	4.29	0	0	dead									piss ants swarming fruits, plant yellowish 5/97; green again 2/98; dull green-maroon, OK 4/99; maroonish, OK-poor 2/00; orangish, poor 4/00; COD weevil (one chamber) 2/01
44.60	44B	25.62	206	2.20	2 fr	disp	2.70	3	1	2.90	3	2A	2.17	1fr	disp	2.71	1	1A	2.96	0	0	2.77	2	1+2A	3.25	3	2+1A	fruit chewed on 5/97; hunkered down 4/99; pale green, a few orange tubercles, OK 2 & 4/00, 2 & 4/01; hunkered, green, good 2/02; green, good 4/02, 2/03; hunkered, green, OK 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Tank Hill Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
44.70	44B	26.37	25	3.40	1+2 fr	disp	3.60	3	1+2A	4.00	4	2+2A	3.73	5	4+1A	4.48	3	3	4.80	4	4A	3.94	4	2+2A	3.80	0	0	green, good 4/99; slightly green, maroonish, good 2/00; good 4/00; green, good 2 & 4/01; spines gray, plant green, OK 2/02; green, good 4/02; covered with litter, green, OK 2/03; grayish, poor 4/03
44.80	44B	20.00	247													1.91	1	mia	2.47	0	0	2.32	1	1	3.17	2	3	green, good 2/00; plant and tag mia 4/00; green, good 2 & 4/01, 2 & 4/02, 2 & 4/03
44.90	44B	16.06	232													3.39	2	2A	dead									green, good 2/00; orange-green, OK 4/00; weevil larvae inside, dead 2/01

)ata taken and recorded by Jackie Poole 2/12/97, 5/5/97; 5/5/98, 2/99 with Dave Stuart, 4/21/99, 2/9/00, 4/26/00, 2/19/01, 4/25/01,
2/06/02, 4/24/02, 2/6/03 with Sandy Birnbaum, 4/23/03
)ata taken by Gena Janssen & recorded by Jackie Poole 2/18/98
)ata entered electronically in the field 2/06/02, 4/24/02

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.2 mi North & East of lodge along main road to North gate, go up drainage to fenceline																												
Stake 46 is the 147th large fencepost east from the large west fencepost in creek; GPS = R020722A																												
1.00	46	17.83	198										4.33	2+3fr	4+1A	5.71	2	3	6.25	7	8	5.74	4	5	5.04	2	3	grayish-green, OK 4/99; grayish-greer good 2/00; olive, OK 4/00; dark maroonish-green, OK 2/01; green, good 4/01; purplish olive, OK 2/02; orangish-purplish-green 4/02; green with reddish tubercle tips, OK 2 & 4/03
1.01	46	17.86	198																1.26		0	1.82	1	0	1.69	0	mia	discovered 4/01; green, good 4/01, 2 & 4/02, 2/03; plant and tag mia 4/03
1.10	46	17.75	198																2.28	1	dead							discovered 2/01; hunkered, green; good 2/01; dead, COD unknown 5/01
2.00	46	10.60	199										3.95	5	1	5.01	4	2+2A	7.26	7	5+3A	7.04	8	5+1A	6.93	9	9	maroonish, OK 4/99; orangish-maroonish-green, OK 2 & 4/00; orangish-maroonish-green, good 2 & 4/01; reddish green, good 2 & 4/02, 2 & 4/03
2.01	46	10.69	199																0.95	0	0	0.47	0	0	0.37	0	0	not at base of 2.00, discovered 2/01; green, OK 2/01; green, good 4/01; hunkered, green, OK 2/02; green, goo 4/02; green, OK 2/03; green, good 4/0
2.02	46	10.68	199																0.55	0	0	0.62	0	0	0.47	mia	0	base of 2.00, left of 2.03 & 2.04, discovered 2/01; hunkered, green, OK 2 & 4/01, 2/02; green, OK 4/02; plant mia 2/03; green, OK 4/03
2.03	46	10.68	199																1.60	0	0	1.95	0	0	2.04	0	0	base of 2.00, between 2.02 & 2.04; green, good 2 & 4/01, 2 & 4/02, 2 & 4/03
2.04	46	10.67	199																1.14	0	0	1.02	0	0	1.32	0	0	base of 2.00, right of 2.02 & 2.03; green, good 2 & 4/01; hunkered, gree good 2 & 4/02, 2 & 4/03
2.05	46	10.62	199																0.59		0	0.58	mia	0	0.46	0	0	at 2 o'clock on 2.00, discovered 4/01; green, good 4/01; plant mia 2/02; green, good 4/02, 2 & 4/03
2.06	46	10.67	199																0.38		0	0.44	0	0	0.34	0	0	at 7 o'clock on 2.00, discovered 4/01; green, OK 4/01; hunkered, green, OK 2/02; green, OK 4/02; one measurement only, green OK 2 & 4/0

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.07	46	10.67	199																0.17		0	0.53	0	0	0.37	0	0	at 7:30 o'clock on 2.00, discovered 4/01; green, OK 4/01; hunkered, green, OK 2/02; green, good 4/02; one measurement only, green, OK 2 & 4/03
2.08	46	10.66	199																0.23		0	0.30	0	0	0.55	mia	0	at 8 o'clock on 2.00, discovered 4/01; green, OK 4/01; hunkered, green, OK 2/02; green, good 4/02; plant mia 2/03; one measurement only, green, good 4/03
2.09	46	10.65	199																0.16		0	0.36	0	0	0.48	0	0	at 8:30 o'clock on 2.00, discovered 4/01; green, OK 4/01; hunkered, green, OK 2/02; green, good 4/02; one measurement only, green, OK 2 & 4/03
2.10	46	10.64	199																0.23		0	0.33	0	0	0.52	0	0	at 8:45 o'clock on 2.00, discovered 4/01; green, OK 4/01; hunkered, green, OK 2/02; green, good 4/02; one measurement only, green, OK 2 & 4/03
2.11	46	10.63	199																0.33		0	0.52	0	0	0.46	0	0	at 9 o'clock on 2.00, discovered 4/01; green, OK 4/01; hunkered, green, OK 2/02; green, good 4/02; one measurement only, green, OK 2/03
2.12	46	10.64	200																0.62		0	0.92	0	0	0.83	0	0	discovered 4/01; olive, OK 4/01hunkered, green, good 2/02; green, good 4/02; green, OK, hunkered 2 & 4/03
2.13	46	11.50	199																3.80	3	1+1A	3.63	4	2A	4.88	5	3A	discovered 2/01; originally tagged as 2.10, green with a few red tubercle tips, OK 2/01; dark green, OK 4/01; purplish green, OK 2 & 4/02; dark green, good 2 & 4/03
2.14	46	10.67	199																			0.37		0	0.55	mia	0	between 2.07 & 2.08, discovered 4/02; green, OK 4/02 ; plant and tag mia 2/03; one measurement only, green, good 4/03
2.15	46	10.65	199																			0.40		0	0.47	mia	0	between 2.09 & 2.10, discovered 4/02; green, OK 4/02 ; plant and tag mia 2/03; one measurement only, green, good 4/03
2.16	46	10.99	199																			0.65		0	1.28	0	0	discovered 4/02; green, OK 4/02; green, good 2 & 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
3.00	46	52.09	271										5.05	3+3fr	3+2A	Dead												very reddish 2/99; very reddish, OK 4/99; most spines gray, some new growth, no flowers, removed 2/00; dead, COD unknown 2/00
4.00	46	16.13	197										3.46		2A	4.12	2	2	5.56	5	3+2A	5.93	4+2fr	5+2A	5.73	8	5+1A	reddish, OK, discovered 4/99; hooded during weevil study in summer 99; green, good, spines growing into shroud 9/99; olive green, good 2/00; rock on top, green, good 4/00; olive, OK 2/01; dark green, good 4/01; green with a few orange tubercle tips, good 2/02; green, good 4/02 & 2/03; olive, OK 4/03
4.10	46	17.26	197																5.76	3	2+1A	dead						in grass clump, discovered 2/01; green, good 2 & 4/01; dead, COD fly? collected for weevil study 2/02
4.20	46	17.52	197																			2.01	0	0	2.34	2	2+1A	discovered 2/02; blue green, OK 2/02 green, good 4/02, 2 & 4/03
5.00	46	~17.20	198										1.57		0	1.83	0	0	2.31	0	0	1.95	0	0	2.08	1	1	discovered 4/99; injured, new head of side, OK 4/99; green, good 2 & 4/00, & 4/01; hunkered, green, OK 2/02; green, good 4/02, 2 & 4/03
6.00	46	~17.24	198										3.04		0	3.59	0	0	4.17	3	2	3.55	3	4A	3.88	4	4	discovered 4/99; hunkered, green, OK 4/99; green, good 2 & 4/00, 2 & 4/01; maroonish-orange green, OK 2/02; reddish green, good 4/02; olive, good 2/03; reddish-olive, OK 4/03
6.10	46	~17.26	~195																			2.00	0	0	2.31	2	1+1A	left of 6.20, discovered 2/02; green, good 2 & 4/02; green, good 2 & 4/03
6.20	46	~17.25	~195																			1.17	0	0	mia			right of 6.10, discovered 2/02; green, good, 2/02; green, OK 4/02; plant mia 2 & 4/03
7.00	46	~17.42	198										3.09		1A	2.98	2	1	3.37	2	1A	3.92	2	2A	3.80	3	2A	discovered 4/99; green, good 4/99; hooded during weevil survey in summer 99; green, a little shrunken, OK 9/99; green, good 2 & 4/00, 2/01; dark green, hunkered, OK 4/01; dark green, good 2/02; dark green, hunkered, OK 4/02; green, good 2 & 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
8.00	46	~17.54	198										2.81		0	3.04	1	2	3.40	3	2+1A	3.46	1	1+1A	3.48	1	1	discovered 4/99; green, good 4/99, 2 & 4/00; maroonish, OK 2/01; green, good 4/01, 2/02; purplish-green, OK 4/02; purplish-green, good 2 & 4/03
9.00	46	~17.56	198										0.87		0	0.91	0	0	0.99	0	0	1.08	0	0	1.07	0	0	discovered 4/99; green, good 4/99, 2 & 4/00, 2 & 4/01, 2 & 4/02, 2 & 4/03
10.00	46	~15.76	199										1.46		0	1.63	0	0	2.16	0	0	mia			mia			discovered 4/99; green, good 4/99, 2 & 4/00, 2 & 4/01; tag uprooted, replaced, plant mia 2 & 4/02; plant and tag mia 2 & 4/03
11.00	46	~15.78	199										1.36		0	1.93	0	0	2.60	1	1	dead						discovered 4/99; left side of cluster 11-12; green, good 4/99, 2 & 4/00, 2 & 4/01; dead, COD unknown, collected for weevil study 2/02
12.00	46	~15.78	199										1.53		0	2.07	1	1A	2.54	1	1	1.34	0	dead				discovered 4/99; right side of cluster 11-12; one measurement only 2/00; green, good 4/99, 2 & 4/00, 2 & 4/01; maybe dead 2/02; dead, COD weevils, collected for weevil study 4/02
12.10	46	~15.8	199																1.48		0	1.67	0	0	2.11	0	0	discovered 4/01; green, good 4/01; hunkered, green, good 2/02; green, OK 4/02; green, good 2 & 4/03
13.00	46	~16.56	198										0.88		0	1.07	0	0	1.32	0	0	1.17	0	0	0.90	0	0	discovered 4/99; top left side of cluster 13-17; green, good 4/99, 2/00; green, OK 4/00, 2 & 4/01; hunkered, green, OK 2/02, green, OK 4/02, 2 & 4/03
14.00	46	~16.55	198										1.45		0	1.46	0	0	2.09	0	0	1.74	0	0	1.71	0	0	top middle of cluster 13-17; discovered 4/99; green, good 4/99; olive green, good 2 & 4/00, 2 & 4/01; olive, OK 2 & 4/02; reddish-green, OK 2/03; olive, OK 4/03
15.00	46	~16.56	198										0.79		0	0.77	0	0	0.90	0	0	0.80	0	0	0.65	0	0	top right of cluster 13-17, discovered 4/99; green, good 4/99, 2/00; hunkered, OK 4/00, 2 & 4/01; hunkered, green, OK 2/02; green, good 4/02; green, OK 2/03; hunkered, green, OK 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
16.00	46	~16.57	198										0.68		0	0.91	0	0	0.94	0	0	0.82	0	0	0.62	0	0	behind 14.00, discovered 4/99; green, good 4/99; olive green, good 2 & 4/00 green, OK 2 & 4/01; hunkered, green, OK 2 & 4/02; green, OK 2/03; maroonish, OK 4/03
17.00	46	~16.58	198										0.64		0	0.77	0	0	0.73	0	0	0.65	0	0	mia			behind & right of 16.00, discovered 4/99; green, good 4/99; olive green, good 2 & 4/00; hunkered, green, OK 2 & 4/01, 2/02; green, OK 4/02; tag present, plant mia 2 & 4/03
18.00	46	17.59	199										1.61		0	1.81	1	1A	2.85	3	3	2.75	1	1	2.80	2	1+1A	discovered 4/99; green, good, hunkered 4/99, 2 & 4/00, 2/01; poppin out, green, good 4/01; hunkered, green, good 2/02; green, good 4/02, 2 & 4/03
18.01	46	~17.64	199																0.66	0	0	0.87	0	0	1.06	0	mia	discovered 2/01; coming out at top of tag, green, OK 2 & 4/01; hunkered, olive, OK 2/02; green, good 4/02, 2/03 plant mia 4/03
18.02	46	~17.65	199																0.33		0	0.31	mia	0	1.23	mia	0	discovered 4/01; coming up at lower right edge of tag, OK 4/01; plant mia 2/02; green, OK 4/02; plant mia 2/03; hunkered in spike moss, green, good 4/03
19.00	46	17.62	199										0.91		0	0.69	0	0	1.11	0	0	0.96	0	0	1.26	0	0	behind 18.00 & left of 20.00, discovered 4/99; green, good, hunkered 4/99, 2 & 4/00, 2 & 4/01; hunkered, green, OK 2/02; green, goc 4/02, 2 & 4/03
20.00	46	17.59	199										0.64		0	0.58	0	0	0.99	0	0	0.82	0	0	0.87	0	0	right of 19.00, discovered 4/99; green, good 4/99, 4/00, 2 & 4/01; very hunkered, olive, OK 2/02; green, gooc 4/02, 2 & 4/03
20.10	46	17.61	199													0.88	0	0	1.37	0	0	1.37	0	0	1.54	0	0	between 18.00 & 21.00; green, hunkered, good 2/00; hunkered, OK 4/00; hunkered, green, good 2 & 4/01 very hunkered, OK 2/02; green, good 4/02, 2 & 4/03
21.00	46	~17.57	199										1.40		0	1.73	0	0	2.33	0	0	2.54	2	2	dead			under Texas kidneywood, discovered 4/99; green, good 4/99, 4/00, 2 & 4/01 purplish green, OK 2/02; green, good 4/02; just spines left, COD unknown 2/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
22.00	46	~18.39	200										2.57		2A	2.80	0	0	4.03	4	3+2A	4.68	4	4	4.77	8	4+1A	discovered 4/99; dull green, OK 4/99; maroonish, OK 2/00; green with some orange tubercles, OK 4/00; slightly maroonish-green, OK 2/01; bluish-green, good 4/01; dark olive, good 2/02; green, good 4/02, 2 & 4/03
22.10	46	18.64	200																						1.90	1	0	discovered 2/03; green, good 2 & 4/03
23.00	46	~18.79	200										4.12		1A	4.64	2	1+1A	5.64	6	8+1A	5.16	6	7	5.18	7	6	discovered 4/99; slightly reddish, OK 4/99; hooded during weevil study in summer 99; green with spine growth & some orange tubercles, OK 9/99; green with spine growth & some orange tubercles, good 2/00; maroonish, OK 4/00, 2 & 4/01, 2 & 4/02; green, good 2 & 4/03
23.01	46	18.88	200																0.42		0	0.81	0	0	0.50	0	0	at 4 o'clock position on 23.00, discovered 4/01; one measurement only, green, good 4/01; green, OK 2/02; reddish green, OK 4/02; green, good 4/02; purplish, poor 2 & 4/03
23.02	46	18.89	200																0.46		0	0.88	0	0	0.78	0	0	at 4:30 o'clock position on 23.00, discovered 4/01; one measurement only, green, good 4/01; one measurement only, green, OK 2 & 4/02; purplish, OK 2/03; green, OK 4/03
23.03	46	18.89	200																0.38		0	0.52	0	0	0.71	0	0	at 5 o'clock position on 23.00, discovered 4/01; one measurement only, green, OK 4/01; green, OK 2 & 4/02, 2 & 4/03
23.04	46	18.90	200																0.45		0	0.72	0	0	0.71	0	0	at 6 o'clock position on 23.00, discovered 4/01; one measurement only, green, good 4/01; green, OK 2 & 4/02, 2 & 4/03
23.10	46	19.07	200																1.15		0	1.08	0	0	dead			discovered 4/01; loose, green, OK 4/01; brownish, loose, OK 2/02; green, OK 4/02; hard, dry, COD unknown 2/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
24.00	46	~17.44	~204										2.71		1A+disp	3.13	1	1	3.71	3	3A	4.33	5	3+2A	4.30	4	5	dull green, OK, discovered 4/99; hooded during weevil study in summer 99; green, good, shroud totally off 9/99 2/00; ants swarming fruit, green, good 4/00; slightly maroonish-green, good 2/01; green, good 4/01, 2 & 4/02; green, good 2 & 4/03
24.10	46	~17.48	~204																0.99		0	1.39	0	0	1.18	0	0	discovered 5/01; green, good 5/01, 2 & 4/02; green, OK 2 & 4/03
24.20	46	~17.49	~210																0.51		0	dead						discovered 5/01; green, OK 5/01; dead, dry, corky, COD unknown 2/02
25.00	46	9.06	193										1.11		0	1.65	0	0	2.47	0	0	2.12	1	1	1.99	0	0	discovered 4/99; green, good, under rock 4/99, 2 & 4/00, 2 & 4/01, 2 & 4/02 2 & 4/03
26.00	46	12.38	186										2.17			2.73	1	1	3.91	4	4	3.69	3	5	3.30	2	3	discovered summer 99; green, good 9/99, 2 & 4/00; ants in flowers, plant green, good 2/01; green, good 4/01, 2 & 4/02; green with orangish tubercle tips, OK 2/03; green, good 4/03
26.10	46	13.13	180																						2.56		1	discovered 4/03; green, OK 4/03
27.00	46	12.43	188										4.10			4.72	3	3+1A	6.63	10	9+3A	6.74	7	3+9A	6.74	13	7+9A	discovered summer 99; green, good 9/99, 2 & 4/00, 2 & 4/01; olive with orangish tubercle tips, good 2/02; green, good 4/02, 2 & 4/03
27.01	46	12.47	188										0.87			1.31	0	0	2.31	0	0	2.84	4	4	3.69	5	5	discovered 9/99; green, good, hunkered, not tagged 9/99, 2 & 4/00; green, good 2 & 4/01, 2 & 4/02, 2 & 4/03
28.00	46	12.57	195										4.07			4.91	4	5	6.87	8	3+4A	6.31	8+1fr	7+2A	6.62	8	10	discovered summer 99; green, good 9/99, 2 & 4/00, 2 & 4/01; dark olive with some orangish tubercle tips, good 2/02; reddish green, good 4/02; green, reddish tubercle tips good 2 & 4/03
29.00	46	12.39	198										1.75			2.56	0	0	4.05	4	2+2A	4.14	5	3+2A	4.86	5	5	discovered summer 99; green, good 9/99, 2 & 4/00, 2 & 4/01, 2 & 4/02, 2 & 4/03
29.01	46	12.43	198										0.91			1.26	0	0	2.20	0	0	2.14	2	2	2.25	2	2	discovered 9/99; green, hunkered, good 9/99; 2 & 4/00; hunkered, reddish, OK 2/01; green, good 4/01; hunkered, green, good 2 & 4/02; green good 2 & 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
29.02	46	12.58	198																			0.71		0	0.89	0	0	discovered 4/02; green, good 4/02; green, good, partially buried by debris 2 & 4/03
29.10	46	12.42	200																			1.30		0	1.80	0	0	discovered 4/02; green, good 4/02, 2 & 4/03
29.20	46	12.39	202																						1.63	0	0	discovered 2/03; green, good 2 & 4/03
30.00	46	16.82	201										1.11			0.79	0	0	0.77	0	0	0.96	0	0	0.95	0	0	discovered summer 99; orange, OK, hunkered, squishy 9/99; reddish, hunkered, Ok 2/00; hunkered, green, OK 4/00, 2 & 4/01; almost buried, olive, OK 2/02; green, OK 4/02; green, good 2 & 4/03
30.10	46	16.79	199																0.94		0	0.84	0	0	0.82	0	0	discovered 4/01; hunkered, green, good 4/01; hunkered, green, OK 2/02; green, OK 4/02; green, OK 2 & 4/03
31.00	46	16.85	200										0.68			1.03	0	0	1.54	0	0	1.79	1	1	1.78	0	0	discovered summer 99; dark green, OK, hunkered 9/99; olive green, hunkered, OK 2 & 4/00, 2 & 4/01; hunkered, purple, OK 2/02; green, OK 4/02; green, good 2 & 4/03
32.00	46	16.90	197										0.96			1.18	0	0	2.19	1	0	2.46	2	2	2.86	2	1+1A	discovered summer 99; green, good, hunkered, almost buried 9/99; hunkered, green, OK 4/00, 2/01; popped out, green good 4/01; hunkered, purple, good 2/02; green, OK 4/02; green, good 2/03; purplish green, OK 4/03
32.10	46	18.95	198																			1.11		0	mia			discovered 4/02; olive, OK 4/02; plant and tag mia 2 & 4/03
33.00	46	18.89	198										1.55			2.04	0	0	2.50	2	2	2.86	2	2	3.08	2	2	discovered & shrouded 7-9/99; green and good 9/99, 2 & 4/00; maroonish, OK 2/01; maroonish-green, OK 4/01, 2/02; green, good 4/02; purplish green, OK 2/03; purple, OK 4/03
34.00	46	~19.25	199										1.13			1.70	1	0	2.57	2	1	2.55	3	3	dead			discovered & shrouded 7-9/99; shroud loose, green, good, hunkered 9/99; green, good 2 & 4/00; dark green, OK 2/01; green, good 4/01, root gone, just sitting on top of ground, maroonish green, OK but will eventually die, incredibly flowering! 2/02; green, OK, incredibly fruiting 4/02; dead, gone 2/03

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
35.00	46	11.40	~210													4.80	2	2	5.91	5	5	5.68	2	3	5.61	2	3+1A	discovered 2/00; green, good 2 & 4/00 olive, OK 2/01; slightly maroonish green, good 2 & 4/02; dark green, goo 2 & 4/03
35.01	46	11.44	~210																0.67		0	1.49	mia	0	mia			at 6 o'clock on 35.00, discovered 4/01 one measurement only, green, good 4/01; plant mia 2/02; green, good 4/02 plant mia 2 & 4/03
35.02	46	11.44	~210																0.43		0	1.14	mia	0	mia			at 5 o'clock on 35.00, discovered 4/01 one measurement only, hunkered, OK 4/01; plant mia 2/02; green, good 4/02 plant mia 2 & 4/03
35.03	46	11.40	~210																0.62		0	0.59	0	0	0.53	0	0	at 3 o'clock on 35.00, discovered 4/01 one measurement only, green, OK 4/01; one measurement only, hunkered, green, OK 2/02; green, goo 4/02; OK 2/03; green, OK 4/03
35.04	46	11.39	~210																0.54		0	0.38	mia	0	0.56	0	0	at 2 o'clock on 35.00, discovered 4/01 one measurement only, green, OK 4/01; plant mia 2/02; green, OK 4/02, & 4/03
35.05	46	11.38	~210																0.55		0	0.90	0	0	mia			at 1:30 o'clock on 35.00, discovered 4/01; one measurement only, green, OK 4/01; one measurement only, hunkered, green, OK 2/02; green, OK 4/02; plant mia 2 & 4/03
35.06	46	11.37	~210																0.80		0	0.88	0	0	0.92	0	0	at 1 o'clock on 35.00, discovered 4/01 one measurement only, green, good 4/01, 2 & 4/02; green, good 2 & 4/03
35.07	46	11.37	210																0.33		0	0.47	0	0	mia			at 12:30 o'clock on 35.00, discovered 4/01; one measurement only, green, OK 4/01; one measurement only, hunkered, green, OK 2/02; green, goo 4/02; plant mia 2 & 4/03
35.08	46	11.37	210																0.48		0	0.54	0	0	0.52	0	0	at 12 o'clock on 35.00, discovered 4/01; one measurement only, green, OK 4/01; one measurement only, hunkered, green, OK 2/02; green, goo 4/02; green, OK 2/03; green, good 4/0
35.09	46	11.37	210																1.28		0	1.30	0	0	0.69	0	0	at 11:30 o'clock on 35.00, discovered 4/01; green, good 4/01, 2 & 4/02, 2 & 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
35.10	46	11.46	209																1.35		0	1.38	0	0	1.93	0	0	discovered 4/01; green, good 4/01; hunkered, olive, OK 2/02; green, good 4/02, 2 & 4/03
35.11	46	11.37	210																0.42		0	0.60	mia	0	0.61	0	0	at 11 o'clock on 35.00, discovered 4/01; one measurement only, green, OK 4/01; plant mia 2/02; green, good 4/02; green, OK 2 & 4/03
35.12	46	11.39	210																0.91		0	1.04	0	0	0.58	0	0	at 10 o'clock on 35.00, discovered 4/01; one measurement only, green, OK 4/01; hunkered, green, OK 2/02; green, good 4/02 & 2/03; green, OK 4/03
35.13	46	11.37	210																0.89		0	1.12	0	0	1.07	0	0	above 35.11 & left of 35.09; discovered 4/01; green, good 4/01, 2 & 4/02, 2 & 4/03
35.14	46	11.37	210																			0.19		0	0.59	mia	0	between 35.09 & 35.08, discovered 4/02; green, good 4/02; plant mia 2/03; green, good 4/03
35.15	46	11.38	210																			0.57		0	0.36	mia	0	between 35.10 & 35.12, discovered 4/02; green, good 4/02; plant mia 2/03; green, good 4/03
35.2	46	11.57	210																			1.10	0	0	1.78	1	1	discovered 2/02; one measurement only, green, good 2/02; green, good 2 & 4/03
36.00	46	~18.90	~190													2.47		1disp	4.07	5	1+4A	4.54	5	6	4.90	8	7	discovered 4/00; green, good 4/00; tag mia, replaced, plant dark with a few red tubercle tips, good 2 & 4/01; purplish green, good 2/02; green, good 4/02, 2 & 4/03
37.00	46	~12.60	~228																3.50		1A	3.39	2	2	3.46	1	1	discovered 4/01; blue-green, good 4/01; green, good 2 & 4/02; slightly reddish-green, OK 2 & 4/03
38.00	46	12.26	~214																1.12		0	1.15	0	0	1.52	1	1	discovered 4/01; green, good 4/01, 2 & 4/02, 2 & 4/03
39.00	46	12.28	~214																1.67		0	1.78	1	1	1.68	2	2	discovered 4/01; green, good 4/01, 2 & 4/02, 2 & 4/03
39.10	46	12.28	~214																			1.29	0	1	1.45	0	0	discovered 2/02; right of 39.00; green, good 2 & 4/02, 2 & 4/03
40.00	46	12.30	~214																1.05		0	1.35	0	0	1.82	1	1	discovered 4/01; green, good 4/01; green, OK 2/02; green, good 4/02; purplish green, good 2/03; olive, OK 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
41.00	46	12.44	~215																0.79		0	1.00	0	0	1.38	1	1	discovered 4/01; olive, OK 4/01; green OK 2/02; green, good 4/02 & 2/03; roc on top, removed, green, good 4/03
42.00	46	12.49	~216																0.63		0	0.86	0	0	mia			discovered 4/01; hunkered, green, OK 4/01; reddish olive, OK 2/02; purplish, OK 4/02; tag present, plant mia 2 & 4/03
42.10	46	12.49	214																			0.36		0	0.45	0	0	discovered 4/02; olive, OK 4/02 ; maroonish, OK 2/03; olive, OK 4/03
43.00	46	12.53	~214																0.82		0	0.88	0	0	1.13	0	0	on left of 43.00, discovered 4/01; green, OK 4/01; olive, OK 2 & 4/02; purplish, OK 2/03; hunkered, green, OK 4/03
44.00	46	12.54	~214																0.47		0	0.68	0	0	0.96	0	0	on right of 42.00, discovered 4/01; green, OK 4/01; olive, OK 2 & 4/02; green, good 2/03; hunkered, green, O 4/03
45.00	46	12.59	~214																1.20		0	1.58	0	0	1.99	1	1	discovered 4/01; green, good 4/01, 2 4/02 & 2/03; purplish green, good 4/03
46.10	46	28.70	184	2.30	3	1	2.10	0	Dead																			tag uprooted, retagged 2/97; COD unknown 5/97
46.11	46	28.85	184				1.30	0	0	1.50	0	0	1.76	1fr	1A	2.15	1	0	2.48	1	1	2.77	2	1+1A	3.27	3	4	hunkered, green, good 4/99, 2 & 4/00, 2/01; popping out, green, good 4/01, 2 & 4/02; green, good 2 & 4/03
46.20	46	28.70	184	2.00	0	0	1.60	0	Dead																			tag mia, retagged 2/97; COD unknow 5/97
46.30	46	28.70	184	1.10	0	0	Dead																					There was a large dead plant beside 46.1-46.3. This plant was found dead in 2/96 (COD unknown, stem black inside but not hollow). This plant (46.30) was a pup (its root coming off the large plant's root). The pup had a hole in the stem from which a larva was collected 2/97.
46.50	46	28.35	184				2.20	0	0	Dead																		plant maroon 5/97; dead larva inside 2/98
47.00	46	13.20	~218																1.01		0	1.27	0	0	1.47	0	0	discovered 4/01; green, good 4/01, 2 4/02; olive, OK 2/03; green, good 4/03
48.00	46	13.14	~219																0.52		0	0.71	0	0	0.99	0	0	discovered 4/01; hunkered, green, OK 4/01; tag eaten, replaced 2/02; green, good 2 & 4/02; green, OK 2/03; hunkered, green, OK 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Vireo Territory Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
48.10	46	~12.74	~219																						0.74	0	0	discovered 2/03; green, good 2 & 4/03
48.20	46	~12.98	~220																						1.62	0	0	discovered 2/03; green, good 2/03; hunkered, green, OK 4/03
49.00	46	12.49	~213																0.73		0	0.85	0	0	1.35	0	0	discovered 4/01; green, OK 4/01; under rock, olive, OK 2/02; green, good 4/02, 2 & 4/03
50.00	46	16.98	~204																0.80		0	1.16	0	0	1.22	0	0	discovered 4/01; olive, OK 4/01; green, OK 2 & 4/02; green, good 2/03; removed rock on top, green, good 4/03
51.00	46	17.20	204																						1.04		0	discovered 4/03; hunkered in spike moss, green, good 4/03
52.00	46	17.52	204																						1.26		0	discovered 4/03; green, good 4/03
53.00	46	17.57	204																						1.35		0	discovered 4/03; green, good 4/03
54.00	46	15.75	204																						1.29		0	discovered 4/03; hunkered, green, OK 4/03
Stake 46A is the 3rd rusty T-post east from the large fencepost in the creek; GPS 12 = R020920A																												
46.40	46A	26.65	193	2.40	1 fr	1	2.90	2	1	2.90	1	1A	2.89	0	0	3.28	1	1	2.99	3	0	dead						fruit torn apart, dispersing seeds 5/96; one very small bud 2/98; yellowish at base, green, new spine growth on top, OK 4/99; olive green, OK 2 & 4/00; maroon, poor 2/01; new spine growth at apex, maroon, poor 4/01; dead, weevil chambers, COD weevils 2/02
Data taken and recorded by Jackie Poole 3/3/96, 5/8/96; 2/12/97, 5/6/97; 5/5/98; 4/99, 2/99 with Linda Hedges, 9/15/99, 2/9/00,																												
4/28/00 with Craig Scofield & Bill Calvert, 2/16/01, 4/25-26/01, 2/07/02, 4/25/02, 2/5/03 with Sandy Birnbaum, 4/24/03																												
Data taken by Gena Janssen and recorded by Jackie Poole 2/18/98																												
Data partly entered electronically in the field 2/07/02, 4/25/02																												

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Wait Gate Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Site is 0.7 mi South of main gate, at red gate (0.3 mi from county line); GPS15 = R021716A																			
1.00		14.48	10	1.57	0	0	2.39	0	0	2.43	0	0	2.17	0	0	2.78	3	2	green, good 4/99; dark purplish-green, OK 2/00; green, good 4/00; maroonish-green, hunkered, OK 2 & 5/01, 2/02; olive, OK 4/02; recently uprooted, replanted, one flower smashed, green, OK 2/03; green, OK 4/03
1.01		13.48	9	1.00		0	1.35	0	0	1.16	0	0	1.16	0	0	1.40	0	0	on right of 1.02; discovered 5/99; green, good 5/99; one measurement only 2/00; dull green, OK, under rock 2 & 4/00, 2/01, 2/02; tag chewed, replaced 2/01, 2/02; green, good 5/01, 4/02, 2 & 4/03
1.02		13.48	9	1.17		0	1.00	0	0	1.39	0	0	1.37	0	0	1.68	0	0	on left of 1.01; discovered 5/99; green and good 5/99; dull green, hunkered in Selaginella, OK 2 & 4/00, 2/01, 2/02; tag chewed, replaced 2/01, 2/02; coming out, green, good 5/01; green good 4/02, 2 & 4/03
1.03		13.67	9	0.64		0	1.07	0	0	0.84	0	0	1.00	0	0	1.17	0	0	discovered 5/99; OK, seedling of larger dead plant 5/99; purplish, hard, OK 2/00; green, OK 4/00; tag mia, replaced, olive, OK 2/01; green, good 5/01, 2 & 4/02, 2 & 4/03
1.04		13.69	9	0.52		0	0.60	0	0	0.53	0	0	0.56	0	0	0.55	0	0	discovered 5/99; OK, seedling of larger dead plant 5/99; dull green, OK 2 & 4/00; tag mia, replaced, accidentally uprooted, replanted 2/01; grayish-green, poor 2 & 5/01, 2/02; olive, poor 4/02; lower stem showing, olive, OK 2/03; grayish red, poor 4/03
1.041		13.75	9							0.48	0	0	0.53	0	0	0.99	0	0	discovered 2/01; grayish-green, poor 2/01; green, OK 5/01; tag mia, replaced 2/02; green, OK 2 & 4/02, 2 & 4/03
1.05		13.98	8	2.31		0	2.09	0	0	mia			mia			mia			discovered 5/99; OK, apical meristem reddish 5/99; dull grayish-red, OK 2/00; reddish, OK 4/00; plant and tag mia 2 & 5/01, 2 & 4/02, 2 & 4/03
1.06		13.99	8	0.99		0	0.64	0	0	1.00	0	0	0.99	0	0	1.31	0	0	discovered 5/99; green, good 5/99; green, hunkering, OK 2 & 4/00; tag eaten, replaced, grayish-green, OK 2 & 5/01; olive, OK 2/02; green, OK 4/02; green, good 2 & 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Wait Gate Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.07		14.46	20	2.02		0	2.34	1	1disp	2.85	2	2A	3.04	3	1+2A	dead			discovered 5/99; green, good , hunkered in gravel and Selaginella 5/99; 2 & 4/00; bluish-green, OK 2/01, hunkered, green, OK 5/01, green, good 2 & 4/02; weevil galleries and chambers, COD weevils 2/03
1.08		14.98	21	2.23		0	2.49	2	2	2.75	0	0	2.86	0	0	2.64	0	0	under small juniper, discovered 5/99; green, good 5/99, 2 & 4/00; partially covered by juniper litter, green, OK 2 & 5/01, 2 & 4/02; covered by litter, green, good 2 & 4/03
1.10		14.65	4							3.29	0	0	3.50	0	2	4.62	6	7	discovered 2/01; grayish-green, OK 2/01; maroonish-green, OK 5/01, 2/02; green, good 4/02; maroonish-green, good 2 & 4/03
1.20		13.83	13							1.75	0	0	1.37	0	0	1.33	0	0	discovered 2/01; green, good 2 & 5/01; very hunkered, olive, poor, tag mia, replaced 2/02; green, good 4/02; rock on top, removed, plant green, good 2 & 4/03
1.30		14.06	13							1.68	0	0	1.96	1	0	2.36	3	2	discovered 2/01; hunkered in Selaginella, green, OK 2/01; green, good 5/01, 2 & 4/03
1.40		13.75	10													1.21	0	0	discovered 2/03; green, good 2 & 4/03
1.50		13.77	10													1.67	0	0	discovered 2/03; green, good 2 & 4/03
1.60		13.69	10													2.50	1	0	discovered 2/03; green, good 2 & 4/03
1.70		14.65	358													6.00		10	discovered 4/03; dark green, good 4/03
1.80		15.21	11													1.01		0	discovered 4/03; green, OK 4/03
2.00		15.12	10	3.10	5	1+3disp	4.03	2	2	mia			mia			mia			OK, 2/99, poor, reddish, 4/99; hooded during weevil study during summer 99; green, good, 9/99; reddish, OK 2/00 reddish-green, OK 4/00; tag and plant mia 2 & 5/01, 2 & 4/02, 2 & 4/03
2.10		12.90	25				3.18	1	1	mia			mia			mia			discovered 2/00, dull green, OK 2 & 4/00, tag and plant mia 2 & 5/01, 2 & 4/02, 2 & 4/03
2.11		12.90	25							0.48	0	dead							discovered 2/01, edge of grass clump, gray-green, poor 2/01, hard, dry, COD unknown 5/01

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Wait Gate Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.20		13.12	24				4.34	2	1+1disp?	3.98	0	0	4.27	3	3+1A	dead			discovered 2/00, maroon, OK 2/00 yellowish, OK 4/00, apex damaged, maroon, poor 2/01, green, good 5/01, 2/02, weevil chambers, COD weevils 2/03
2.30		10.24	15							2.37	1	1	2.75	2	0	3.67	2	3	discovered 2/01; hunkered in Selaginella, green, good 2 & 5/01, 2 & 4/02; rock on top, flowers crushed, rock removed, plant green, good 2 & 4/03
2.40		10.51	13							1.67	0	0	2.14	1	1+1A	dead			discovered 2/01, hunkered in Selaginella, green, good 2 & 5/01, 2 & 4/02; just spines left, COD unknown 2/03
3.00		12.17	216	6.28	6+1fr	2+3disp	6.88	8	7+1A+ 1disp	8.09	7	8+1A	7.39	9	12	dead			maroon, good 4/99; maroon, OK 2/00; some maroonish tubercles, OK 4/00; some maroonish tubercles, bluish-green, good 2/01, reddish-green, good 5/01, 2 & 4/02, uprooted, collected for weevil study 2/03, COD weevils 3/03
4.00		12.57	216	2.55	1+1fr	0	1.45	0	0	2.72	2	2A	2.66	2	1+1A	4.56	4	5	poor, plant partially eaten 4/99; hunkered, green, good 2 & 4/00, 2/01; popped out, green, good 5/01; hunkered, green, OK 2/02; green, good 4/02; close to rooting around prickly pear, plant green, good 2 & 4/03
4.10		12.55	216							0.83		0	mia			mia			discovered 5/01; hunkered in Selaginella, green, OK 5/01; tag & plant mia 2 & 4/02, 2 & 4/03
4.20		12.53	214													1.14		0	discovered 4/03; hunkered, green, OK 4/03
5.00		12.13	211	6.57	7+7fr	13+1A	7.67	13	11+2disp	8.39	11	7+9A	7.58	14	15+4A	dead			maroonish, OK 4/99; dull reddish-green, OK, fresh flowers yellow, fade to pinkish dusky yellow (Photos 1-4) 2/00; some orange tubercles, OK 4/00, maroonsih-green, OK 2/01, purplish-green, OK 5/01, 2 & 4/02, uprooted, large hole in upper root, 3 live flowers, collected for weevil study 2/03, COD weevils 3/03
5.01		12.11	211													0.47	0	mia	discovered 2/03; hunkered in Selaginella, seedling of 5.00; green, OK 2/03; plant mia 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Wait Gate Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
5.02		12.08	211													0.48	0	0	discovered 2/03; green, OK 2/03, left of 5.03 and 5.04; green, good 4/03
5.03		12.09	211													0.50	0	0	discovered 2/03; green, OK 2/03, right of 5.02 and in front of 5.04; green, OK 4/03
5.04		12.10	211													0.56	0	0	discovered 2/03; green, OK 2/03, right of 5.02 and in back of 5.03; green, OK 4/03
5.05		12.07	211													0.43		0	discovered 4/03; in front of 5.03 and 5.04; green, OK 4/03
5.06		12.08	211													0.61		0	discovered 4/03; right of 5.05; green, OK 4/03
5.10		12.28	212				1.70	1	0	2.80	0	0	2.60	2	2	2.88	3	1+2A	discovered in grass and Selaginella 2/00; green, good, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
5.20		11.22	212							2.77	1	1A	3.10	3	1+2A	4.23	6	1+disp	discovered 2/01; maroonish-green, OK 2 & 5/01, 2/02; green, good 4/02; dull, olive, OK 2/03; dark green, OK 4/03
6.00		12.56	209	2.04	2+1fr	2	2.54	1	0	3.35	2	2	3.13	3	1	dead			OK, green, 4/99; maroon, OK 2 & 4/00, 2 & 5/01, 2 & 4/02; uprooted, COD uprooting 2/03
7.00		12.05	209	1.02	0	0	1.49	0	0	1.92	0	0	1.81	1	2A	dead			tag loose, dull green, OK 4/99; maroon, hunkered, OK 2/00; hunkered, dull green, OK 4/00; bluish-green, OK 2 & 5/01, 2/02; purplish-green, good 4/02; just spines left, COD unknown 2/03
8.00		12.64	208	2.50	1	1	3.21	2	2A	4.10	2	1+2A	3.79	3	2+2A	4.46	4	3+1A	reddish, OK, fruit has hole 4/99; maroon, OK 2/00; reddish-green, OK 4/00; purple, OK 2 & 5/01, 2/02; red, OK 4/02 & 2/03; purplish, OK 4/03
9.00		12.47	207	1.59	0	0	1.72	0	0	1.96	0	0	1.88	0	0	2.28	3	0	two-headed plant, head closest to stake, spines gray 4/99; reddish, OK (Photos 5-6) 2 & 4/00, 2/01; dull reddish-olive, OK 5/01, 2/02; purple, OK 4/02, 2 & 4/03
9.01		12.47	207	1.66	0	0	2.21	1	1	2.90	2	1+1A	2.69	2	2+1A	3.26	3	2+1A	two-headed plant, head farthest from stake, reddish, poor 4/99; reddish, OK 2 & 4/00, 2/01; dull reddish-olive, OK 5/01; purplish, OK 2/02; reddish-green, OK 4/02, 2 & 4/03
9.02		12.41	207													0.50		0	discovered 4/03; green, OK 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Wait Gate Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
10.00		12.45	202	3.33	0	Dead													two-headed plant, head on left looking toward stake, dead 4/99
10.01		12.45	202	1.38	0	Dead													two-headed plant, head on right, dead 4/99
11.00		12.57	207	0.97	0	0	1.12	0	0	1.34	0	0	1.15	0	0	1.32	0	0	dull green, OK 4/99; red, poor 2 & 4/00, 2/01; reddish-green, OK 5/01; reddish, poor 2/02; reddish-green, OK 4/02, 2 & 4/03
12.00		12.46	207	0.93	0	0	1.74	0	0	1.94	0	0	1.82	0	0	1.96	0	0	green, good 4/99; reddish-green, OK 2 & 4/00; dull reddish-green, poor 2/01; pale reddish-green, OK 5/01; olive, OK 2/02; purplish-green, OK 4/02; olive, OK 2/03; green, OK 4/03
13.00		12.57	207	1.59	0	0	2.18	1	1A	2.54	1	1	2.38	2	2	2.55	1	1	dull green, OK 4/99, 2 & 4/00; reddish at base, otherwise pale olive, OK 2 & 5/01; olive, OK 2 & 4/02; almost completely uprooted, replanted, reddish-green, OK 2 & 4/03
13.01		12.59	207	0.68	0	0	0.59	0	0	0.67	0	0	0.66	0	0	0.67	0	0	on right, OK 4/99; dull gray-green, poor 2/00; maybe dead 4/00, 2/01; green, OK 5/01, 2 & 4/02, 2 & 4/03
13.02		12.59	207	0.51	0	0	0.71	mia	0	0.81	mia	0	0.86	0	0	0.94	0	0	on left, pinkish, OK 4/99; mia 2/00; relocated under rock, green, good 4/00; plant mia 2/01; relocated under rock, green, OK 5/01; hunkered, green, OK 2 & 4/02; popped out, green, OK 2 & 4/03
14.00		12.30	206	1.69	0	Dead													
15.00		12.28	206	0.91	0	Dead													
16.00		10.86	207	1.45		0	1.36	0	0	mia			mia			mia			discovered 4/99, dull green, OK, stepped on 4/99, 2/00 (misshapen), pale green, OK 4/00, plant mia 2 & 5/01, 2 & 4/02, 2 & 4/03
17.00		10.99	207	2.59		1A	2.65	2	2A	2.80	1	1	2.70	2	2A	3.00	2	1+1A	17.00 is on left; dull green, OK, stepped on, discovered 4/99; starting to form two heads, measured as one 2/00; maroon, OK 2 & 4/00; reddish-green, OK 2 & 5/01, 2 & 4/02, 2/03; olive, OK 4/03
17.01		10.99	207							2.33	0	0	1.88	1	1A	2.54	3	1	17.01 is on right; reddish-green, OK 2 & 5/01, 2/02; olive, OK 4/02, 2 & 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Wait Gate Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
18.00		11.10	207	2.20		1	2.28	1	1A	2.72	0	0	2.38	0	0	2.67	2	0	green, good, stepped on, discovered 4/99; hooded during weevil study in summer 99; dull green, OK, 9/99; reddish, OK 2 & 4/00, 2/01; pale maroonish-olive, OK 5/01; pale reddish, OK 2 & 4/02; reddish green, OK 2 & 4/03
19.00		11.60	208	1.27		0	2.01	0	0	2.81	2	2A	2.24	2	1+1A	3.47	3	2+1A	green, hunkered, squishy, OK 9/99; hunkered, dull green, OK 2 & 4/00; tag mia, replaced (now 2 tags), maroonish-green, OK 2/01; maroon, OK 5/01, 2/02; purple, OK 4/02, 2/03; purplish green, OK 4/03
19.01		11.63	210													0.78		0	discovered 4/03; green, OK 4/03
19.10		11.29	209													0.65		0	discovered 4/03; green, OK 4/03
20.00		14.45	216	0.94		0	1.25	0	0	2.23	0	0	2.48	1	1	3.01	4	2	green, hunkered, OK 9/99, 2 & 4/00; pale green with pale reddish tubercle tips, OK 2 & 5/01, 2 & 4/02, 2 & 4/03
20.01		14.42	216													0.55	0	0	not tagged, left 20.00 tag and plant, under rock, discovered 2/03; green, OK 2 & 4/03
20.02		14.42	215													0.41		0	discovered 4/03; green, OK 4/03
21.00		14.52	215	1.83		0	2.56	2	2	3.22	2	3	3.62	3	2+2A	dead			purplish-green, hunkered, OK 9/99, 2 & 4/00, popped out, purplish-green, OK 2 & 5/01, 2 & 4/02, weevil chambers, COD weevils 2/03
21.01		14.51	215													0.48	0	0	discovered 2/03; seedling of 21.00, right of 21.02-21.05, behind 21.05 and in front of 21.02; green, OK 2/03; grayish, OK 4/03
21.02		14.53	215													0.58	0	0	discovered 2/03; seedling of 21.00, behind 21.01 and 21.03-21.05, between 21.01 and 21.03 and 21.04; green, OK 2 & 4/03
21.03		14.53	215													0.36	0	0	discovered 2/03; seedling of 21.00, behind 21.04; green, good 2/03; red, OK 4/03
21.04		14.52	215													0.43	0	0	seedling of 21.00, in front of 21.03 and left of 21.01, 21.02, and 21.05, discovered 2/03; green, OK 2 & 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Wait Gate Site

PL#	STK#	DIST	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
21.05		14.50	215													0.34	0	0	seedling of 21.00, closest to stake, in front of 21.01-21.04, between 21.01 and 21.04, discovered 2/03; green, OK 2/03; hunkered, OK 4/03
22.00		7.52	203				2.70	1	1A	3.16	1	1	2.59	1	1	2.89	1	1	discovered 2/00; green with a few reddish tubercles, OK 2/00; orangish, OK 4/00; purplish-orange, OK 2/01; orangish-olive, OK 5/01; pale reddish, OK 2/02; orangish-green, OK 4/02, 2 & 4/03
22.10		7.85	203										2.24	0	0	2.87	0	0	discovered 2/02; dark maroonish, OK 2/02; green, OK 4/02; purple, OK 2 & 4/03
23.00		7.50	124				5.17	2+2fr	2+2disp	5.04	1	1A	4.64	0	0	4.52	0	0	under small persimmon, discovered 2/00; green with a few gold tubercles, good 2/00; orangish, OK 4/00; maroon, poor 2/01; green with red tubercle tips, OK-poor 5/01; orangish, OK 2/02; reddish base, green apex, OK 4/02; reddish-green, poor 2/03; new spine growth, green with red tubercle tips, OK 4/03
Data collected by Jackie Poole 2/17/99 with Linda Hedges, 4/99, 5/1/99, 9/15/99, 2/15/00, 4/28/00, 2/15/01, 5/01/01, 2/10/02, 4/25/02,																			
	2/12/03, 4/23/03																		
Data entered electronically in the field 2/10/02, 4/25/02																			

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Whiskey Bottle Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake WB1 is ~ 125 paces East of road through small opening, 0.4 mi North of lodge on main road to North gate.																												
	GPS8 = R021520A; R020621A																											
1.00	WB1	34.85	97	5.10	7 fr	disp	4.60	0	Dead																			COD=weevils
1.10	WB1	34.72	97	2.80	1 fr	disp	2.40	0	Dead																			COD=weevils
1.20	WB1	34.77	96	4.10	1 fr	0	Dead																					reddish; not looking good 2 & 5/96; COD unknown, no weevils or insect exit holes, tag removed 2/97
1.30	WB1	35.36	100	4.40	8 fr	2A, rest disp	4.40	0	Dead																			COD=weevils, pin flag stuck in cactus; larva collected from nearby Coryphantha echinus 5/97
1.40	WB1	~32.62	~105	4.00	3fr	0, disp?	3.90	3	3	Dead																		distance measured around juniper plant turning yellow 5/96; dead, filled with 5 or 6 larvae (collected) & orange mush 2/98
2.00	WB1	31.30	209	3.40	4 fr	1+1A	3.90	4	4	4.00	5	5	Dead															hollow, probably weevils 2/99
2.10	WB1	31.57	209	3.90	5 fr	disp	4.90	5	6	4.90	7	4	4.18	5+3fr	3+4 disp	5.08	2	2disp	dead									flower & stigma bright yellow, plan dull green, OK, 2/99; small ants swarming fruits 4/99; tubercles getting orangish, OK 2 & 4/00; inside powdery, COD unknown 2/01
2.20	WB1	33.33	205	4.10	4 fr	2+1	4.60	4	6	3.80	2	Dead																dead, weevil collected 5/98
2.30	WB1	33.40	209	6.00	5+8 fr	4A+1 dehisc	6.40	9	14	Dead																		COD unknown, not really hollow (i.e., weevils) 2/98
2.40	WB1	35.22	205				3.30	3	3	3.20	3	1+1A	3.42	4fr	3A	3.06	3	2disp	4.00	3	1+2A	3.50	4	1+3A	4.10	5	na	hunkered in Selaginella, some reddish tubercles 2/99; green, good 4/99; green, good 2/00 (one flower eaten), 4/00; green, good 2 & 5/01, 2 & 4/02, 2/03; fruits pulled off apical meristem and partly eaten, plant green, OK 4/03
2.41	WB1	35.03	205				4.50		5	4.60	4	4A	4.65	5+3fr	8	6.15	7	3+3A	6.04	5	3+2A	6.07	7	4+3A	5.94	8	7+1A	discovered 5/97; tag mia, replaced 98; flowers & stigma bright yellow, tag severely chewed, replaced 2/99; dark green, good 4/99, 2/00 (3 flowers eaten), 4/00; ~10% eaten, scarred over, slightly purplish-green, OK 2/01; olive, OK 5/01, 2/02; green, good 4/02; purplish green, good 2/03; green, OK 4/03

Ancistrocactus tobuschii Data for Kickapoo Cavern SP - Whiskey Bottle Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.60	WB1	36.75	208				3.30	2	2+1A	3.40	4	2	2.99	3fr	2+1A	3.34	2	0	3.96	3	1+1A	3.72	3	1+1A	dead			tag mia, replaced 98 & 2/99 squishy 2/99; maroonish olive, firm, OK 4/99, 2/00 (stigma and flowers pinkish); maroonish 2/01, olive, OK 5/01, 2/02, rock on top, removed, green, good 4/02; dead, COD weevils, hole in root, collected for weevil study 2/03
2.60	WB1	~32.95	205							2.40	1	1	2.22	2+1fr	1+1 disp	3.40	1	0 1	3.46	2	2A	3.35	2	0	dead			around juniper, discovered 2/98; edge of rock; flowers & stigma bright yellow 2/99; green, good 4/99, green, good, rock partially on top 2 & 4/00, 2 & 5/01; green, OK 2/02, partially covered by ant dirt; green, OK 4/02; dead, COD weevils, chambers 2/03
2.70	WB1	30.95	208													2.64	1	0	4.12	4	7	4.09	4	2+2A	4.07	3	3	purplish-orange green, OK 2/00; green, OK 4/00; olive, OK 2 & 5/01; reddish green, OK 2/02; green, good 4/02; green, OK 2 & 4/03
2.80	WB1	35.80	204																			2.57		0	1.59	0	dead	discovered 4/02; green, good 4/02 hunkered, poor, maybe dead 2/03, dry, hard, solid, COD unknown 4/03
3.00	WB1	~57.58	~198	5.10	6 fr	6A	4.50	0	0	4.70	5	4	3.92	4+1fr	2+3A	Dead												measured beside juniper and through agarita; flowers & stigma yellow, a little maroon, OK 4/99; hollow, weevil chambers and five weevils, Dead 2/00
3.10	WB1	~57.25	~198				3.00	2	2	2.90	0	0	Dead															by rock, hollow, probably weevils 2/99
4.00	WB1	32.28	~204																			1.46	0	0	2.06	0	0	discovered 2/02; green, good 2 & 4/02; large rock on top, removed, green ,good 2 & 4/03
5.00	WB1	~32.74	~203																			1.65	0	0	1.77	0	0	discovered 2/02; green, good 2 & 4/02; green, slightly misshapen, OK 2 & 4/03
6.00	WB1	33.64	207																			1.41		0	1.08	0	0	discovered 4/02; green, good 4/02 green, OK 2 & 4/03
7.00	WB1	33.66	207																			1.80		0	1.43	0	dead	discovered 4/02; green, good 4/02 olive, hunkered, OK 2/03; weevil in stem, COD weevils 4/03
8.00	WB1	31.26	~204																						2.44	0	dead	discovered 2/03; green, good 2/03 weevil inside, COD weevils 4/03

Ancistrocactus tobuschii Data for
Kickapoo Cavern SP - Whiskey Bottle Site

PL #	STK #	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
9.00	WB1	31.31	~204																						0.93	0	dead	discovered 2/03; green, good 2/03 small chamber in root, COD weevils 4/03
10.00	WB1	30.94	~203																						1.14	0	dead	discovered 2/03; olive, OK 2/03; almost solid, COD unknown 4/0;
11.00	WB1	31.31	~203																						0.73	0	0	discovered 2/03; olive, OK , hunkered 2 & 4/03
12.00	WB1	33.43	~206																						0.63		0	discovered 4/03; green, OK 4/03
Data taken and recorded by Jackie Poole 3/5/96 & 5/9/96; 2/12/97; 5/5/98; 2/15/99, 4/21/99, 2/8/00 with Craig Scofield, 4/28/00, 2/9/01,																												
	5/02/01, 2/06/02, 4/25/02, 2/5/03 with Sandy Birnbaum, 4/22/03																											
Data taken by David Stuart and recorded by Jackie Poole 5/5/97																												
Data taken by Gena Janssen and recorded by Jackie Poole 2/18/98																												
Data entered elecrtonically in the field 2/06/02, 4/25/02																												

Ancistrocactus tobuschii
Monitoring Data for
Kerr WMA

PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
South Owl Pasture, Deer Stand #5, **Stake 3A** = 031318A; South Owl main road, at bottom of hill, turn right, take first road to left																			
	(road before Max's site); Site discovered by Bill Armstrong 5/02; plot added 3/13/03																		
1.00	3A	1.73	64													5.10	4	2+1A	two flowers and two tubercles eaten, plant green, OK 3/03; green, good 5/03
2.00	3A	1.60	80													4.56	4	3	green, good 3/03; olive, OK 5/03
3.00	3A	1.48	80													1.66	0	0	in front of 3.01 and 3.02; green, OK 3 & 5/03
3.01	3A	1.49	80													1.95	0	0	behind 3.00 and left of 3.02; purplish green, OK 3/03; olive, OK 5/03
3.02	3A	1.50	80													1.35	0	0	behind 3.00 and right of 3.01; green, OK 3 & 5/03
4.00	3A	1.10	175													6.40	7	7	left of 4.01; green, good, flowers visited by honeybees 3/03; green, OK, 5/03
4.01	3A	1.13	174													6.06	5	5	right of 4.00; green, good, flowers visited by honeybees 3/03; green, OK, 5/03
5.00	3A	2.96	175													6.15	11	9+2A	green, good 3 & 5/03
6.00	3A	2.75	229													3.80	4	2+1A	green with a few orange tubercle tips, OK 3 & 5/03
7.00	3A	2.84	235													3.50	3	3A	purpish green, good 3 & 5/03
8.00	3A	2.20	244													3.33	0	0	left of 8.01 and in front of 8.02 & 8.03; center eaten, plant green, OK 3 & 5/03
8.01	3A	2.20	244													2.75	0	0	right of 8.00 and in front of 8.02 & 8.03; eaten to soil level, poor 3/03; resprouting, green, OK 5/03
8.02	3A	2.22	244													2.55	0	0	left of 8.03, behind 8.00 and 8.01; chunk eaten, plant green, OK 3 & 5/03
8.03	3A	2.22	244													3.63	0	0	right of 8.02, behind 8.00 & 8.01; 75% eaten, remaining tubercles green, poor 3/03; green, OK 5/03
8.03	3A	2.44	244													0.88		0	discovered 5/03; green, good 5/03;**NEEDS RETAGGING IN 2004 (two 8.03)**
9.00	3A	2.75	246													1.43	0	0	green, good 3 & 5/03
10.00	3A	2.80	247													1.37	0	0	grayish green, OK 3/03; forming two apices, green, OK 5/03
10.01	3A	2.81	247													1.19	0	0	behind 10.00; green, good 3 & 5/03
11.00	3A	5.08	200													5.10	5	5A	parent of 11.01-11.09, uprooted, dead 5/03
11.01	3A	5.06	200													0.93	0	0	left of 11.03, behind 11.02; green, good 3 & 5/03
11.02	3A	5.04	200													1.86	0	0	closest to stake; green, good 3 & 5/03
11.03	3A	5.06	200													1.20	0	0	right of 11.01, behind 11.02, between 11.01,11.03, & 11.04; green, good 3 & 5/03
11.04	3A	5.07	200													2.35	0	0	right of 11.01-11.03 & 11.08, in front of 11.05-11.07; growing on top of 11.08, green, good 3/03; green, good, 5/03
11.05	3A	5.11	200													1.20	0	0	farthest from stake; green, good 3 & 5/03

Ancistrocactus tobuschii
Monitoring Data for
Kerr WMA

PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
11.06	3A	5.10	200													1.11	0	0	left of 11.05 and behind 11.07; green, good 3 & 5/03
11.07	3A	5.09	200													0.66	0	0	in front of 11.06; green, good 3/03; green, OK 5/03
11.08	3A	5.06	200													0.41	0	0	between 11.03 & 11.04; reddish, OK 3/03; green, OK 5/03
11.09	3A	5.07	200													0.76		0	right of 11.04, discovered 5/03; one measurement only 5/03; green, good 5/03
12.00	3A	5.25	202													0.59	0	0	closest to stake; green, OK 3/03; reddish green, OK 5/03
12.01	3A	5.25	202													0.59	0	0	behind and left of 12.00; green, OK 3/03; reddish, OK 5/03
12.02	3A	5.25	202													0.42	0	0	between 12.02 & 12.03; reddish, OK 3 & 5/03
12.03	3A	5.26	202													0.61	0	0	behind 12.02 & 12.04, in front of 12.05; green, OK 3/03
12.04	3A	5.25	202													0.50	0	0	in front of 12.03, right of 12.00 and 12.01-12.03; green, OK 3 & 5/03
12.05	3A	5.26	202													0.47	0	0	behind 12.03; green, OK 3 & 5/03
12.06	3A	5.26	202													0.62	0	0	behind 12.00, 12.01, left of 12.02-12.05; green, good 3/03; green, OK 5/03
12.07	3A	5.27	202													0.70	0	0	behind 12.07; green, OK 3/03; reddish, OK 5/03
12.08	3A	5.27	202													0.41	0	0	far right, in front of 12.09; green, OK 3/03; reddish, OK 5/03
12.09	3A	5.27	202													0.42	0	0	far right, behind 12.08 and in front of 12.10; green, OK 3/03; reddish, OK 5/03
12.10	3A	5.27	202													0.45	0	0	far right, behind 12.08 & 12.09; green, OK 3/03; reddish, OK 5/03
12.11	3A	5.23	202													0.43		0	under 12.08-12.10 tag, discovered 5/03; green, OK 5/03
12.13	3A	5.22	202													0.47		0	closest to stake, under 12.00-12.07 tag, discovered 5/03; green, OK 5/03
12.14	3A	5.23	202													0.49		0	under 12.00-12.07 tag, behind 12.13, discovered 5/03; green, OK 5/03
12.15	3A	5.23	202													0.36		0	rightmost, in front of 12.00and 13.00, discovered 5/03; green, good 5/03
12.16	3A	5.22	202													0.50		0	leftmost, against rock, left of 13.00, discovered 5/03; green, OK 5/03
13.00	3A	5.23	202													0.55	0	0	in front of 13.01; green, OK 3 & 5/03
13.01	3A	5.24	202													0.49	0	0	behind 13.00; green, OK 3 & 5/03
13.02	3A	5.32	202													1.28		0	under rock, discovered 5/03; green, good 5/03
14.00	3A	6.12	195													2.25	0	0	accidentally stepped on, green, OK 3/03; green, good 5/03

Ancistrocactus tobuschii
Monitoring Data for
Kerr WMA

PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
15.00	3A	6.19	196													1.67	0	0	green, good 3 & 5/03
16.00	3A	6.65	194													3.96	3	3	green, good 3 & 5/03
17.00	3A	6.88	247													5.06	4	1+2A	reddish green, OK 3/03; orangish green, OK 5/03
18.00	3A	6.25	249													4.38	3	3	honeybee visiting flowers, plant green, good 3 & 5/03
19.00	3A	6.00	246													3.01	1	1	green, good 3 & 5/03
20.00	3A	6.55	245													3.35	3	3	green, OK 3 & 5/03
21.00	3A	1.65	244													1.47	0	0	purplish olive, OK 3/03; partly eaten, uprooted, maroon, poor 5/03
21.01	3A	1.94	240													0.78		0	left of 21.02, discovered 5/03; green, OK 5/03
21.02	3A	1.94	240													0.94		0	right of 21.01, discovered 5/03; green, OK 5/03
22.00	3A	1.87	251													1.27	0	0	green good 3 & 5/03
23.00	3A	2.14	252													2.41	1	1A	orangish, green, OK 3/03; olive, OK 5/03
24.00	3A	2.16	257													2.01	0	0	eaten to soil level, poor 3/03; new growth, green, OK 5/03
25.00	3A	2.13	257													1.67	0	0	apical meristem damage, purple, OK 3 & 5/03
26.00	3A	2.08	260													2.37	0	0	75% eaten, reddish green, poor 3/03; new growth, green, good 5/03
26.01	3A	2.06	258													0.50	0	mia	3.5 cm right of 26.00, not tagged; reddish, OK 3/03; plant mia 5/03
27.00	3A	2.30	258													2.22	0	0	green, good 3 & 5/03
28.00	3A	2.48	260													2.33	0	0	eaten to ground level, poor 3/03; two tubercles sprouting, green, OK 5/03
29.00	3A	1.83	265													1.08	0	0	purplish olive, OK 3/03; olive, OK 5/03
30.00	3A	1.90	267													1.45	0	0	apical meristem damage, yellowish green, poor 3/03; pale green, OK 5/03
31.00	3A	7.31	293													7.90	15	15	flowers visited by honey and sweat bees, green, good 3 & 5/03
32.00	3A	6.73	296													4.14	6	6	front of 32.01 & 32.02; purple, OK 3/03; olive,OK 5/03
32.01	3A	6.77	296													4.42	5	5	behind 32.00, left of 32.02; purple, OK 3/03; olive, OK 5/03
32.02	3A	6.77	296													3.94	5	5	behind 32.00, right of 32.01; purple, OK 3/03; olive, OK 5/03
33.00	3A	2.66	309													5.27	0	0	center eaten, reddish green, poor 3/03; reddish green, OK 5/03
34.00	3A	3.05	317													4.83	2	2A	partly covered by ant dirt, green, OK 3/03; green, good 5/03
35.00	3A	0.93	318													3.03	0	0	right of 35.01 and in front of 35.02; covered with ant dirt, OK 3/03; coming out, green, OK 5/03

Ancistrocactus tobuschii
Monitoring Data for
Kerr WMA

PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
35.01	3A	0.93	318													2.58	0	0	left of 35.00 and in front of 35.02; covered with ant dirt, OK 3/03; coming out green, OK 5/03
35.02	3A	0.95	318													1.86	0	0	behind 35.00 and 35.01; covered with ant dirt, green, OK 3 & 5/03
36.00	3A	1.22	335													5.68	0	0	covered with ant dirt, OK 3/03; coming out, green, OK 5/03
37.00	3A	3.31	9													1.82	0	0	olive, OK 3/03; green, good 5/03
South Owl Pasture, **Stake 3B** = R031322A																			
1.00	3B	11.82	11													5.20	5	3+2A	green, good 3 & 5/03
2.00	3B	14.76	4													3.99	3	2+1A	olive, OK 3/03; green with some orange tubercle tips, OK 5/03
2.01	3B	15.03	4													3.53	2	2	leftmost of 2.02-2.12; green, good 3 & 5/03
2.02	3B	15.02	4													6.48	7	6+1A	right of 2.01 and left of 2.03-2.12; green, good 3 & 5/03
2.03	3B	15.03	4													2.26	0	0	between 2.02 & 2.07; apex not showing, purple, OK 3/03; forming apex, green, good 5/03
2.04	3B	15.06	4													2.25	0	0	between 2.02 & 2.09, below 2.03 and above 2.05; purple, OK 3/03; green, OK 5/03
2.05	3B	15.07	4													1.70	0	0	below 2.04 and right and above 2.06; green, good 3 & 5/03
2.06	3B	15.08	4													2.41	1	0	below 2.02 & 2.05; green, good 3 & 5/03
2.07	3B	15.03	4													1.21	0	0	between 2.03 & 2.08; green, good 3 & 5/03
2.08	3B	15.03	4													0.81	0	0	between 2.07 & 2.10; green, good 3 & 5/03
2.09	3B	15.05	4													3.55	3	1+2A	between 2.04 & 2.11; green, good 3 & 5/03
2.10	3B	15.02	4													3.62	0	0	between 2.08 & 2.11; purplish, OK 3/03; green, OK 5/03
2.11	3B	15.05	4													7.25	9	11	between 2.10 & 2.09 & 2.12; green, good 3 & 5/03
2.12	3B	15.07	4													4.85	3	1	rightmost of 2.01-2.11; green, good 3 & 5/03
2.13	3B	14.99	4													1.19	0	0	above 2.11; one measurement only 3/03; green, good 3 & 5/03
2.14	3B	15.04	5													0.57	0	0	left of 2.01-2.13; reddish green, OK 3 & 5/03
2.15	3B	15.16	3													0.77	0	0	right of 2.01-2.14; reddish green, OK 3/03; olive, OK 5/03
2.16	3B	15.13	3													1.50	0	0	between 2.12 & 2.15; green, good 3 & 5/03
2.17	3B	15.14	3													0.65	0	0	immediately below 2.16, not tagged; green, good 3 & 5/03
2.18	3B	15.15	4													0.43	0	0	below 2.11; reddish, OK 3 & 5/03

Ancistrocactus tobuschii
Monitoring Data for
Kerr WMA

PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
2.19	3B	15.07	4													1.33		0	below 2.02, above and left of 2.06, discovered 5/03; green, good 5/03
3.00	3B	24.40	355													5.66	4	4	green, good 3 & 5/03
4.00	3B	22.21	248													3.08		3	discovered 5/03; green with some orange tubercle tips, OK 5/03
5.00	3B	22.25	248													2.89		1+1A	discovered 5/03; green, good 5/03
South Owl Pasture, **Stake 3C** = R031323A, ~62.5m at 50 degrees from northeast leg of deer stand #5																			
1.00	3C	11.05	285													4.97	4	0	green, good 3/03; olive with red and orange tubercle tips, OK 5/03
1.10	3C	10.11	283													4.09		0	discovered 5/03; hunkered, reddish green, new apical meristem growth, OK 5/03
2.00	3C	19.68	162													7.85	12	14+1A	green with some red tubercle tips, good 3 & 5/03
3.00	3C	20.32	162													4.34	5	4+1A	covered with ant dirt, OK 3/03; mostly out, green, good 5/03
4.00	3C	22.23	159													2.36	1	1	green, OK 3 & 5/03
5.00	3C	22.18	159													5.13	7	7	green with some red tubercle tips, good 3/03; green with some orange tubercle tips, OK 5/03
6.00	3C	22.16	159													1.94	0	0	green, good 3 & 5/03
7.00	3C	22.20	159													6.64	10	7+3A	reddish green, good 3/03; green, good 5/03
8.00	3C	22.30	159													6.01	2	2	green, good 3/03; forming two apices, green, good 5/03
9.00	3C	22.37	159													5.16	7	7	green, good 3 & 5/03
9.01	3C	22.34	159													0.45		0	discovered 5/03; green, OK 5/03
10.00	3C	25.17	155													4.20	7	4+2A	purplish green, good 3/03; green, good 5/03
11.00	3C	41.60	144													5.67	5	5	green, good 3/03; tag eaten, plant covered with ant dirt, OK 5/03
12.00	3C	44.53	145													5.61	10	5+3A	green, good 3 & 5/03
13.00	3C	44.45	145													4.58	3	0	olive, good 3/03; covered with litter, OK 5/03
14.00	3C	34.86	102													3.86	3	2+1A	reddish green, good 3/03; olive, OK 5/03
South Owl Pasture, **Stake 3D** = R031415A, 14m at 37 degrees from northeast leg of deer stand #5																			
1.00	3D	16.15	321													3.32	3	2+1A	green, good 3 & 5/03
2.00	3D	16.07	252													4.08	3	2	slightly purplish green, good 3/03; partly covered with litter, green, good 5/03
3.00	3D	16.88	252													5.38	9	7+2A	olive, good 3/03; green, OK 5/03
4.00	3D	13.65	208													2.97	3	3	green, good 3 & 5/03

Ancistrocactus tobuschii
Monitoring Data for
Kerr WMA

PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
5.00	3D	13.70	208													4.77	4	4	purplish green, good 3 & 5/03
6.00	3D	13.60	204													7.06	8	8	green, good 3 & 5/03
South Owl Pasture, **Stake 3E** = R031416A, 33.65m at 160 degrees from northeast leg of deer stand #5																			
1.00	3E	11.82	274													4.31	5	6	green, good 3/03; green, OK 5/03
2.00	3E	1.87	330													4.78	4	4	red and olive, OK 3/03; red, OK 5/03
3.00	3E	11.74	7													5.00	4	4	green, good 3 & 5/03
4.00	3E	11.79	7													5.23	5	2+3A	green, good 3 & 5/03
5.00	3E	12.06	7													2.72	2	2A	green, good 3/03; olive, OK 5/03
6.00	3E	12.07	7													0.82	0	0	olive, OK 3 & 5/03
7.00	3E	12.10	7													3.65	3	3	maroonish, OK 3/03; orangish green, OK 5/03
8.00	3E	12.09	8													1.96	1	1A	purplish, OK 3/03; green, OK 5/03
9.00	3E	12.07	9													2.65	2	2	green, good 3 & 5/03
10.00	3E	10.77	15													4.24	6	6+1A	accidentally stepped on?, olive, OK 3/03; green with some orange tubercle tips, OK 5/03
11.00	3E	11.12	16													5.54	8	8	green, good 3/03; hunkered, OK 5/03
12.00	3E	10.93	18													6.71	9	10	green, good 3 & 5/03
13.00	3E	4.94	26													5.47	4	4	green, good 3/03; green, OK 5/03
14.00	3E	3.99	29													3.16	4	4	green, good 3/03; hunkered, green, OK 5/03
South Owl Pasture, **Stake 3F** = R031416B, ~80m at 175 degrees from northeast leg of deer stand #5																			
1.00	3F	2.29	272													7.48	10	6+4A	green, good 3 & 5/03
1.01	3F	2.33	274													0.62	0	0	left of 1.09; green, OK 3 & 5/03
1.02	3F	2.37	274													0.43	0	0	right of 1.03; green, OK 3 & 5/03
1.03	3F	2.37	274													0.51	0	0	left of 1.02; green, good 3 & 5/03
1.04	3F	2.38	274													0.59	0	0	behind 1.02 & 1.03, left of 1.05 & 1.06; green, good 3 & 5/03
1.05	3F	2.38	274													0.58	0	0	between 1.04 & 1.06; green, good 3/03; green, OK 5/03
1.06	3F	2.38	274													0.45	0	0	right of 1.04 & 1.05; behind 1.02 & 1.03; green, OK 3 & 5/03
1.07	3F	2.39	274													0.41	0	0	left of 1.08, behind 1.04-1.06; green, OK 3 & 5/03
1.08	3F	2.40	274													0.64	0	0	right of 1.07, behind 1.02-1.06; green, good 3/03; green, OK 5/03
1.09	3F	2.33	274													0.56	0	0	right of 1.01; green, good 3/03; green, OK 5/03
1.10	3F	2.45	274													0.40	0	0	behind 1.01-1.09, in front and right of tag; green, OK 3 & 5/03

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.11	3F	2.37	274													0.34		0	between 1.01 & 1.04, discovered 5/03; green, OK 5/03
1.12	3F	2.32	274													0.34		0	right of 1.01 and left of 1.13, discovered 5/03; green, OK 5/03
1.13	3F	2.32	274													0.40		0	in front of 1.09 and right of 1.12, discovered 5/03; green, OK 5/03
1.14	3F	2.26	274													0.30		0	at 10 o'clock off of 1.00, discovered 5/03; red, OK 5/03
2.00	3F	9.50	198													6.18	8	6+1A	green, good 3/03; green, OK 5/03
3.00	3F	9.51	194													3.37	2	2	in front of 3.01-3.03; honey bee on flower; maroonish, OK 3/03; green, OK 5/03
3.01	3F	9.53	194													2.64	3	3	right of 3.00, 3.02 & 3.03; maroonish, OK 3/03; orangish, OK 5/03
3.02	3F	9.54	194													3.38	3	2+1A	left of 3.00, 3.01 & 3.03; maroonish, OK 3/03; green, good 5/03
3.03	3F	9.56	194													2.67	2	2	behind 3.00-3.02; maroonish, OK 3/03; olive, OK 5/03
3.04	3F	9.54	195													1.16	0	0	left of cluster 3.00-3.03; green, OK 3 & 5/03
4.00	3F	13.20	196													4.67	6	2	green, good 3 & 5/03
5.00	3F	13.50	195													6.42	8	3+1A	green, good 3 & 5/03
6.00	3F	12.72	275													3.05	3	0	green, good 3/03; eaten? Two apices forming, green, OK 5/03
7.00	3F	11.32	278													8.03	9	8	small chuk eaten near top, green, OK 3/03; green, good 5/03
8.00	3F	11.52	281													3.90	5	4+1A	green, good 3 & 5/03
9.00	3F	12.09	290													4.11	5	4	green, good 3 & 5/03
10.00	3F	12.34	298													2.77	2	2	behind 12.00 & 13.00, in front of 11.00; green with an orange tubercle, OK 3 & 5/03
11.00	3F	12.37	298													3.01	3	3	farthest from stake; green, good 3/03; olive, OK 5/03
11.10	3F	12.41	295													2.83		0	discovered 5/03; green, good 5/03
11.20	3F	12.49	295													2.47		1	discovered 5/03; green, good 5/03
12.00	3F	12.33	298													1.97	0	0	in front of 10.00, 11.00 & 13.00; green, good 3 & 5/03
13.00	3F	12.34	298													1.04	0	0	behind 12.00 and in front of 10.00; green, good 3/03; green, OK 5/03
14.00	3F	15.42	300													6.08	9	7+2A	green, good 3/03; green, OK 5/03
14.01	3F	15.45	300													0.56	0	0	right of 14.00 & 14.02; green, OK 3 & 5/03
14.02	3F	15.45	300													0.47	0	0	between 14.00 & 14.01; green, OK 3 & 5/03
14.03	3F	15.38	300													0.60		0	discovered 5/03; green, good 5/03
14.04	3F	15.38	300													0.80		0	left of 14.03 and in front of 14.05, discovered 5/03; green, good 5/03

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
14.05	3F	15.40	300													0.83		0	behind and right of 14.04 and right of 14.00, discovered 5/03; green, good 5/03
14.06	3F	15.39	300													1.05		0	at 11 o'clock on 14.00, discovered 5/03; green, good 5/03
14.07	3F	15.40	300													0.50		0	at 11.30 o'clock on 14.00, discovered 5/03; olive, OK 5/03
14.08	3F	15.40	300													0.37		0	at noon o'clock on 14.00, discovered 5/03; green, OK 5/03
14.09	3F	15.39	300													0.53		0	at 1:30 o'clock on 14.00, left of 14.05, discovered 5/03; green, OK 5/03
14.10	3F	15.41	300													0.59		0	at 2:30 o'clock on 14.00, left of 14.05, left and in front of 14.11; discovered 5/03; green, good 5/03
14.11	3F	15.42	300													0.57		0	at 3 o'clock on 14.00, behind 14.05, discovered 5/03; green, OK 5/03
14.12	3F	15.44	300													0.42		0	at 4 o'clock on 14.00, discovered 5/03; red, OK 5/03
14.13	3F	15.46	300													0.68		0	at 5 o'clock on 14.00, discovered 5/03; green, good 5/03
14.14	3F	15.46	300													0.54		0	between and just behind 14.13 & 14.15, discovered 5/03; green, good 5/03
14.15	3F	15.46	300													0.42		0	at 5:30 o'clock on 14.00, discovered 5/03; green, OK 5/03
14.16	3F	15.46	300													0.54		0	at 7 o'clock on 14.00, discovered 5/03; green, good 5/03
14.17	3F	15.45	300													1.15		0	at 8 o'clock on 14.00, discovered 5/03; green, good 5/03
14.18	3F	15.47	300													0.37		0	behind 14.00, at base of rock, discovered 5/03; one measurement only 5/03; green, OK 5/03
14.19	3F	15.48	300													0.41		0	between 14.18 & 14.20, discovered 5/03; one measurement only 5/03; green, OK 5/03
14.20	3F	15.49	300													0.57		0	leftmost of 14.18-14.20, discovered 5/03; one measurement only 5/03; green, poor 5/03
South Owl Pasture, **Stake 2815** = R050119A																			
51.00	2815	2.70	342	3.4	0	0	4.14	2	1+1A	3.89	0	0	dead						discovered 4/16/97; damaged on one side, good 3 & 5/99, 3 & 5/00, puplish, OK 2/01; green, good 4/01;very squishy, apex yellow, very poor, COD weevils, collected for weevil study 2/02

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
52.00	2815	2.67	347	3.9	1+2fr	1	4.72	2fr	2	4.04	0	0	dead						discovered 4/16/97; loose spines nearby, good 3/99; good 5/99; good, green 3/00; old fire scar becoming exposed at base, green, good 5/00; chunk eaten out of side, scarred over, OK 2/01; green, good 4/01; dead, weevil chambers, galleries, and exit holes, COD weevils 2/02
53.00	2815	1.77	5	mia			mia			mia									identity questionable, discovered 4/16/97; plant mia 99, 3 & 5/00, 2 & 4/01
54.00	2815	1.22	85	mia			mia			mia									discovered 4/16/97; big 98; plant mia 99, 3 & 5/00, 2 & 4/01
55.00	2815	0.67	85	mia			mia			mia									discovered 4/16/97; little 98; plant mia 99, 3 & 5/00, 2 & 4/01
56.00	2815	0.75	78	2.3	0	0	2.69	1	1	2.70	0	0	1.97	0	mia	mia			discovered 4/16/97; tiny 98; good 3 & 5/99; good, green 3 & 5/00, 2 & 4/01, very hunkered, green, OK 2/02; plant mia 5/02, 3 & 5/03
57.00	2815	1.04	53	mia			mia			mia	mia	mia							identity questionable, discovered 4/16/97; plant mia 99, 3 & 5/00, 2 & 4/01
58.00	2815	0.61	55	mia			mia			mia									discovered 4/16/97; tiny 98; plant mia 3 & 5/00, 2 & 4/01
59.00	2815	0.69	70	1.1	0	0	1.60	0	0	2.25	2	2A	1.80	0	dead				green, good 3 & 5/99, 3 & 5/00, 2 & 4/01 very squishy, apex yellow, body red very poor, firmly rooted 2/02; headless weevil on plant next to exit hole, COD weevils 5/02
60.00	2815	3.14	184				3.83	2fl+1fr	3	dead									discovered 3/00, green, good 3 & 5/00; uprooted, body hollow, no exit holes, COD unknown 2/01
61.00	2815	3.19	184				3.28	2	2	dead									discovered 3/00, green ,good 3 & 5/00; uprooted, body hollow, no exit holes, COD unknown 2/01
62.00	2815	1.30	85							2.88	1	1A	3.07	0	0	dead			discovered 2/01, green, good 2 & 4/01, 2/02;green, OK 5/02, just spines left, COD unknown 3/03
Stake 2821 = R050120B																			
3.00	2821	5.82	118													3.56	2	2	discovered 3/03; green, good 3 & 5/03
4.00	2821	12.40	135													6.70	7	5+2A	discovered 3/03; green with some red tubercles, OK 3/03; green, OK 5/03
49.00	2821	0.32	180	3.8	2 fr	2	dead												discovered 4/23/97; good 3/99; maroonish, OK 5/99; dead just spines on top, root removed for weevil study 3/00

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
49.10	2821	~8.5	314				5.00	5fr	3	5.14	5	2+5A	5.20	6	3	4.37	0	0	discovered by Bill Armstrong 3/00; reddish, OK 3 & 5/00; tag mia, replaced 2/01; plant maroonish-green, OK 2 & 5/01; same and tubercle missing, scarred over 2/02; orangish-green, OK 5/02; purplish, poor 3/03; squishy, new growth, OK 5/03
49.11	2821	8.66	314							0.75		0	0.84	0	0	mia			not tagged, at 3 o'clock on 49.10, discovered 5/01; green, good 5/01, 2/02; spineless, green, OK 5/02; plant mia 3 & 5/03
49.12	2821	8.68	314							0.38		0	mia			mia			one measurement only, not tagged, at 5:30 o'clock on 49.10, discovered 5/01; green, good 5/01; plant mia 2 & 5/02, 3 & 5/03
49.13	2821	8.69	314							0.44		0	0.59	0	0	0.77	0	0	one measurement only, not tagged, at 6 o'clock on 49.10, discovered 5/01; green, good 5/01, 2 & 5/02, 3 & 5/03
49.14	2821	8.69	314							0.31		0	0.39	0	0	mia			not tagged, at 6:30 o'clock on 49.10, discovered 5/01; one measurement only 5/01, 2/02; green, good 5/01, 2 & 5/02; plant mia 3 & 5/03
49.15	2821	8.69	314							0.28		0	mia			mia			one measurement only, not tagged, at 7 o'clock on 49.10, discovered 5/01; green, good 5/01; plant mia 2 & 5/02, 3 & 5/03
49.16	2821	8.66	314							~.30		0	mia			mia			one measurement only, not tagged, at 9 o'clock on 49.10, discovered 5/01; green, good 5/01; plant mia 2 & 5/02, 3 & 5/03
49.17	2821	8.65	314							~.20		0	mia			mia			one measurement only, not tagged, at 10 o'clock on 49.10, left of 49.18, 49.20, discovered 5/01; green, good 5/01;plant mia 2 & 5/02, 3 & 5/03
49.18	2821	8.65	314							~.20		0	mia			mia			one measurement only, not tagged, at 10 o'clock on 49.10, right of 49.17 and behind 49.19, discovered 5/01; green, good 5/01; plant mia 2 & 5/02, 3 & 5/03
49.19	2821	8.64	314							0.57		0	0.66	mia	0	mia			one measurement only, not tagged, at 11 o'clock on 49.10, right and in front of 49.17 & 49.18, discovered 5/01; green, good 5/01; plant mia 2/02; green, OK 5/02; plant mia 3 & 5/03
49.20	2821	8.62	314							0.32		0	0.62	mia	0	0.82	0	0	one measurement only, not tagged, at 12 o'clock on 49.10, discovered 5/01; green, good 5/01; plant mia 2/02; green OK 5/02; green, good 3 & 5/03
49.21	2821	8.61	314							0.64		0	0.71	0	0	mia			discovered 5/01; green, good 5/01, 2 & 5/02; plant mia 3 & 5/03

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
49.22	2821	8.56	314							0.70		0	0.82	0	0	mia			discovered 5/01; green, good 5/01, 2 & 5/02; plant mia 3 & 5/03
Stake 2931																			
1.00	2931	0.36	12										2.17	1	mia	3.43	0	0	discovered 2/02; green, good 2/02; plant mia 5/02; green, good 3 & 5/03
2.00	2931	0.34	12										0.97	0	mia	2.21	0	0	discovered 2/02; green, good 2/02; plant mia 5/02; green, good 3 & 5/03
19.00	2931	0.30	0	dead															discovered 3/1/92; blooming 98; just spines left, COD unknown 99
20.00	2931	1.22	142	8.4	10fr	9	7.94	2+7fr	10	dead									discovered 3/1/92; great, green 3 & 5/99, 3 & 5/00; exit holes, COD weevils 2/01
Stake 2933 = R050120A																			
3.00	2933	0.98	1450	dead															discovered 3/14/97, blooming 98; just spines left, COD unknown 99
4.00	2933	13.69	1980	dead															discovered 3/13/97, just spines left, COD unknown 99
12.00	2933	3.98	21	6	11 fr	7+4A	7.85	10fr	9+1A	7.98	13	11A	dead						discovered 3/13/97, good, green 3 & 5/99, 3 & 5/00, 2 & 5/01, dead, COD unknown, collected for weevil study 2/02
48.00	2933	11.48	282	4.6	8 fr	2+5A	dead												Big Mama discovered 4/23/97, a little reddish, good 3/99; looks dead, clump easily uprooted, most stems look dead or poor, collected for weevil study 3/00; dead, COD unknown 5/00
48.01	2933	11.48	282	4.1	6 fr	4+1A	dead												looks dead, clump easily uprooted, most stems look dead or poor, collected for weevil study 3/00; dead, COD unknown 5/00
48.02	2933	11.43	282	5.5	6 fr	2+1A	dead												looks dead, clump easily uprooted, most stems look dead or poor, collected for weevil study 3/00; dead, COD unknown 5/00
48.03	2933	11.44	282	3.6	3 fr	3A	dead												looks dead, clump easily uprooted, most stems look dead or poor, collected for weevil study 3/00; dead, COD unknown 5/00
48.04	2933	11.39	282	4.6	6 fr	4+2A	dead												reddish, poor, clump easily uprooted, most stems look dead or poor, collected for weevil study 3/00; dead, COD unknown
48.05	2933	11.43	282	4.3	7 fr	5+2A	dead												looks dead, clump easily uprooted, most stems look dead or poor, collected for weevil study 3/00; dead, COD unknown 5/00

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
48.06	2933	11.41	282	2.5	0	0	dead												reddish, poor, clump easily uprooted, most stems look dead or poor, collected for weevil study 3/00; dead, COD unknown
48.07	2933	11.47	282	4.7	0	0	dead												looks dead, clump easily uprooted, most stems look dead or poor, collected for weevil study 3/00; dead, COD unknown 5/00
48.08	2933	11.51	282	4	4 fr	4	dead												green, OK 3/00; collected with rest of clump for weevil study 3/00; dead, COD unknown
48.09	2933	11.52	282	4.3	5 fr	3+2A	dead												reddish, OK, clump easily uprooted, most stems look dead or poor, collected for weevil study 3/00; dead, COD unknown
48.10	2933	11.53	282	1.8	1 fr	0	3.11	0	0	3.44	1	0	dead						green, good 3/00; reddish, OK 5/00, apex off center, plant green, OK 2 & 5/01; dead, COD unknown, collected for weevil study 2/02
48.11	2933	11.46	282	0.8	0	0	dead												green, OK 3/00; collected with rest of clump for weevil study; dead, COD unknown 3/00
48.12	2933	11.61	282				2.51	1fr	1	3.03	2	0	dead						discovered 3/00; green, good 3 & 5/00, 2/01, slightly reddish-green, OK 5/01; dead, COD unknown, collected for weevil study 2/02
48.13	2933	11.63	282				1.48	0	0	1.56	0	0	dead						discovered 3/00; green, good 3 & 5/00, 2 & 5/01;dead, COD unknown, collected for weevil study 2/02
48.14	2933	11.54	282				1.19	0	0	dead									discovered 3/00; green, good 3 & 5/00; just spines left, COD unknown 2/01
48.15	2933	11.40	282				0.32	0	0	mia			mia			mia			discovered 3/00; OK, 3/00; orange, OK 5/00; plant mia 2 & 5/01,2 & 5/02, 3 & 5/03
48.16	2933	11.37	282				0.80	0	0	mia			mia			mia			discovered 3/00; green, good 3/00; hunkered, OK 5/00; plant and tag mia 2 & 5/01, 2 & 5/02, 3 & 5/03
48.17	2933	11.44	282				0.42	0	0	dead									left of 48.18 and 48.19, discovered 3/00; reddish, OK 3 & 5/00, just spines left, COD unknown 2/01
48.18	2933	11.44	282				0.42	0	0	dead									between 48.17 and 48.19, discovered 3/00; reddish, OK 3 & 5/00; just spines left, COD unknown 2/01
48.19	2933	11.44	282				0.40	0	0	dead									right of 48.17 and 48.18, discovered 3/00; reddish, OK 3 & 5/00; just spines left, COD unknown 2/01
48.20	2933	11.67	282	2.1	1 fr+1A	1A	3.58	3fr	1+1disp	4.15	0	0	3.54	2	0	4.02	0	dead	green, good, lopsided 5/99, 3 & 5/00, small hole in tubercle, plant green, OK 2/01, green, good 5/01, 2 & 5/02, 3/03; weevil chambers and exit holes, COD weevils 5/03

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
48.21	2933	11.42	282				0.37	0	mia	1.32	0	0	mia			mia			discovered 3/00; one measurement only 3/00; green, OK, dislodged, replanted 3/00; mia 5/00; green, good 2 & 5/01; tag and plant mia 2 & 5/02, 3 & 5/03
48.22	2933	11.49	282				0.65	0	0	0.66	0	0	mia			mia			left of 48.23, discovered 3/00; green, good 3 & 5/00, 2 & 5/01; plant mia 2 & 5/02, 3 & 5/03
48.23	2933	11.49	282				0.65	0	0	0.81	0	0	mia			mia			right of 48.22, discovered 3/00; green, good 3 & 5/00, 2 & 5/01; plant mia 2 & 5/02, 3 & 5/03
48.24	2933	11.51	282				0.31		0	0.62	mia	0	mia			mia			not tagged, just behind 28.22 and 28.23 tag, discovered 5/00; green, good 5/00; plant mia 2/01; relocated 5/01, green, good 5/01; plant mia 2 & 5/02, 3 & 5/03
48.25	2933	11.54	282							0.67	0	mia	mia			mia			discovered 2/01; green, good 2/01; tag loose, plant mia 5/01, 2 & 5/02, 3 & 5/03
48.26	2933	11.68	284							2.41	0	0	dead						discovered 2/01; green with some red tubercle tips, OK 2/01; green, good 5/01; attached to live plant (48.27), COD unknown 2/02
48.27	2933	11.69	284							2.22	0	0	1.80	0	0	2.22	0	0	discovered 2/01; green, good 2 & 5/01; green OK 2/02; green good 5/02; loose spines, green with some mushy reddish tubercles 3/03; green, OK 5/03
48.30	2933	11.55	282	1.3		0	mia			mia			mia						discovered under prickly pear 5/99, tag and plant mia 3 & 5/00, 2 & 5/01, 2 & 5/02
48.31	2933	11.52	282										0.42		0	mia			behind tag for 48.22 & 48.23, discovered 5/02; green, good 5/02; plant mia 3 & 5/03
48.32	2933	11.40	282										1.10		0	dead			discovered 5/02, green, good 5/02; weevil larvae inside, COD weevils 3/03
48.33	2933	11.49	282										0.78		0	0.85	0	0	discovered 5/02; green, good 5/02, 3 & 5/03
61.00	2933	13.41	290	mia			mia			mia									discovered 5/28/97; perfect sp? 98; gone without a trace 99; plant mia 99; 3 & 5/00, 2 & 5/01
Stake 2934 = R050119B																			
1.00	2934	0.61	0																dead 98
1.10	2934	15.00	129				5.01	2fl+4fr	6	4.87	2	2A	5.62	9	2+5A	dead			discovered by Bill Armstrong 3/00; maroonish, OK 3/00; olive, OK 5/00, tag mia, replaced 2/01; purplish green, OK 2 & 5/01 purplish green, good 2/02; olive with some pink tubercle tips, OK 5/02; weevil chambers and exit holes, COD weevils 3/03
Stake 2936 = R050120C																			
18.00	2936	0.58	174	4.3	5 fr	5	5.72	2+4fr	6	6.72	7	1+8A	7.10	10	6+1A	7.88	13	7+3A	discovered 3/17/97; blooming 98; good, green 3 & 5/99, 3 & 5/00, 2 & 5/01, 2 & 5/02, 3 & 5/03

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
18.01	2936	0.53	174										0.62		0	dead			at 1.30 o'clock on 18, discovered 5/02; green, good 5/02, hollow, COD weevils 3/03
18.02	2936	0.54	174										0.62		0	0.90	0	0	at 2 o'clock on 18, discovered 5/02; green, OK 5/02, 3 & 5/03
18.03	2936	0.59	174										0.78		0	0.98	0	0	at 4 o'clock on 18.00, discovered 5/02; one measurement only, green, OK 5/02; green, good 3 & 5/03
Stake 2815 equals 2837 on map, not marked																			
South Owl Pasture - turn left at bottom of hill, stop by second hackberry																			
	Stake 1 - ~2 meters WNW of agarita 234 degrees from first live oak on road, flanked by 2 persimmons; R050116A																		
1.00	1	4.85	47							6.66	4	dead							discovered by BA 8?/00; tagged, some tubercle damage, green, OK 2/01, dead, collected for weevil study 4/01, two seedlings replanted under rock in hole (1.01 & 1.02)
1.01	1	4.83	48							0.46		0	0.58	0	0	mia			green, good 4/01; red, OK 2/02; grayish-green, OK 5/02; plant mia 3 & 5/03
1.02	1	4.84	48							0.29		0	0.41	0	0	0.97	0	0	green, good 4/01; red, OK 2/02; grayish-green, OK 5/02; green, OK 3/03; green, good 5/03
2.00	1	5.07	56							4.59	4	1	dead						discovered by Bill Armstrong 8/00; tagged 2/01; green, good 2 & 4/01 (collected weevil on ground beside plant); just spines left 2/02
3.00	1	5.02	54													0.82	0	0	discovered 3/03; green, OK 3 & 5/03
North Owl Pasture, **Stake 2928**																			
29.00	2928	3.11	83	dead															discovered 3/17/97; non-blooming 98, hollow, weevils? 3/99
30.00	2928	3.14	3	6.9	12 fr	11+2A	8.93	3+13fr	16	dead									discovered 3/10/97; blooming 98, good 3 & 5/99, 3 & 5/00, many small exit holes, COD weevils 2/01
45.00	2928	18.47	240	mia			mia			mia									discovered 4/23/97; sick/dying 98; mia 99, 3 & 5/00, 2 & 5/01
Stake 2929																			
33.00	2929	0.43	280	1.9	0	0	3.43	2+1fr	2+1A	4.62	4	4A	dead						discovered 3/13/97; blooming 98, poor, only a few tubercles left 3/99, good, green 5/99, misshapen, green, one reddish tubercle, OK 3/00, green, good 5/00, 2 & 5/01, root hollow, COD unknown 2/02
Stake 2932																			

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
34.00	2932	5.91	260	mia			mia			mia									mia 99, 3 & 5/00, 2 & 5/01
35.00	2932	1.58	215	mia			mia			mia									discovered 3/17/97; identity questionable; sick/dying 98; mia 99, 3 & 5/00, 2 & 5/01
36.00	2932	1.77	214	mia			mia			mia									discovered 3/17/97; identity questionable; non-blooming 98; mia 99, 3 & 5/00, 2 & 5/01
37.00	2932	11.72	210	4.3	2	dead													discovered 3/17/97; blooming 98; good 3/99; hollow, collected by WHC 5/99; dead, COD weevils
38.00	2932	11.76	210	4	2 fr	dead													discovered 3/17/97; blooming 98; good 3/99; squishy, collected by WHC 5/99; dead, COD may be weevils
59	2932	17.37	75	mia			mia			mia									not habitat at these directions; discovered 5/28/97; fruit with bl? 98; mia 99, 3 & 5/00, 2 & 5/01
60	2932	17.37	73	mia			mia			mia									not habitat at these directions; discovered 5/28/97; tiny 98; mia 99, 3 & 5/00, 2 & 5/01
Stake 2935																			
39.00	2935	0.61	180	mia			mia			mia									discovered 3/17/97; blooming 98; mia 99, 3 & 5/00, 2 & 5/01
40.00	2935	0.67	185	mia			mia			mia									discovered 3/17/97; blooming 98; mia 3 & 5/00, 2 & 5/01
West Fawn Pasture																			
42.00	2824	0.00	0	dead															discovered 4/11/97; 1 we? 98; COD unknown
Plot 8 Pasture																			
43.00	2811	0.26	194	5.3	5 fr	3+1A	5.20	0	dead										discovered 4/16/97; green; good 3 & 5/99; brown and tan near base, green on top, very squishy, loosely rooted, poor, removed for weevil study 3/00; dead; COD unknown
44.00	2811	0.30	180	4.4	2 fr	1+1A	dead												discovered 4/16/97; green; good 3 & 5/99; dead; weevil larvae inside stem, stem with reddish-brown liquid inside, removed for weevil study 3/00
44.10	2811	0.30	202	4	0	0	dead												3rd misshapen head 3 & 5/99; dead; weevil larvae inside stem, stem with reddish-brown viscous liquid inside, removed for weevil study 3/00
Stake 2593 = R050115B, Plot 9 rebar in second opening, south from 19th large fence post from gate (including gate fence post) in Plot 8/9 fenceline																			

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
70.00	2593	5.35	293				5.95	5	5	5.72	0	2A	6.38	4	6+1A	dead			discovered by Bill Armstrong 3/00; green, good 3 & 5/00, 2 & 5/01, 2 & 5/02; collected for weevil study; COD unknown 3/03
Stake 2 = R050116B, South Owl 2 (Max's Site) - Site discovered 3/01by Max Traweek; Plot added on 4/30/01; South Owl main road, at bottom of hill,																			
	turn right, go 0.1 mi; turn left, go 0.1 mi, site on left																		
0.00	2	2.72	76										1.60	0	0	1.33	0	0	discovered 2/02;green, good 2 & 5/02; apex eaten, gray green, poor 3/03; new apex forming, green, OK 5/03
0.10	2	1.85	75													0.54		0	discovered 5/03; green, good 5/03
0.20	2	1.90	78													0.76		0	discovered 5/03; green, good 5/03
0.30	2	1.93	76													0.95		0	discovered 5/03; green, OK 5/03
0.40	2	1.96	76													0.57		0	discovered 5/03; green, OK 5/03
0.50	2	2.13	71													0.65		0	discovered 5/03; hunkered, green, OK 5/03
1.00	2	1.71	116							4.96		2	dead						reddish-green, OK 4/01; dead, weevil chambers, galleries & exit holes, COD weevils 2/02
1.01	2	1.69	116										0.28	0	mia	0.94	0	0	discovered 2/02; red, OK 2/02; plant mia 5/02; green, OK 3 & 5/03
1.02	2	1.70	116										0.88	0	0	0.88	0	0	discovered 2/02; hunkered, green, OK 2/02; out, red, OK 5/02; green, OK 3 & 5/03
1.03	2	1.74	116										0.77	0	0	1.01	0	0	discovered 2/02; maroonish 2/02; gray-green, poor 5/02; green, OK 3/03; green, good 5/03
1.04	2	1.71	116										0.34	0	0	0.66	0	0	discovered 2/02; olive, OK 2/02; gray-green, poor 5/02; gray green, 3/03; green, OK 5/03
1.05	2	1.73	116										0.31	0	0	mia			discovered 2/02; red at base, OK 2/02; olive, OK 5/02; plant mia 3 & 5/03
1.06	2	1.72	116										0.26	0	0	0.30	0	0	discovered 2/02; red, OK 2 & 5/02, 3 & 5/03
1.07	2	1.735	116										0.30	0	0	mia			discovered 2/02; red, OK 2/02; red, poor 5/02; plant mia 3 & 5/03
1.08	2	1.73	116										0.40	0	0	mia			discovered 2/02; green, OK 2 & 5/02; plant mia 3 & 5/03
1.09	2	1.72	116										0.37	0	mia	0.47	mia	0	behind 1.02, right of 6.00, left of 1.03 and in front of 1.10; discovered 2/02; green OK 2/02; plant mia 5/02; plant mia 3/03; green, OK 5/03
1.10	2	1.79	116										0.79	0	0	1.28	0	0	discovered 2/02; green, OK 2 & 5/02, 3 & 5/03
1.11	2	1.83	116										0.51	0	0	0.91	0	mia	discovered 2/02; reddish, OK 2/02; green, OK 5/02, 3/03; plant mia 5/03

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
1.12	2	1.84	117										0.60	0	mia	0.85	mia	0	discovered 2/02; blue-green, OK 2/02; plant mia 5/02, 3/03; reddish olive, OK 5/03
1.13	2	1.69	113										0.99	0	0	mia			discovered 2/02; blue-green, OK 2/02; olive, OK 5/02; plant mia 3 & 5/03
1.14	2	1.65	95										0.79	0	0	dead			discovered 2/02; maroonish, OK 2/02; green, good 5/02; just spines left, COD unknown 3/03
1.15	2	1.76	95										0.58	0	0	0.79	0	0	discovered 2/02; reddish green, OK 2/02; olive, OK 5/02, 3 & 5/03
1.16	2	1.96	97										0.67	0	0	1.21	0	0	discovered 2/02; maroon, OK 2/02; green, OK 5/02, 3/03; green, good 5/03
1.17	2	2.11	96										0.55	0	0	1.24	0	0	discovered 2/02; hunkered, green, OK 2/02; green, good 5/02; reddish green, OK 3/03; green, good 5/03
1.18	2	1.69	101													0.88	0	0	left of 1.19 (may be same plant), discovered 3/03; reddish, poor 3/03; reddish, OK 5/03
1.19	2	1.70	101													0.72	0	0	right of 1.18 (may be same plant), discovered 3/03; green, OK 3 & 5/03
2.00	2	1.62	116							1.02		0	0.99	0	0	1.72	0	0	left edge of grass clump; reddish-green, OK 4/01; tag mia, replaced, plant olive, OK 2 & 5/02; green, OK 3/03; green, good 5/03
2.10	2	1.38	116										0.69	0	0	1.06	0	0	discovered 2/02; one measurement only 2/02; green, OK 2 & 5/02, 3/03; green, good 5/03
2.20	2	1.51	119													0.63		0	discovered 5/03; green, OK 5/03
3.00	2	1.70	118							0.55		0	0.61	0	0	1.01	0	0	right of 4.00; green, OK 4/01; tag mia, replaced, plant maroonish, OK 2/02; reddish, OK 5/02; green, OK 3 & 5/03
4.00	2	1.70	118							0.38		0	0.73	0	0	0.82	0	0	behind 3.00; green, OK 4/01; tag mia, replaced, plant marooonish, OK 2 & 5/02; green, OK 3/03; green, good 5/03
5.00	2	1.73	118							0.29		0	0.90	0	0	0.94	0	0	front of 6.00 and behind 4.00; red, OK 4/01; green, OK 2 & 5/02, 3/03; green, good 5/03
5.10	2	1.66	116										0.45	0	0	1.02	0	0	discovered 2/02; red, OK 2 & 5/02; green, good 3 & 5/03
6.00	2	1.73	118							0.47		0	0.63	0	0	mia			6.00 is behind 5.00; green, OK 4/01; hunkered, poor 2/02; green, OK 5/02; plant mia 3 & 5/03
6.10	2	1.73	118										0.68		0	mia			discovered 5/02; green, OK 5/02; plant mia 3 & 5/03
7.00	2	1.20	116							1.03		0	1.12	0	0	2.19	0	0	green, good 4/01; tag mia replaced, plant green, good 2 & 5/02, 3 & 5/03
7.10	2	0.55	124										1.29		0	1.27	0	0	discovered 5/02; green, OK 5/02, 3/03; tag mia, replaced, plant green, good 5/03

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
7.20	2	0.94	104										1.47		0	1.06	0	dead	discovered 5/02; green, OK 5/02; dead?, firmly rooted 3/03; stem hollow, COD weevils? 5/03
7.30	2	1.10	79										0.79		0	0.99	mia	0	discovered 5/02; green, OK 5/02; tag and plant mia 3/03; popped out beside crustose lichen, green, good 5/03
7.40	2	1.43	102													1.51		0	discovered 5/03; green, good 5/03
7.50	2	1.48	105													1.37		0	under rock, discovered 5/03; green, OK 5/03
8.00	2	1.95	110							0.71		0	0.78	0	0	1.41	0	0	green, good 4/01; tag mia replaced, plant maroonish, OK 2/02; green, OK 5/02; green, good 3/03; green, OK 5/03
9.00	2	2.02	114							1.02		0	1.19	0	0	1.41	0	0	green, good 4/01; tag loose, plant purplish green, OK 2 & 5/02, 3/03; green, good 5/03
9.10	2	2.25	112										2.58	2	1A	2.51	0	0	discovered 2/02; purplish green, good 2 & 5/02; green, OK 3 & 5/03
10.00	2	2.46	112							1.36		0	1.50	0	0	2.07	0	0	green, good 4/01, 2 & 5/02, 3/03; reddish at base, green above, good 5/03
10.10	2	2.47	97										1.11	0	0	2.06	0	0	discovered 2/02; olive, OK 2 & 5/02; green, good 3 & 5/03
11.00	2	2.69	114							1.36		0	1.86	0	0	mia			green, good 4/01; olive, OK 2 & 5/02; plant and tag mia 3 & 5/03
12.00	2	2.80	114							1.50		0	2.45	2	0	dead			green, good 4/01, 2 & 5/02, just spines left, COD unknown 3/03
13.00	2	3.10	104							0.96		0	1.03	0	0	1.23	0	0	green, good 4/01, 2 & 5/02, 3/03; green, OK 5/03
14.00	2	2.06	112							0.28		0	mia			mia			green, OK 4/01; tag & plant mia 2 & 5/02, 3 & 5/03
15.00	2	3.20	103							0.36		0	0.60	0	0	0.88	0	0	one measurement only 2/02; green, OK 4/01, 2 & 5/02; green, good 3 & 5/03
16.00	2	3.20	103							0.49		0	0.72	0	0	1.03	mia	0	one measurement only 4/01, 2/02; green, OK 4/01, 2 & 5/02; plant and tag mia 3/03; retagged, green, good 5/03
16.10	2	3.17	103										0.82	0	0	0.74	0	0	discovered 2/02; green, OK 2 & 5/02, 3 & 5/03
17.00	2	3.22	103							0.35		0	0.49	0	0	0.84	0	0	green, OK 4/01, 2 & 5/02; green, good 3 & 5/03
18.00	2	3.32	103							0.35		0	0.62	0	0	1.05	0	0	one measurement only 4/01; green, good 4/01, 2 & 5/02, 3 & 5/03
18.10	2	3.38	93										2.51	2	1A	1.51	0	0	discovered 2/02; purplish green, good, 2 & 5/02; partly eaten, new stem forming, green good 3/03; two apices formed, green, good 5/03
18.20	2	3.04	86										2.45		0	2.18	0	0	discovered 5/02; green, good 5/02; partly eaten, poor 3/03; green, good 5/03

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
19.00	2	3.23	103							0.34		0	0.49	0	0	mia			one measurement only 4/01; green, OK 4/01, 2/02; good 5/02; plant mia 3 & 5/03
20.00	2	3.82	103.5							1.26		0	1.80	0	0	2.33	1	0	green, good 4/01; olive OK 2/02; green, good 5/02; reddish green, OK 3 & 5/03
21.00	2	2.60	97							1.68		0	dead						reddish-green, OK (dead plant beside, COD weevils) 4/01; solid, dry, COD unknown 2/02
22.00	2	2.50	117							2.26		0	2.38	2	0	dead			green, good 4/01, 2 & 5/02; small chamber, COD weevils 3/03
22.01	2	2.46	117										0.43	0	0	0.82	0	0	discovered 2/02; under rock, not tagged, green, OK 2 & 5/02, 3 & 5/03
22.10	2	2.94	117										0.95		0	1.15	0	0	discovered 5/02; olive, OK 5/02, 3 & 5/03
22.20	2	2.71	124													0.93		0	discovered 5/03; green, good 5/03
22.30	2	2.83	124													0.75		0	discovered 5/03; green, good 5/03
22.40	2	2.86	128													1.01		0	discovered 5/03; green, OK 5/03
23.00	2	1.46	118							1.26		0	1.79	0	0	dead			green, good 4/01, olive, OK 2 & 5/02; small chamber, COD weevils 3/03
24.00	2	1.83	136							1.64		0	2.37	2	1A	1.95	0	0	green, good 4/01;purplish green, good 2 & 5/02; eaten to soil level, probably dead 3/03; new apex froming, green, OK 5/03
24.10	2	1.65	130										0.79		0	0.97	0	0	discovered 5/02; green, OK 5/02, 3 & 5/03
25.00	2	2.35	132							1.61		0	1.58	0	0	2.56	0	0	green, good 4/01, 2 & 5/02, 3 & 5/03
25.10	2	2.25	132										1.16	0	0	mia			discovered 2/02; olive, OK 2/02; reddish, poor 5/02; plant mia 3 & 5/03
25.20	2	2.20	123													1.62		0	discovered 5/03; hunkered, green, good 5/03
26.00	2	2.65	131							3.72		4	3.94	4	2+2A	dead			green, good 4/01, tag mia, replaced, plant slightly purplish green, good 2 & 5/02; large larva inside, COD Moneilema 3/03
27.00	2	1.77	155							5.34		0	0.53	0	0	0.83	0	0	three apical meristems, plant reddish-olive, new spine growth, OK 4/01; plant green, OK 2 & 5/02; green, good 3 & 5/03
28.00	2	1.64	149							0.90		0	1.24	0	0	1.49	0	0	green, good 4/01, 2 & 5/02, 3 & 5/03
29.00	2	1.74	149							0.48		0	0.56	0	0	0.85	0	0	in front of 30 and 27, not tagged 4/01; green, OK 4/01, 2 & 5/02; green, good 3 & 5/03
30.00	2	1.74	149							0.44		0	0.43	0	0	0.77	0	0	behind 29 and in front of 27, not tagged 4/01; green, OK 4/01, 2 & 5/02; green, good 3 & 5/03
31.00	2	1.75	149							0.37		0	0.34	0	0	0.60	0	0	left of 29 and 30 and in front of 27, not tagged 4/01; green, OK 4/01, 2 & 5/02; green, good 3 & 5/03

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PL#	STAKE	DIST.	ANGLE	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
32.00	2	1.83	160							0.79		0	1.02	0	0	1.49	0	0	green, good 4/01; tag mia, replaced, plant green, good 2/02, 3 & 5/03
33.00	2	1.83	158							0.67		0	0.81	0	0	1.41	0	0	green, good 4/01; tag mia, replaced, plant green, OK 2 & 5/02; green, good 3 & 5/03
33.01	2	1.81	158													0.43	0	0	at 2 o'clock on 33.00, discovered 3/03; green, OK 3 & 5/03
34.00	2	1.87	160							0.55		0	0.42	0	0	0.58	0	0	green, OK 4/01; tag mia, replaced, plant green, OK 2 & 5/02, 3 & 5/03
34.10	2	1.88	158										0.45	0	0	mia			discovered 2/02; green, OK 2 & 5/02; plant mia 3 & 5/03
34.20	2	1.85	153										0.50	0	0	0.70	0	dead	discovered 2/02; green, OK 2 & 5/02, 3/03; dry, hard, solid, COD unknown 5/03
35.00	2	1.90	160							1.14		0	1.34	0	0	2.11	0	0	green, good 4/01; tag mia, replaced, plant green, good 2 & 5/02, 3 & 5/03
35.10	2	1.88	157										0.41		0	mia			discovered 5/02; green, OK 5/02; plant mia 3 & 5/03
36.00	2	1.93	160							0.37		0	0.63	0	0	0.88	0	0	green, OK 4/01; tag mia, replaced, plant green, OK 2 & 5/02; green, good 3 & 5/03
37.00	2	1.90	162							1.00		0	1.13	0	0	1.24	0	0	green, good 4/01; green, OK 2 & 5/02; green, good 3 & 5/03
38.00	2	1.91	162							1.26		0	1.43	0	0	1.77	0	0	green, good 4/01; green, OK 2 & 5/02; green, good 3 & 5/03
39.00	2	1.51	163							0.86		0	0.87	0	0	0.68	0	0	green, good 4/01; red, OK tag mia, replaced 2/02; olive, OK 5/02; reddish, OK 3 & 5/03
39.10	2	1.02	142										0.88	0	0	1.24	0	0	discovered 2/02; reddish green, OK 2/02;green, good 5/02, 3 & 5/03
40.00	2	1.99	163							0.29		0	0.40	0	0	mia			green, OK 4/01; tag mia, replaced, grayish green, OK 2 & 5/02; plant mia 3/03; plant and tag mia 5/03
41.00	2	2.01	154							0.74		0	1.24	0	0	1.44	1	0	green, good 4/01, 2 & 5/02, 3 & 5/03
41.10	2	1.98	154										0.56	0	0	mia			discovered 2/02; green, good 2 & 5/02; plant mia 3 & 5/03
42.00	2	2.19	164							0.90		0	0.95	0	0	1.51	0	0	green, good 4/01; maroonish, OK 2 & 5/02; green, good 3 & 5/03
43.00	2	3.69	161							1.13		0	1.53	1	0	2.04	0	0	green, good 4/01; purple, OK, tag mia, replaced 2/02; pale green, OK 5/02; 85% eaten, remaining tubercles red, poor 3/03; one tubercle sprouting, green, good 5/03
44.00	2	2.38	163							0.85		0	0.93	0	0	1.26	0	0	green, good 4/01; maroonish, OK 2/02; green, good 5/02, 3 & 5/03

Ancistrocactus tobuschii Data for Las Rincones

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
The **reference point (rebar)** is in front of a pruned juniper. GPS1 R030914A																												
1.00		7.93	73	2.20	1	0	3.20	1+1B	1A	2.90	1	1	3.10	3fr	2	3.93	3	3	3.14	0	0	dead						good 3/98; pulling into soil 5/98 & 3/99; popping out, olive, OK 5/99; out, green, good 3 & 5/00; green with some red and orange tubercle tips, misshapen, OK 2 & 4/01; dry, corky, hollow inside, COD unknown 3/02
2.00		8.03	73	1.90	1	0	2.50	1+1B	2	1.90	2	2	2.77	2	2	2.63	2	2	2.66	0	0	2.34	2	2	3.12	2	1+1A	dead plant beside 3/96; dead plant gone, getting covered by lichens, but looking good 3 & 5/98, 3/99; olive, OK 3/99; slightly hunkered, green with a few orange tubercles, OK 3 & 5/00; pale green, OK 2/01; green, good 4/01, 3 & 4/02, 3 & 5/03
3.00		8.22	75	2.80	1+1fr	2	2.80	3	1A	2.70	0	0	2.80	2	3	3.77	4	4	3.83	1	1A	2.15	0	0	dead			very small buds 3/97; OK 3 & 5/98, 3/99; green, good 5/99; olive, OK 3/00; green, good 5/00; yellowish-green, OK 2/01; green with yellowish tubercle tips, OK 4/01; grayish red, poor 3/02; seems dead, but firmly rooted 4/02; collected for weevil study, COD probably weevils 3/03
3.01		8.18	75										0.40		0	0.56	0	0	0.84	0	0	1.10	0	0	1.55	0	0	in rock, discovered 5/99; green, OK 5/99, 3 & 5/00; green, good 2 & 4/01, 3 & 4/02, 3 & 5/03
4.00		7.94	76	3.30	1+2fr	3	3.60	2+2B	1+3A	4.10	3	3	3.60	1+1fr	2	3.89	3	3	3.91	1	1	3.63	2	3	dead			good 3 & 5/98, 3/99; maroon, OK 5/99 & 3/00; orangish, OK 5/00; reddish olive, OK 2 & 4/01; olive, OK 3 & 4/02; collected for weevil study, COD unknown 3/03
5.00		6.97	74	4.10	0	0	4.50	3B	3	4.30	3	3	dead															of the cluster 5-6, 5 is on the right looking toward the reference point; good 3 & 5/98; dead, solid and dry, granular and fluffy inside, COD unknown 3/99
6.00		6.96	74	3.40	0	0	4.00	1+2B	3	3.50	1	1	dead															of the cluster 5-6, 6 is to the left of 5; OK 5/98; dead, solid, dry, fluffy - granular inside, COD unknown 3/99
7.00		7.05	76	3.10	2	2	3.10	1+2B	2	3.00	1	2	3.03	1fr	1	3.95	3+1fr	4	4.38	3	4	4.15	2	3	4.40	0	0	good 3 & 5/99; good, green 3 & 5/00, 2 & 4/01; one red tubercle, otherwise green, good 3 & 4/02; soil disturbance in area, plant green, with some orange spots, OK 3/03; olive, OK 5/03
8.00		7.13	76	4.50	3	3	5.30	2+2B	4	4.90	0	0	4.43	2+1fr	3	5.49	3	3	5.59	3	3	4.73	3	0	dead			plant good, tag loose 3/99; good 5/99; slightly reddish, good 3 & 5/00; green, good 2 & 4/01, 3/02; apex covered by ant dirt, green, good, 4/02; torn apart by rooting, COD rooting 2/03; two seedlings replanted 3/03

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
9.00		7.08	74	1.60	0	0	2.30	0	0	2.40	0	0	2.52	0	0	3.06	3	3	3.70	0	0	3.52	2	2	3.93	0	0	green, good 5/99, 3 & 5/00, 2 & 4/01, 3 & 4/02; olive, OK 3/03; covered in ant dirt, only spines showing 5/03
9.01		7.01	74										2.38		0	2.68	0	0	2.33	0	0	2.35	0	0	2.71	0	0	green, good, discovered 5/99, 3 & 5/00, 2 & 4/01, 3 & 4/02; green, OK 3 & 5/03
9.10		6.75	71																						1.13	0	0	in rock, discovered 3/03; green, OK 3 & 5/03
9.20		6.59	69																						1.76		0	discovered 5/03; hunkered, olive, OK 5/03
10.00		7.11	78	1.40	0	0	1.40	0	0	1.50	0	0	1.92	0	0	2.57	0	0	2.74	0	0	2.40	0	0	2.78	0	0	good 3 & 5/99; green, good 3 & 5/00, 2 & 4/01; partly covered by dying prickly pear, green, OK 3/02; out, green, OK 4/02; buried by dirt from soil disturbance, unburied, green, OK 3 & 5/03
11.00		8.68	79	2.40	2	1	dead																					disappearance due to fire ants?; no more fire ants, plant mia 3 & 5/97, 3 & 5/98, 3/99 and 5/99; COD fire ants 3/97
12.00		6.77	86	2.60	0	0	3.20	1	1	3.70	3	3	3.15	1+1fr	2	3.88	0	0	4.61	1	1	4.54	2	2A	5.20	0	0	of the cluster 12-15, 12 is left of 15, closest to the reference point; good 5/98, 3 & 5/99, 3/00; green, good 5/00, 4/01, 3/02; partly covered by ant dirt, green, good 4/02; out, green, OK 3/03; a little ant dirt on apex, green, OK 5/03
13.00		6.80	86	2.90	1	0	3.20	2B	2	2.80	0	1	4.19	2	1+1A	5.04	2	2	5.14	2	2	5.24	3	3A	5.83	0	0	of the cluster 12-15, 13 is behind and to the right of 12; flower buds look odd 3/97; good 5/98, 3 & 5/99; green, good 3 & 5/00, 2/01; green, good 4/01, 3/02; partly covered with ant dirt, green, good 4/02; out, green, OK 3/03; new apex forming between 12.00 and 13.00, green, OK 5/03
14.00		6.80	86	3.30	2	2	3.40	2B	0	3.90	2	2	3.92	2	3	4.98	4	4	5.38	2	2+1A	5.09	3	4A	5.03	0	0	of the cluster 12-15, 14 is behind 12 & to the left of 13; buds barely formed 3/97; good 5/98, 3 & 5/99; green, good 3 & 5/00, 2/01; green, good 4/01, 3/02; partly covered by ant dirt, green, good 4/02; out, forming second apex, green, OK 3/03; totally covered by ant dirt, only spines showing 5/03

Ancistrocactus tobuschii Data for Las Rincones

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
15.00		6.80	86	2.30	0	0	2.80	1B	0	3.00	1	1	2.93	1	1	3.05	1	1	3.24	0	0	3.35	2	2A	3.64	0	0	of the cluster 12-15, 15 is to the left of 14; bud very small 3/97; good 5/98, 3 & 5/99; reddish, OK 3 & 5/00; olive, OK 2 & 4/01; green with a few brown tubercle tips, good 3/02; partly covered by ant dirt, green, good 4/02; out, green, OK 3/03; almost covered by ant dirt, green, OK 5/03
16.00		6.65	88	2.60	2	0	3.30	1B	1	3.10	0	1	3.43	2	2	4.26	2	2	3.84	0	0	4.37	3	3A	4.55	1	1A	plant crushed 3/96; OK 3/97, 3/98 & 5/98, 3/99; olive, OK 5/99; green, good 3 & 5/00; chunk missing on one side, scarred over, green, OK 2 & 4/01; green, good 3/02; partly covered by ant dirt, green, good 4/02; out, forming second apex, green, OK 3/03; almost covered by ant dirt, green, OK 5/03
17.00		6.20	88	2.30	1	1	3.50	3B	2+1A	3.30	3	3	3.42	1	1	4.08	0	0	2.97	0	dead							on right of 18.00, good 5/98, 3/99; green, good 5/99, forming a new apical meristem; green, good 3 & 5/00, 2/01; dead, chambers & galleries, COD, weevils, collected for weevil study 4/01
18.00		6.20	66	2.20	0	0	3.20	3B	3	3.40	1	1	2.93	3	3	4.26	4	3+1A	3.75	0	0	dead						on left of 17.00, good 5/98, 3/99; green, good 5/99, 3 & 5/00; green with some reddish tubercles, OK 4/01; hollow, dry, corky, COD unknown 3/02
19.00		6.57	88	2.00	0	0	2.80	1+1B	2	3.10	1	1	3.40	2+2fr	4	4.28	3	3	4.16	3	3+1A	4.18	4	3+1A	4.84	4	3	good 3 & 5/99; green, good 3 & 5/00, 2 & 4/01, 3 & 4/02, 3/03; partly covered by ant dirt, green, OK 5/03
19.01		6.54	88										1.54		0	1.83	0	0	dead									left of 19.02, discovered 5/99; green, good 5/99, 3 & 5/00; just spines left, COD unknown 2/01
19.02		6.55	88										1.41		0	1.66	0	0	dead									on right of 19.01, discovered 5/99; slightly maroonish, OK 5/99; green, good 3 & 5/00; filled with orange liquid, no insect sign, COD probably fly larva 2/01
20.00		6.51	94	2.80	2	2	3.70	3B	3	4.60	3	5	4.45	4+1fr	5	4.47	2	2	4.21	0	0	4.32	3	3A	4.40	3	0	tag mia, replaced 3/98; good 3/99; good, green 5/99; turning goldish at base, otherwise green, OK 3 & 5/00, 2/01; green, good 4/01; green, good 3/02; partly covered by ant dirt, green, good 4/02; out, green, good 3/03; covered by ant dirt, only spines showing 5/03

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
20.01		6.79	95																0.92	0	0	1.15	0	0	1.53	0	0	discovered 2/01, in solution pocket in rock, green, good 2/01; covered by pissant dirt, OK 4/01; green, good 3 & 4/02, 3 & 5/03
21.00		6.41	94	1.70	0	0	1.80	0	0	2.10	2	2	2.09	1	0	2.36	1	1	2.53	1	0	2.14	0	0	2.34	0	0	of the cluster 21-23, 21 is to the left and behind 22 and 23; good 5/98, 3/99; green, good 5/99; reddish, OK 3/00; green, good 5/00; reddish olive, OK 2/01; reddish, poor 4/01; reddish green, OK 3 & 4/02, 3/03; covered by ant dirt, only spines showing 5/03
22.00		6.38	94	3.40	2	2	4.40	2B	2	4.70	4	3+1A	4.26	2+1fr	3	4.47	0	0	4.04	0	0	3.78	0	0				of the cluster 21-23, 22 is to the left of 23; looks good 5/98, 3/99; maroonish, OK 5/99; olive, OK 3 & 5/00; marronish-olive, OK/poor 2/01; forming a second apical meristem, green, OK 4/01; same, but olive, OK 3 & 4/02
22.01		6.38	94.00																						2.39	0	0	to the left of 22.02; olive, OK 3 & 5/03
22.02		6.38	94.00																						3.47	0	0	to the right of 22.01; olive, OK 3 & 5/03
23.00		6.38	94	3.20	2	2	4.00	2B	2	3.80	3	3	3.97	1+1fr	2	4.61	3	3	4.59	2	2	4.44	0	1+3A	4.46	1	0	of the cluster 21-23, 23 is to the right of 22; good 5/98, 3/99; maroonish, OK 5/99; olive, OK 3 & 5/00, 2/01; yellow-green at the base, green above, new spine growth 4/01; olive, OK 3 & 4/02, 3 & 5/03
23.01		6.36	94																0.69		0	0.82	0	0	1.31	0	0	discovered 4/01, 12 o'clock on 23, green, OK 4/01, 3/02; green, good 4/02; green, OK 3 & 5/03
24.00		6.58	94	2.40	0	0	2.50	0	0	2.50	0	0	dead															grayish red, firmly rooted, looks bad 3 & 5/97, about one-third eaten, grayish red, bad 3/98, misshapen, OK 5/98, dead, solid, granular, COD unknown 3/99
25.00		6.45	99	2.20	0	0	2.80	1B	1A	2.70	2	2	2.94	1+1fr	2	3.25	2	2	3.15	2	2	2.72	0	0	2.71	0	0	good 3/99; maroonish, OK 5/99 & 3/00; orangish, OK 5/00; olive, OK 2 & 4/01; yellow base, olive above, poor 3/02; reddish green, OK 4/02; green, OK 3/03; reddish, poor 5/03
26.00		6.30	99	2.70	0	0	3.00	0	0	3.20	0	0	3.24	1+1fr	1+1A	3.59	2	2	3.50	0	0	3.04	0	0	3.15	0	0	good 3/99; maroonish, OK 5/99 & 3/00; olive, OK 5/00; maroonish, OK-poor 2/01; maroonish-green, OK 4/01, 3 & 4/02, 3/03; green, OK 5/03
27.00		6.18	99	3.40	3	3	4.00	2BB	1+1A	4.10	3	3	3.60	2	2	3.79	3	2+1A	3.78	1	1	3.58	3	2	3.49	1	0	good 3/99; green, good 5/99; reddish, OK 3/00; green, good 5/00, 2 & 4/01, 3 & 4/02; reddish green, OK 3 & 5/03

Ancistrocactus tobuschii Data for Las Rincones

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
28.00		5.82	93	2.80	0	0	3.90	4B	4	4.20	27	3	3.85	0	0	4.39	0	0	3.65	dead								of the cluster 28-37, 28 is in the center, OK, reddish 3/99, 5/99, 3 & 5/00; new head forming on left side 5/00; new head gone, plant squishy, reddish, loose, poor 2/01; collected for weevil study, COD weevils 2/01
29.00		5.82	93	1.70	0	0	2.60	3B	2A	2.50	0	0	2.06	0	0	2.09	0	0	1.52	dead								of the cluster 28-37, 29 is behind and right of 28, OK, reddish 3/99, 5/99, 3 & 5/00; squishy, seems dead 2/01; collected for weevil study, COD weevils 2/01
30.00		5.84	93	2.00	0	0	2.10	0	0	2.10	0	0	1.83	0	0	2.05	0	0	1.40	dead								of the cluster 28-37, 30 is to the left of 29, OK, reddish 3/99, 5/99, 3 & 5/00; squishy, maybe dead 2/01; collected for weevil study, COD weevils 2/01
30.01		5.84	93				1.10	0	0	1.20	0	mia	mia			mia			mia	mia								between 30.00 & 31.00, behind 28.00, not tagged 3/97, mia 5/98, 3/99, 5/99, 3 & 5/00, 2/01; surrounding plants collected for weevil study, their COD weevils 2/01
31.00		5.84	93	1.70	0	0	2.70	0	0	2.40	0	0	1.25	0	0	1.37	0	0	1.25	dead								of the cluster 28-37, 31 is behind 28.00 and 30.00; getting squeezed out, reddish, OK 3 & 5/99, 3 & 5/00, squishy, tan, looks dead; collected for weevil study, COD weevils 2/01
32.00		5.84	93	1.10	0	0	2.10	0	0	1.90	0	0	1.61	0	0	1.73	0	0	1.06	dead								of the cluster 28-37, 32 is to the left of 31; reddish, OK 3/99, 5/99, 3 & 5/00; green, OK 2/01; collected for weevil study, COD weevils 2/01
32.01		5.84	93							0.80	0	0	1.24	0	0	0.99	0	0	mia	mia								of the cluster 28-37, 32.01 is below or behind 34.00, not on tag, discovered 3/98, reddish, OK 3 & 5/99, 3 & 5/00; plant mia 2/01; surrounding plants collected for weevil study, COD weevils 2/01
33.00		5.83	93	1.20	0	0	1.60	0	0	1.30	0	0	1.67	0	0	1.95	0	0	1.72	dead								of the cluster 28-37, 33 is left (below) 32, reddish, OK 5/99, 3 & 5/00; green, OK 2/01; collected for weevil study, COD weevils 2/01
34.00		5.82	93	1.50	0	0	1.60	0	0	1.50	0	0	1.19	0	0	1.20	0	0	dead									of the cluster 28-37, 34 is to the left of 33 and to the right of 35, behind & between 35 & 36; reddish, OK 3 & 5/99, 3 & 5/00; weevil larva inside 2/01
35.00		5.81	93	1.40	0	0	1.80	0	0	1.70	0	0	1.82	0	0	1.54	0	0	1.30	dead								of the cluster 28-37, 35 is to the left of 28, behind and between 36 & 37; reddish, OK 3 & 5/99, 3 & 5/00; green, OK; collected for weevil study, COD weevils 2/01

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
35.01		5.80	93				1.00	0	0	1.10	0	mia	mia			mia			mia									between 36.00, 35.00 & 34.00; not tagged 3/97, mia 5/98, 3 & 5/99, 3 & 5/00, 2/01; surrounding plants collected for weevil study, COD weevils 2/01
36.00		5.79	93	1.70	0	0	1.60	0	0	1.70	0	0	2.26	0	0	2.68	0	0	1.79	dead								of the cluster 28-37, 36 is far left of 37; producing additional apical meristems?, reddish, OK 3/99; reddish, OK 5/99; forming a new apical meristem on left, reddish, OK 3 & 5/00; producing 3 new heads, plant red, squishy, loose, poor, collected for weevil study, COD weevils 2/01
37.00		5.80	93	1.90	0	0	2.10	0	0	2.00	0	0	2.21	0	0	2.87	0	0	2.77	dead								of the cluster 28-37, 37 is the closet to stake, reddish, OK 3/99, 3 & 5/00; green with reddish tubercle tips, OK, collected for weevil study, COD weevils 2/01
37.01		5.68	93													0.58		0	0.76	0	0	mia			mia			beside rock, discovered 5/00; one measurement only 5/00; green, good 5/00, 2 & 4/01; plant mia 3 & 4/02, 3 & 5/03
38.00		5.99	95	5.90	6+1fr	7	6.40	4B	4	6.10	3	5+1A	6.05	2+1fr	3+1A	5.81	4	4	5.28	3	2+1A	dead						good 3/99; olive, OK 5/99, 3 & 5/00; green with reddish tubercle tips, OK 2 & 4/01; COD unknown, collected for weevil study 3/02
39.00		5.91	94	3.60	0	0	3.90	3B	3A	3.10	0	0	dead															poor 3 & 5/98; solid, granular, COD unknown 3/99
40.00		5.71	94	3.90	0	0	3.90	0	0	Dead	Dead	Dead																40 is to the right of 41; yellow-orange on top, bad 5/97; stem solid, COD unknown 3/98
41.00		5.68	94	3.30	1	1	3.70	3B	2+1A	3.80	3	3	3.79	2+2fr	3+1A	3.67	0	0	3.51	0	0	3.37	2	3A	3.31	0	0	41 is to the left of 40; good 3/99; olive, OK 5/99; purple, partially covered with ant litter, OK 3 & 5/00; gray green with purplish tubercles, lopsided, OK 2/01; reddish-green, new green apical growth, OK 4/01; green, good 3/02; partly covered with ant litter, green, good 4/02; out, forming three apices, green, OK 3/03; four apices, green, OK 5/03
42.00		5.89	97	2.80	2	2	3.20	1B	1A	2.80	1	1	2.45	1+1fr	2	2.83	0	0	2.54	0	0	2.49	0	0	2.62	1	0	42 is to the right of 43; good 3/99; good, green 5/99; reddish, OK 3/00; green, good 5/00; purplish green, OK 2/01; green, good 4/01; olive, OK 3/02; green, OK 4/02, 3 & 5/03

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
43.00		5.88	97	2.80	2	2	3.00	1B	1A	2.70	0	1	2.84	2	2	3.02	0	0	2.98	0	0	2.75	0	0	2.94	1	0	43 is to the left of 42; good 3/99; good, green 5/99; reddish, OK 3 & 5/00; greenish yellow, OK 2 & 4/01; green, OK 3 & 4/02, 3 & 5/03
44.00		5.80	97	1.30	0	0	1.70	0	0	1.90	0	0	1.86	0	0	2.27	0	0	2.30	0	0	2.18	0	0	2.21	0	0	of the cluster 44-46, 44 is the farthest on the right, a 4th head may be coming out; no 4th head 3/98; reddish, OK 3/99, 5/99, 3/00; purplish, OK 5/00, 2 & 4/01; reddish, poor, 3/02; purplish green, OK 4/02, 3 & 5/03
44.01		5.80	97				1.10	0	0	mia			mia			mia												in front of and between 44.00 & 45.00; not tagged 3/97; mia 3 & 5/98, 3/99, 5/99, 3 & 5/00
45.00		5.80	97	1.50	0	0	1.50	0	0	1.70	0	0	1.85	0	0	1.78	0	0	2.00	0	0	1.78	0	0	1.93	0	0	of the cluster 44-46, 45 is between 44 and 46, a 4th head may be coming out; no 4th head 3/98; reddish, OK 3 & 5/99, 3/00; purplish, OK 5/00, 2 & 4/01; reddish green, OK 3 & 4/02; green, OK 3 & 5/03
46.00		5.80	97	1.80	0	0	2.10	0	0	2.40	0	0	2.54	0	0	2.94	1	1	2.73	0	0	2.67	0	0	2.80	0	0	of the cluster 44-46, 46 is the farthest on the left, a 4th may be coming out; no 4th head 3/98; reddish, OK 3 & 5/99, 3/00; purplish, OK 5/00, 2 & 4/01, 3 & 4/02, 3/03; goldish green OK 5/03
47.00		5.74	96	3.10	2	2	3.40	0	0	3.40	0	0	2.50	0	0	2.93	0	0	dead									becoming 2-headed 5/98; not 2-headed, reddish, OK; 3 apical meristems, reddish, OK 5/99, 3/00; four-headed, green, good 5/00, exit holes, cause of death weevils 2/01
48.00		5.60	96	1.80	0	0	1.90	0	0	1.80	0	nd	1.67	0	0	2.04	0	0	1.97	0	0	1.75	0	0	1.88	0	0	good 3/99; maroonish, OK 5/99; olive, OK 3/00; green, good 5/00, 2 & 4/01; green, OK 3/02; covered with ant dirt 4/02; out, green, OK 3/03; covered with ant dirt, only spines showing 5/03
49.00		5.39	98	3.10	0	1	3.20	1B	1	3.70	2	2	3.12	0	1	3.67	1	1	3.52	0	0	3.23	0	0	3.55	0	0	49 is to the right of 50; dull green, OK 3/99 & 5/99; purplish-yellowish green, OK 3/00; covered with litter, OK 5/00; purplish tan, poor 2/01; reddish green, OK 4/01; yellowish green, OK 3/02; reddish green, OK 4/02; green, OK 3/03; green, good 5/03

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
50.00		5.40	98	2.70	0	0	2.60	0	0	2.70	0	0	2.33	0	0	2.80	0	0	2.81	0	0	2.67	0	0	3.05	0	0	50 is to the left of 49; dull green, OK 3/99, 5/99, 3/00; covered with litter, OK 5/00; dull green, OK 2/01; green, good 4/01; green with some tan tubercle tips, OK 3/02; olive, OK 4/02; green, OK 3/03; green, good 5/03
51.00		5.42	98	2.20	0	0	2.10	0	0	2.20	0	0	1.80	0	0	1.87	0	0	1.55	0	dead?							OK 3/99; misshapen, olive, OK 5/99, 3/00; covered with litter, OK 5/00; blue green, OK 2/01; looks dead, collected for weevil study, COD unknown 4/01
52.00		5.89	111	2.10	0	0	2.60	0	0	2.30	0	0	2.30	0	0	2.45	0	0	2.58	0	0	2.50	0	0	2.62	0	0	of the cluster 52-59, 52 is the rightmost of the closest three heads to the reference point; dull green, OK 3/99, 5/99, 3/00; green, good 5/00; olive, OK 2 & 4/01; green, good 3 & 4/02; green, OK 3/03, green, good 5/03
53.00		5.89	111	1.70	0	0	2.20	0	0	2.50	0	0	2.28	0	0	2.41	0	0	2.28	0	0	2.43	0	0	2.69	0	0	of the cluster 52-59, 53 is between 52 and 54; dull green, OK 3/99, 5/99, 3/00; green, good 5/00; green, OK 2 & 4/01, 3 & 4/02, 3/03; green, good 5/03
54.00		5.90	111	2.60	0	0	2.90	0	0	2.90	0	0	2.52	0	0	2.74	0	0	2.88	0	0	2.59	0	0	2.51	0	0	of the cluster 52-59, 54 is the leftmost of the closest three heads to the reference point; dull green, OK 3/99, 5/99, 3/00; green, good 5/00, 2 & 4/01, 3 & 4/02, 3 & 5/03
55.00		5.91	111	3.10	0	0	3.40	0	0	3.60	0	0	3.28	0	0	3.65	0	0	3.46	0	0	3.26	0	0	3.60	1	0	of the cluster 52-59, 55 is behind 52-54 and is the rightmost head of the 2nd line of heads; dull green, OK 3/99, 5/99, 3/00; green, good 5/00; olive, OK 2 & 4/01; green, good 3 & 4/02, 3 & 5/03
55.01		5.93	110													0.90	0	0	0.82	0	0	0.74	0	0	0.68	0	mia	discovered 3/00; reddish, OK 3/00; hunkered, OK 5/00; blue green, OK 2 & 4/01; hunkered, poor 3/02; very hunkered, green, OK 4/02, 3/03; plant mia 5/03
56.00		5.94	111	2.30	0	0	2.80	0	0	2.60	0	0	2.25	0	0	2.66	0	0	2.50	0	0	2.30	0	0	2.56	0	0	of the cluster 52-59, 56 is behind 55; dull green, OK 3/99, 5/99, 3/00; green, good 5/00; olive, OK 2 & 4/01, 3/02; green, good 4/02, 3 & 5/03
57.00		5.93	111	3.10	0	0	3.10	0	0	2.80	0	0	2.78	0	0	3.12	0	0	3.18	0	0	3.12	0	0	3.27	0	0	of the cluster 52-59, 57 is between 55 and 58 in the middle line of heads; dull green, OK 3/99, 5/99, 3/00; green, good 5/00, 2 & 4/01, 3 & 4/02; green, good 3 & 5/03

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PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
58.00		5.94	111	2.00	0	0	1.80	0	0	1.40	0	0	1.61	0	0	1.87	0	0	1.74	0	0	0.90	0	0	1.05	0	0	of the cluster 52-59, 58 is to the left and at base of 57; dull green, OK 3/99, 5/99, 3/00; green, good 5/00, 2 & 4/01; olive OK 3/02; few spines, green, OK 4/02, 3 & 5/03
59.00		5.95	111	1.10	0	0	1.30	0	0	1.10	0	0	1.05	0	0	1.05	0	0	1.14	0	0	0.87	0	0	1.24	0	0	of the cluster 52-59, 59 is behind and between 57 & 56; dull green, OK 3/99, 5/99, 3/00; green, good 5/00; hunkered, green, OK 2 & 4/01, 3 & 4/02, 3/03; almost buried, green, OK 5/03
60.00		6.45	109	2.80	0	0	2.80	0	0	2.60	0	0	2.64	0	0	2.70	0	0	2.85	0	0	2.27	0	0	dead			of the cluster 60-62, 60 is closest to the reference point on the right; poor 3/98, greening up, OK 5/98 & 3/99, olive, OK 5/99, maroonish, OK 3/00; dull green, OK 5/00, 2 & 4/01, 3/02; looks dead, but firmly rooted 4/02; dry, solid, COD unknown, 60.00, 61.00-62.00 was all one plant 3/03
60.01		6.89	105										2.66		0	2.64	0	0	2.48	0	0	2.45	0	0	2.41	0	0	discovered 5/99; green, OK 5/99, 3/00; green, good 5/00, 2 & 4/01; pale yellowish-green, OK 3/02; green, OK 4/02, 3 & 5/03
61.00		6.44	109	2.40	0	0	2.30	0	0	2.00	0	0	1.72	0	0	1.97	0	0	2.02	0	0	1.75	0	0	dead			of the cluster 60-62, 61 is the closest to the reference point on the left; poor 3/98, greening up, OK 5/98 & 3/99; olive, OK 5/99, maroon, OK 3/00, olive, poor 5/00 & 2/01, reddish green, root partly exposed, poor 4/01, 3/02; looks dead, but firmly rooted 4/02; all one plant, dead, dry, solid, COD unknown 3/03
62.00		6.47	109	2.00	0	0	2.10	0	0	1.90	0	0	1.86	0	0	1.81	0	0	1.67	0	0	1.68	0	0	dead			of the cluster 60-62, 62 is behind 60 and 61; poor 3/98, greening up, OK 5/98, 3/99, olive, OK 5/99, maroon, OK 3/00, olive, OK 5/00, maroonish green with exposed tan spineless lower stem, poor 2 & 4/01, 3/02, looks dead, but firmly rooted 4/02; all one plant, dead, solid, dry, COD unknown 3/03

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
62.01		6.46	109				1.60	0	0	1.50	0	0	1.44	0	0	1.49	0	0	1.47	0	0	1.28	0	0	dead			behind 61.00 & to the left of 62.00; not tagged 3/97; poor 3/98; greening up, OK 5/98, 3/99; olive, OK 5/99; green, OK 3/00; yellowish, OK 5/00; gray green with exposed tan spineless lower stem, poor 2 & 4/01, 3/02; looks dead, but firmly rooted 4/02; all one plant, dead, solid, dry, COD unknown 3/03
63.00		6.38	111	3.10	1	1	3.50	1B	1A	3.80	0	1	3.79	0	0	3.88	1	1	3.75	0	0	dead						good 3/99; green, good 5/99; green with some reddish tubercle tips, OK 3 & 5/00, 2 & 4/01; dead weevil exit holes, COD weevils 3/02
64.00		5.84	102	1.60	0	0	1.50	0	0	1.60	0	0	1.52	0	0	1.72	0	0	1.78	0	0	1.51	0	0	2.17	0	0	good 3/99; green, good 5/99, 3 & 5/00, 2 & 4/01; hunkered, green, OK 3/02; popping out, green, OK 4/02; green, good 3/03; covered in ant dirt, only spines showing 5/03
65.00		5.14	79	2.20	0	0	2.50	0	0	2.20	0	0	2.08	0	0	2.39	0	0	2.74	0	0	2.38	0	0	2.58	0	0	of 65 and 66, 65 is closest to the reference point; fire scarred?, poor 3/98; OK 5/98; dull green, OK 3/99 & 5/99; reddish-green, OK 3/00; yellowish-olive, OK 5/00 & 2/01; reddish green, OK 4/01; olive, OK 3 & 4/02; reddish green, OK 3 & 5/03
66.00		5.15	79	3.20	0	0	3.70	1	1	3.80	0	0	3.60	0	1	3.96	1	1	4.31	0	0	3.69	1	1	3.85	0	0	of 65 and 66, 66 is behind 65; fire scarred?, poor 3/98; OK 5/98, 3/99; dull green, OK 5/99 & 3/00; yellowish-olive, OK 5/00; green with some red tubercle tips, OK 2 & 4/01; olive, OK 3 & 4/02; forming second apex on left side, olive, OK 3 & 5/03
66.01		5.15	79				0.80		0	0.90	0	0	1.01	0	0	0.95	0	0	dead									not tagged, discovered 5/97, to right of 66; OK 3/99, 5/99, 3 & 5/00; just spines left, cause of death unknown 2/01
66.02		4.65	86										0.72		0	0.87	0	0	0.83	0	0	0.99	0	0	1.13	0	0	discovered 5/99; green, OK 5/99, 3 & 5/00; maroonish green, OK 2/01; green, OK 4/01, 3/02; olive, poor 4/02; olive, OK 3/03; green, good 5/03
66.03		5.15	79																			1.41		0	dead			discovered 4/02, at 8 o'clock on 66; green, good 4/02; just loose spines left, COD unknown 3/03
67.00		5.22	81	1.30	0	0	1.60	0	0	1.90	0	0	2.01	0	0	2.43	0	0	2.72	0	0	2.70	2	2	2.67	0	0	getting covered by crustose lichen, OK 3/99; popping out, green, good 5/99, 3 & 5/00, 2 & 4/01, 3 & 4/02, 3/03; partly covered by ant dirt, green, OK 5/03

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PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
68.00		5.42	81	1.80	0	0	2.30	0	0	2.40	1	1	2.57	1fr	1	2.26	0	0	2.43	0	0	2.02	0	0	2.64	0	0	very reddish, OK 3/99, 5/99, 3/00; orangish, OK 5/00, 2/01; reddish at base with new green apical growth, OK 4/01, 3 & 4/02; slilghtly reddish green, OK 3/03; green, OK 5/03
69.00		5.48	79	1.30	0	0	1.40	0	0	1.40	0	0	1.80	0	0	2.20	1	1	2.66	1	1	2.24	2	2	3.24	1	1	getting covered by crustose lichen, OK 3/99; popping out, green, good 5/99, 3 & 5/00, 2 & 4/01; hunkered, green, OK 3/02; green, good 4/02, 3 & 5/03
69.01		5.48	79				0.60	0	0	0.60	0	0	0.66	0	0	0.82	0	0	0.65	0	0	0.74	0	0	1.11	0	0	to left of 69.00; not tagged 3/97; almost covered by crustose lichens, OK 3/99; coming out, green, good 5/99; green, OK 3 & 5/00, 4/01, 3 & 4/02; green, good 3 & 5/03
70.00		5.20	82	1.50	0	0	1.60	0	0	2.10	0	0	2.10	0	0	2.22	1	1	2.61	0	0	2.30	0	0	2.48	0	0	getting covered by crustose lichens, OK 3/99; green, good 5/99; tag loose, green, good 3/00; green, good 5/00; olive, OK 2/01; green, good 4/01, 3 & 4/02; green, OK 3/03; covered by ant dirt, only spines showing 5/03
71.00		5.38	82	1.80	0	0	1.70	0	0	1.50	0	0	1.99	0	0	2.47	0	0	2.87	0	0	2.73	0	0	3.49	0	0	green, good 5/99, 3 & 5/00, 2 & 4/01, 3 & 4/02, 3 & 5/03
72.00		5.46	81	0.60	0	0	0.70	0	0	0.80	0	0	0.89	0	0	1.06	0	0	1.22	0	0	1.10	0	0	1.77	0	0	reddish, few spines, poor 3/97; OK 5/97; root becoming exposed, plant OK 3/98; root more covered 5/98; OK 3/99; olive, OK 5/99, 3/00; hunkering, OK 5/00, 2 & 4/01; hunkering, green, good 3 & 4/02, 3 & 5/03
73.00		4.88	45	3.70	1+1fr	2	4.20	2B	2	3.80	2	1A	3.56	1+2fr	3	4.39	2+2fr	4	4.19	0	0	3.54	2	2	3.85	2	2	maroon, OK 3 & 5/98; some loose spines, hunkering, getting misshapen, OK, dull green 3/99; maroon, OK 5/99, 3 & 5/00; purple, OK 2 & 4/01,3 & 4/02; misshapen, purplish green, OK 3 & 5/03
74.00		2.95	46	1.50	0	0	1.60	0	0	Dead	Dead	Dead																only spines left, COD unknown 3/98
75.00		2.85	49	3.10	1+1fr	2	3.70	2B	1+1A	Dead	Dead	Dead																mushy red inside, COD unknown 3/98
75.10		3.10	44				0.90	0	0	1.00	0	0	1.07	0	0	1.19	0	0	1.29	0	0	1.25	0	0	1.54	0	0	hunkered 3/99; green, good, hunkered 5/99; green, OK 3 & 5/00, 2 & 4/01; very hunkered, dark green, OK 3 & 4/02; rock on top, OK 3/03; hunkered, green, OK 5/03
75.20		3.15	44				1.50	0	0	1.90	0	0	2.02	0	0	2.84	3	3	3.41	1	1	2.94	3	4	3.54	1	2	hunkered 3/99; popping out, green, good 5/99; one flower damaged, plant green, good 3 & 5/00; purplish-green, OK 2 & 4/01; green, OK 3 & 4/02; green, with purplish tubercle tips, good 3/03; purplish green, OK 5/03

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
75.30		3.03	41				0.90	0	0	1.00	0	0	1.08	0	0	1.56	0	0	1.58	0	0	1.56	0	0	2.12	0	0	hunkered 3/99; green, good, hunkered 5/99; coming out, green, good 3/00; hunkering, OK 5/00 & 2/01; popping out, green, OK 4/01; dark green, good 3 & 4/02, 3 & 5/03
75.40		3.66	40				3.40	1+1B	2A	3.30	0	0	3.63	2fr	2	4.23	3	3	4.50	2	1	4.09	3	4	4.82	3	3A	green, good 5/99, 3 & 5/00, 2 & 4/01, 3 & 4/02, 3/03; green with some orange, purple, and red tubercle tips, OK 5/03
75.50		3.45	44													2.25	0	0	2.76	1	1	2.77	2	2	3.04	0	0	discovered 3/00; green, good 3 & 5/00, 2 & 4/01, 3 & 4/02; green, OK 3/03; green, good 5/03
76.00		2.01	45	3.20	0	0	3.30	0	0	3.40	0	0	3.41	1+1fr	1+1A	3.90	2	2	4.18	1	1	4.11	3	4	4.09	0	0	good 3/99; dull green, OK 5/99; tag mia, replaced 3/00; green, good 3 & 5/00, 2 & 4/01, 3 & 4/02; green, OK 3 & 5/03
77.00		2.09	45	3.40	0	0	Dead																					COD fly larvae, yellow viscous liquid inside 3/97
78.00		2.35	22	3.00	1	1	2.80	1B	1	2.70	1	1A	2.70	1+1fr	2	3.15	0	0	2.78	1	1	3.03	3	3	2.87	0	0	barely stepped on 3/98; yellow-green, OK 3/99; reddish, OK 5/99; light green, OK 3 & 5/00, 2 & 4/01; green, good 3/02; reddish green, OK 4/02, 3/03; becoming grayish red and spineless at base, apex green, OK 5/03
78.01		2.27	26										0.91		0	0.75	0	0	0.75	0	0	0.92	0	0	1.04	0	0	discovered 5/99; OK 5/99; just two pale green tubercles, poor 3/00; hunkered, green, OK 5/00, 2 & 4/01; green , good 3 & 4/02; partly buried in juniper litter, green, OK 3 & 5/03
78.02		2.25	26										0.64		0	0.91	0	0	0.68	0	0	0.97	0	0	0.93	0	0	discovered 5/99; OK 5/99; hunkered, OK 3 & 5/00, 2 & 4/01; almost covered by juniper needles, green, good 3 & 4/02; out, green, OK 3 & 5/03
79.00		2.57	24	2.30	0	0	2.30	0	0	2.30	0	0	dead															fire scarred?, badly stepped on, gray, hard, poor 3/98; olive green, OK 5/98; solid, hard, dry, COD unknown 3/99
80.00		2.59	27	2.70	0	0	3.00	0	0	2.90	0	0	2.61	0	0	2.77	0	0	2.85	0	0	2.90	1	1A	3.09	1	0	fire scarred?, gray, hard, poor 4 & 5/98, 3/99; dull green, OK 5/99, 3 & 5/00, 2/01; green, OK 4/01; olive, OK 3 & 4/02; green, OK 3 & 5/03
81.00		2.17	30	1.30	0	0	1.40	0	0	1.50	0	0	1.32	0	0	1.69	0	0	1.84	0	0	1.80	0	0	2.10	0	0	hunkered, OK 3/99; popping out, dull green, OK 5/99; green good 3 & 5/00, 2 & 4/01, 3 & 4/02, 3 & 5/03

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PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
82.00		5.97	8	3.00	2	0	4.50	1+4B	2+3A	4.40	3	3	5.24	4?	1+3?A	5.80	6	8	5.14	0	0	dead						of the pair 82-83, 82 is on the left; good, flowers granulated by ants 3/99; green, good 5/99, 3/00; yellowish, good 5/00; ca. 20% of plant eaten, green with maroonish tubercles, OK 2/01; lower part maroonish green, upper stem green with new growth, OK 4/01; dead, weevil exit holes, COD weevils collected for weevil study 3/02
83.00		5.97	8	2.60	2	2	4.00	5B	3+1A	4.30	4	5	5.44	4?	4?A	5.99	5	7	5.01	0	0	dead						of the pair 82-83, 83 is on the right; good, flowers granulated by ants 3/99; green, good 5/99, 3/00; some yellowish tubercles, good 5/00; some tubercle damage, plant maroonish green, OK 2/01; maroonish-green at base with new green apical growth, OK 4/01; dead, COD unknown, collected for weevil study 3/02
83.01		6.20	12										1.21		0	1.71	0	0	2.09	0	0	2.09	0	0	3.32	2	2	discovered 5/99, green, good, popping out of crustose lichen 5/99, 3/00; hunkered, OK 5/00; popping out, blue green, OK 2/01; green, OK 4/01, 3/02; purplish green, OK 4/02; green, good 3 & 5/03
84.00		5.91	6	3.00	2	0	3.90	2+3B	5	mia			mia			mia												of the pair 84-85, 84 is on the left; mia 3 & 5/98, 3/99, 5/99, 3 & 5/00
85.00		5.94	6	2.10	1	0	2.80	1+2B	1+2A	mia			mia			mia												of the pair 84-85, 85 is on the right; mia 3 & 5/98, 3/99, 5/99, 3 & 5/00
85.10		7.05	5																			3.51	2	4	4.10	3	3	discovered 3/02; green, good 3 & 4/02, 3 & 5/03
85.11		7.07	5																			0.62	0	0	0.61	mia	0	at 6 o'clock on 85.10, discovered 3/02; maroonish, OK 3 & 4/02; plant mia 3/03; green, OK 5/03
85.20		7.27	1																			2.33	0	0	3.32	1	1	discovered 3/02; green, good 3 & 4/02, 3 & 5/03
86.00		2.54	124	4.10		2	4.30	1+2B	3	4.80	1	1	4.97	2fr	2	6.08	2	2	5.82	0	0	5.31	2	2	5.34	0	0	found in 5/96; great 5/98, 3/99; green 5/99, 3 & 5/00; green, good 2 & 4/01, 3 & 4/02, 3 & 5/03
87.00		3.00	133	3.10		0	3.60	0	0	3.50	1	1	3.79	0	0	4.57	1fr	1	4.71	0	0	4.55	2	2	4.38	0	0	found in 5/96; good 3/99; green, good 5/99, 3 & 5/00, 2 & 4/01, 3 & 4/02; green with some orange tubercles, OK 3/03; green with some orange tubercles, good 5/03
87.10		4.26	108													1.76	0	0	1.78	0	0	1.57	0	0	1.64	0	0	under juniper, discovered 3/00; green, OK, hunkered in juniper needles 3 & 5/00, 2 & 4/01, 3 & 4/02; olive, OK 3/03; olive, poor 5/03

Ancistrocactus tobuschii Data for Las Rincones

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
87.20		4.29	108													2.28	0	0	2.18	0	0	1.53	0	0	2.13	0	0	under juniper, discovered 3/00; yellowish at base, OK 3/00; green, OK 5/00; pale green, tan at base, OK 2 & 4/01, 3 & 4/02; olive, OK 3/03; olive, poor 5/03
88.00		7.47	79	2.90		0	3.40	3	2+1A	2.90	0	0	2.90	0	0	3.61	3	3		dead								found in 5/96; of the cluster 88-94, 88 is closest to the reference point between 89 and 94; reddish, OK 3/99, 5/99, 3 & 5/00, 2/01; collected for weevil study, COD weevils 2/01
88.10		7.45	79							1.10	0	0	1.00	0	0	1.41	0	0	dead									left of 89.10, in front of 88; discovered 3/98; green, good 5/99, 3 & 5/00; exit holes, COD - weevils 2/01
88.20		7.45	79										0.54	0	0	0.90	0	0	dead									left of 88.10, in front of 88, OK; discovered 3/99; OK 5/99, 3/00; green, good 5/00; exit holes, COD - weevils 2/01
89.00		7.47	79	1.00		0	1.30	0	0	1.40	0	0	1.22	0	0	1.70	0	0	dead									found in 5/96; of the cluster 88-94, 89, is right of 88 & in front of 90.1; reddish, OK 3/99 & 5/99; green, good 5/00; exit holes, COD - weevils 2/01
89.10		7.46	79							1.10	0	0	0.69	0	dead													in front of 89, right of 88; discovered 3/98; seems dead, just spines, firmly attached 3/99; gone, COD unknown 5/99
90.00		7.47	79	1.80		0	2.50	2	1+1A	2.40	2	2	2.47	0	0	2.65	1	1	dead									found in 5/96; of the cluster 88-94, 90 is behind and right of 89, and rightmost; reddish, OK 3 & 5/99; very red, OK 3 & 5/00; exit holes, COD - weevils 2/01
90.10		7.49	79							1.30	0	0	mia			mia			mia	mia								between 88 & 90; discovered 3/98; mia 3/99, 5/99, 3 & 5/00, 2/01; surrounding plants collected for weevil study 2/01
91.00		7.49	79	0.80		0	1.40	0	0	1.50	0	0	1.26	0	0	1.98	1	1	dead									found in 5/96; of the cluster 88-94, 91 is behind 88 & 90, & to the right of 92; reddish, OK 3/99 & 5/99, 3 & 5/00; exit holes, COD - weevils 2/01
91.10		7.51	79							0.80	0	0	0.82	0	0	1.44	0	0	dead									below 91, between 90 & 92; discovered 3/98; reddish, OK 3/99 & 5/99; green, OK 3/00; green, good 5/00; exit holes, COD weevils 2/01
92.00		7.49	79	1.50		0	2.20	1	0	2.00	0	0	2.49	0	0	2.70	2	2	dead									found in 5/96; of the cluster 88-94, 92 is between 91 and 93; reddish, OK 3/99 & 5/99; green with a few orange tubercles, OK 3 & 5/00; exit holes, COD - weevils 2/01

Ancistrocactus tobuschii Data for Las Rincones

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
93.00		7.49	79	1.10		0	1.10	0	0	1.40	0	0	1.67	0	0	1.93	0	0	dead									found in 5/96; of the cluster 88-94, 93 is farthest from the reference point on the left; reddish, OK 3/99 & 5/99; green, OK 3/00; orangish, OK 5/00; exit holes, COD - weevils 2/01
94.00		7.48	79	1.90		0	2.10	0	0	2.00	0	0	2.11	0	0	2.67	0	0	dead									found in 5/96; of the cluster 88-94, 94 is closest to the reference point on the left; reddish, OK 3/99 & 5/99; green, OK 3 & 5/00; exit holes, COD - weevils 2/01
95.00		4.55	80	1.60		0	1.80	0	0	1.60	0	0	0.78	0	dead													found in 5/96; in solution hole in rock; bad, probably dead, loose yet firmly rooted 3/99; dead, COD unknown, removed by WHC 5/99
96.00		6.47	91	1.20		0	1.40	0	0	1.50	0	0	1.96	0	0	2.15	1	1	2.51	0	0	2.50	2	2A	3.48	3	0	found in 5/96; OK, hunkering 3/99; popping out, green, good 5/99; green, good 3/00; hunkered, green, good 5/00 & 2/01, 3 & 4/02; out, green, good 3 & 5/03
97.00		7.22	79							1.10	0	0	1.17	0	0	1.63	0	0	1.88	0	0	2.03	0	1	2.30	0	0	discovered 3/98; OK, getting covered by crustose lichens 3/99; popping out, green, OK 5/99; reddish-green, OK 3 & 5/00; green, OK 2/01; green, good 4/01, 3 & 4/02; plant uprooted, still green, OK 3/03; not rooted, gold, poor 5/03
97.10		7.24	80													1.03	0	0	1.16	0	0	1.11	0	0	1.58	0	0	discovered 3/00; green, OK 3 & 5/00, 2/01; green, good 4/01; covered by Nostoc, green, OK 3/02; out, olive, OK 4/02, 3/03; green, OK 5/03
98.00		6.34	70							2.80	0	0	2.48	2fr	2	2.95	0	0	2.57	0	0	2.48	0	0	3.13	0	0	discovered 3/98; dull green, OK 3/99 & 5/99; slightly reddish, OK 3 & 5/00; hunkered, green, OK 2 & 4/01; reddish green, OK 3 & 4/02, 3/03; partly covered with ant dirt, green, OK 5/03
98.01		6.25	70										1.29		0	1.80	1	1	2.51	2	0	2.63	4	4	2.72	2	0	in solution pocket, slightly maroon, OK, discovered 5/99; green, OK 3 & 5/00; olive, OK 2 & 4/01; yellow green, OK 3/02; pale olive, OK 4/02; reddish olive, OK 3 & 5/03
99.00		6.13	69							1.40	0	0	1.46	0	0	1.73	1	1	1.76	0	0	1.77	0	0	1.94	0	0	in solution pit in rock; discovered 3/98; OK 3/99; maroonish, OK 5/99, 3 & 5/00, 2 & 4/01, 3 & 4/02, 3/03; trampled, reddish green, poor 5/03

Ancistrocactus tobuschii Data for Las Rincones

PL#	STAKE	DIST	ANGLE	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
00.00		5.88	65							2.50	1	1	2.69	2fr	1+1A	3.75	3fr	3	3.96	3	3A	3.93	4	3+1A	4.13	2	1+1A	discovered 3/98; good 3/99; OK, yellowish at base 5/99, 3 & 5/00; purplish, OK 4/01; reddish at base, green above, OK 3 & 4/02; maroonish, OK 3 & 5/03
00.01		5.91	65							0.90	0	0	1.05	0	0	1.01	0	0	1.23	0	0	1.30	0	0	1.51	0	0	behind 100, not tagged; discovered 3/98; good, hunkering 3/99; popping out, green, good 5/99, 3 & 5/00; yellowish green, OK 2/01; green, good 4/01, 3 & 4/02, 3 & 5/03
01.00		2.08	33							0.80	0	0	0.92	0	0	1.14	0	0	1.19	0	0	1.24	0	0	1.79	0	0	discovered 3/98; almost buried, good 3/99; popping out, green, good 5/99, 3 & 5/00, 2 & 4/01; hunkered, green, OK 3 & 4/02; popping out, green, good 3 & 5/03
02.00		2.10	33							1.60	0	0	1.91	0	0	2.53	0	0	3.08	0	0	3.17	2	2	3.21	0	0	discovered 3/98; good, hunkered 3/99; popping out, green, good 5/99, 3 & 5/00, 2 & 4/01, 3 & 4/02, 3 & 5/03
02.01		2.44	33																			0.52		0	mia			discovered 4/02; green, OK 4/02; plant mia 3 & 5/03
03.00		6.10	62																0.72		0	0.58	0	0	1.12	0	0	discovered 4/01; green, good 4/01; hunkered, green, OK 3 & 4/02; popping out, green, OK 3 & 5/03
Data taken and recorded by Jackie Poole 3/14/96, 5/7/96, 3/10/97, 5/9/97, 3/10/98, 5/8/98; 3/9/99; with WHC on 5/5/99,																												
	3/8/00, 5/1/00, 2/28/01, 4/30/01, 3/01/02, 4/30/02, 3/11,14/03, 5/5/03																											

Ancistrocactus tobuschii Data for
Lost Maples State Natural Area

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 1 is 31.41 m at 253 degrees from 20 mph sign under and between small live oaks over agaritas; Stake 1 = GPS1 R021916A;																												
Plot 1 burned - none dead (so far) as result of fire, 9 inside burn area (3 not burned) 2/02																												
1.00	1	5.40	44	1.80	0	0	2.30	0	0	2.80	0	0	mia		0?													burned 1/96; burned shell beside 3/96, OK, shell gone 5/96; green, good 3/97, 5/97, 3/98 & 5/98; a few spines in vicinity 3/99; 2 seedlings or 2 tubercles 4/99; two plants 1.01 and 1.02 2/00
1.01	1	5.38	42													1.22	0	0	1.44	0	0	1.65	0	0	1.66	0	0	tag is closest to 1.01; tubercle or seedling of 1.00; green, good 2 & 4/00; olive, OK 2 & 5/01; burned, spines singed, tubercles and part of stem white, rest green, OK, photos 13-16 2/02; green, OK, photos 27 28 4/02; old stem visible at base, new growth brownish-green, OK 2/03; pale green, OK 4/03
1.02	1	5.39	42													1.30	0	0	1.54	0	0	1.73	0	0	1.75	0	0	tubercle or seedling of 1.00; green, good 2 & 4/00; olive, OK 2 & 5/01; burned, spines singed, tubercles and part of stem white, rest green, OK, photos 13-16 2/02; green, OK, photos 27-28 4/02; old stem visible at base, new growth brownish-green, OK 2/30; pale green, OK 4/03
2.00	1	6.35	42	5.10	4	2	4.40	4	4	4.60	3	2	nd	0	0	nd	0	0	dead									not burned1/96; OK-poor, duff greenish-red 5/96, green & good 97, OK, tubercle tips getting orange 98; eaten down to soil level 3/99; very poor, 2 spine clusters 4/99; pup coming off of eaten stem, pup bad, not measured 2/00, looks dead 4/00; pup dead, parent dead, COD herbivory 2/01
2.01	1	6.33	42	1.50	0	0	2.10	0	0	2.50	1	1	nd	0	mia	1.57	0	0	1.65	0	0	dead						burned 1/96; good 5/96, 3/97, 5/97, 3/98; getting buried 5/98; eaten down to soil level 3/99; plant mia 4/99; green, good 2/00; olive, OK 2/01; green, good 5/01, died before fire, dry and corky inside, COD unknown 2/02
3.00	1	6.29	38	2.50	0	0	2.30	1	1	2.60	0	0	2.45	0	0	2.54	0	0	2.39	0	dead							burned 1/96; dead (?) one beside 3/96, OK, dead one still there 5/96; dead one gone, green, good 3 & 5/97, green, good with a few tan tubercle tips 3/98 & 5/98; green, OK 3/99 & 4/99; light green, OK 2 & 4/00; squishy, pale green with tan tubercle tips, poor 2/01, dead, COD unknown 5/01
4.00	1	5.48	37	4.50	1A	0	5.00	3B+2A?	4+1A	5.60	3	3	4.70	2	2	5.97	3	3	6.48	2	3	5.40	1A	0	4.12	0	0	green, good 3/97 & 5/97; a little purplish at the base, good 3/98; orangish 5/98; green, good 3/99 & 4/99; green top, reddish base, good 2/00; green, good 4/00, 2 & 5/01; burned, spines almost singed off, tubercles creamy tan, flower bud burned, body purple, poor 2 & 4/02; burn scar visible at base, upper body green, good 2/03; green, good 4/03
4.10	1	5.39	38				3.20	1+1 fr	2	3.20	1	1	nd	0	Dead													fire scars, dark purplish green, OK 3 & 5/97, purplish green, OK 3/98; orangish 5/98; eaten down below soil level 3 & 4/99, COD herbivory

Ancistrocactus tobuschii Data for
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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
5.00	1	5.00	42	3.30	1 fr	0	3.60	4(2A?)	4	3.90	1	0	mia	mia	0	1.89	0	0	2.52	0	0	2.70	1	0	3.19	2	2	burned 1/96; OK 5/96, 3/97 & 5/97; a little purplish & yellowish, deer shit on plant, OK 3/98; green, good 5/98; loose spines nearby 3/99; seedling or tubercle present 4/99; green, good 2 & 4/00, 2 & 5/01; one half burned, spines singed off, tubercles creamy tan, body purple, unburned half green with maroonish tubercle tips, OK photos 4-8 2/02; green with some red tubercle tips, OK, photos 31-32 4/02; green, good 2 & 4/03
5.10	1	5.93	39							2.50	1	1	nd	0	0?	1.53	0	0	1.97	0	0	2.60	1	1	4.03	3	3	discovered 3/98; getting buried 5/98; eaten down below soil level 3/99; spine cluster or seedling present 4/99; green, good 2 & 4/00, 2 & 5/01; not burned but within burned area, fire skip, green, good 2 & 4/02, 2 & 4/03
6.00	1	4.99	39	4.30	2A+1fr	0	5.00	6(3A?)	5 (1 disp.)	4.60	4fr	2+2A	mia			mia			mia			mia						burned 1/96; poor, maroon in color; new growth faded 5/96; dark green, good 3/97; partially eaten 5/97, maroon again, OK 3/98 & 5/98; loose spines in vicinity 3/99; gone without a trace 4/99, tag and plant mia 2 & 4/00, 2 & 5/01, 2 & 4/02
7.00	1	5.98	28	3.70	0	0	3.40	3	2+1A	3.80	0	0	3.53	0	0	3.60	0	0	3.60	0	0	3.33	0	0	3.41	0	0	burned 1/96; OK 5/96; green, good, being shaded by Schrankia 97; green, good, shaded by little bluestem 98, 99, 00; green, with a few yellow tubercle tips, good 2/01; green, good 5/01; burned, green with whitish tubercles, OK, photos 17-20 2/02; green with some tan tubercle tips, OK, photos 33-34 4/02; green, OK 2/03; green, good 4/03
8.00	1	4.12	31	3.50	1+1fr	2	5.20	3+3fr+1A	5+1A	5.10	3	3	dead															burned 1/96; OK 5/96; tag mia; retagged, good 3/97 & 5/97; tag mia; retagged, fantastic 3/98 & 5/98; whole plant eaten, only spines left 3/99
9.00	1	3.94	31	3.50	1	2	4.20	4+2fr	6	4.30	3	3	nd	0	mia	mia			mia									burned 1/96; OK 5/96; good; green 3/97, 3/98 & 5/98 eaten down to soil level 3/99; tag and plant gone without a trace 4/99; 9.01 and 9.02 probably tubercles of 9.00; mia 00, 01
9.01	1	3.93	34													2.27	0	0	2.32	0	0	2.45	0	0	2.85	2	2	possibly tubercle of 9.00; green, good 2 & 4/00, 2 & 5/01; in burned area but not burned, between rocks, green, good 2 & 4/02, 2 & 4/03
9.02	1	3.95	34													2.25	0	0	2.28	0	0	1.92	0	0	2.68	1	1	possibly tubercle of 9.00; green, good 2 & 4/00, 2 & 5/01; in burned area but not burned, between rocks, green, good 2 & 4/02; 2 & 4/03
10.00	1	4.93	17	5.10	4	3	6.00	5+3fr	7	6.50	5	2+2A	nd	0	0	Dead												burned 1/96; OK 5/96; great 3/97; several fruit partially eaten 5/97; OK, slightly goldish 3/98, yellowish & orange 5/98; mostly eaten, 1 tubercle left 3/99 & 4/99; gone, tag removed, COD mammal herbivory 2/00

Ancistrocactus tobuschii Data for
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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
11.00	1	4.40	18	2.40	0	0	2.60	0	0	2.90	2	1+1A	nd	mia	0	1.75	0	0	dead									burned 1/96; OK 5/96; tag mia, retagged, good 3 & 5/97; OK, yellowish 3/98; green, pulling into dirt 5/98 gone without a trace 3/99; new growth off old stem 4/99, green, good 2 & 4/00; body hollow, COD Moneilema 2/01
11.10	1	4.47	8																			3.52	2A	0	4.35	5	3+2A	discovered 2/02; burned on upper body, spines singed off, plant creamy white and 2 flowers burned to nubs, lower body spines singed, tubercles creamy white, body purple, poor, photos 1-4 2/02; new green apical growth, OK, photos 29-30 4/02; purplish-green, photo 4 2/03, OK 2 & 4/03
12.00	1	8.06	301	3.40	1	0	5.50	2+3fr	3+1A	5.50	2	2	5.22	3fr+2	4+1A	6.07	0	6	dead									burned 1/96; OK 5/96; good 3/97 & 5/97; tag mia, replaced, good 3/98, 5/98, 3/99, good, green 4/99 & 2/00, a few orange tubercle tips, OK 4/00; one gallery and exit hole, COD Moneilema? 2/01
13.00	1	6.52	70													1.81	1	1	2.08	0	0	2.11	0	0	2.38	0	0	discovered 2/00; green, good 2 & 4/00; trampled, olive with a few orange tubercle tips, OK 2/01; green OK 5/01; not in burn area, edge of grass and rock flipped on top, green OK 2/02; green, good 4/02 & 2/03; under live oak leaves, green, good 4/03
14.00	1	3.97	89																			4.79	6	6	6.40	10	11	discovered 2/02; outside burn area, green, good 2 & 4/02, 2 & 4/03
15.00	1	3.75	127																			3.12	3	2	3.85	3	3	discovered 2/02; not in burned area, green, good 2 & 4/02 & 2/03; green with some purplish tubercle tips, OK 4/03
Stake 2 is 24.90 m at 194 degress from the 20mph sign over agarita; Stake 2 = GPS2 R021919A																									0.00			
13.00	2	7.17	356	2.40	1fr	0	3.10	0		3.80	0	0	3.01	3	1A	3.58	2	1	3.72	0	0	3.20	2	0	3.19	2	0	burned 1/96; OK 5/96; one-third eaten, scarred over greenish purple, poor 3/97; better, only a slight scar 5/97; trampled a lot, OK, new growth in center 3/98; right in path, green, level with ground 5/98, 3/99; spine clusters loose, OK 4/99; green, good 2/00; purplish, OK 4/00; becoming two-headed, green with purplish tubercles, OK 2/01; only one apical meristem, within a much larger basal stem, green, OK 5/01; just one head, maroonish-green, OK 2 & 4/02; covered with ant dirt 2 & 4/03
14.00	2	10.00	348	4.20	2+1A	1	5.30	1B+2+2fr	4+1A	5.90	4	4A	5.19	2+4fr	6	5.81	0	0	dead									burned 1/96; OK 5/96; green, good 3/97 & 5/97; green, good, flowers smashed 3/98, green, good 5/98, 3/99, 4/99 & 2/00; covered with ant litter 2/00; coming out; green, good 4/00; plant collapsed, mushy, gooey red-orange, collected, dead 2/01

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
14.01	2	10.03	348	1.20	0	0	1.50	0	0	1.40	0	0	1.36	0	0	1.57	0	0	1.92	0	0	mia			mia			burned 1/96; OK 5/96; tag mia, retagged, OK 3/97; almost buried in dirt 5/97; popped out, good, tag mia, replaced 3/98; good 5/98, 3/99; green, good 4/99; covered with ant litter, OK 2/00; coming out, green, good 4/00; tag mia, replaced, misshapen, green, OK 2/01; orange, hunkered, poor 5/01; plant mia 2/02; plant & tag mia 4/02, 2 & 4/03
15.00	2	9.85	348	7.00	0	0	3.20	1+1fr	2	3.80	1	1	2.74	1	1	3.35	0	0	3.65	0	0	3.14	3	0	4.25	0	0	slightly burned 1/96; good 5/96, 3/97, 5/97, 3/98, 3/99; under live oak seedling, green, good 4/99 & 2/00; covered with ant litter 2/00; out, dull green, OK covered with live oak leaves 4/00; may have suffered apical damage, green, OK 2/01; green, good 5/01, 2 & 4/02; covered with ant dirt 2 & 4/03; photo 5 2/03
16.00	2	8.96	343	4.10	1	1	4.10	1B+2+1fr	4	4.00	1	1	3.91	0	0	4.31	1	1	4.18	1	1	4.76	3	3	5.68	0	0	burned 1/96; OK 5/96 & 3/97; tag mia, retagged, good 5/97; reddish, OK 3/98; poor 5/98; spines dull whitish-gray, body green with maroon overcast 3/99; goldish green, new spine growth, OK 4/99; top green, lower body tan, OK 2/00; goldish, OK 4/00; maroonish, OK 2 & 5/01; green, OK 2 & 4/02; covered with ant dirt 2 & 4/03; photo 6 2/03
17.00	2	10.41	339	4.30	3	2	4.60	3B+2	1+2A	4.00	1	1	3.72	2+2fr	3+1A	4.50	0	0	dead									burned 1/96; one flower slightly eaten 3/96, poor, reddish 5/96, green, OK 3/97, OK, slightly covered with dirt 5/97; good with a few red tubercle tips 3/98 & 5/98; slightly maroonish green, good 3/99 & 4/99; green, OK, covered with ant litter 2 & 4/00; dead, body hollow, COD Monellema 2/01
17.01	2	10.38	339	0.70	0	0	0.70	0	0	0.70	0	0	1.17	0	0	mia			dead									slightly burned 1/96; OK 5/96, green, good 3/97, almost buried in dirt 5/97, popped out, good 3/98 & 5/98, OK 3/99, OK, green 4/99, pl mia 2 & 4/00, relocated, dead, just spines left, COD unknown 2/01
17.02	2	10.43	339				1.00		0	1.20	0	0	1.27	0	0	mia			dead									discovered 5/97, looks good 3/98, 5/98, 3/99, good, green 4/99, mia 2 & 4/00, relocated, dead, hollow, too small for Monellema, COD unknown 2/01
18.00	2	10.39	339	3.60	1	0	4.40	1B+2+1fr	3+1A	5.10	3	3	3.90	3+1fr	4	4.92	0	0	dead									burned 1/96; OK 5/96, green, good 3 & 5/97, tag mia replaced, green, good 3/98, green, good 5/98, 3/99 4/99, green, OK, covered with ant litter 2 & 4/00; body hollow, COD Monellema 2/01
19.00	2	11.68	343	4.40	4	0	5.60	1B+3+4fr	9	5.60	4	4	4.71	4fr	2+1A	6.14	0	0	5.74	0	0	6.11	5	4+1A	dead			burned 1/96; OK-poor, a few new spines 5/96, OK 3/97, great 5/97 & 3/98, good 5/98, OK 3/99, yellowish, OK 4/99, green, good, covered with ant litter 2 & 4/00, apex damaged, some spineless tubercles, green, OK 2/01, new apex green, good, rest of plant slightly orangish-green, OK 5/01, head on right and slightly behind, green, good 2 & 4/02; large chamber and exit hole, COD Monellema 2/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
19.001	2	11.66	343																			3.58	5	0	dead			new head 2/02; green, good 2 & 4/02; large chamber, COD Monilema 2/03
19.002	2	11.66	343																						0.43	0	mia	discovered 2/03; seedling of 19.00; leftmost, reddish green, OK 2/03; plant mia 4/03
19.003	2	11.67	343																						0.46	0	0	discovered 2/03; seedling of 19.00; middle; green, OK 2 & 4/03
19.004	2	11.67	343																						0.75	0	0	seedling of 19.00; rightmost; discovered 2/03; green OK 2 & 4/03
19.01	2	11.22	340				2.00		1+1A	2.30	1	1	1.90	1	1	1.82	0	0	2.43	0	0	3.07	3	3	3.54	0	0	slightly orangish, fruit abortion probably due to trampling, discovered 5/97; tubercle tips reddish, otherwise good 3/98; same but sinking into ground 5/98 & 3/99; coming out, dull green, OK 4/99; green, OK, misshapen, stepped on? 2/00; green with a few reddish tubercle tips, OK 4/00; new apex forming, green with a few reddish tubercle tips, OK 2/01; green, good 5/01 & 2/02; green with some red tubercle tips 4/02; covered in ant dirt 2 & 4/03
20.00	2	8.84	338	5.30	4	3	4.80	2B+3	6	4.80	0	3	5.11	6	6	5.89	0	0	6.62	3	5	7.29	8	12	7.78	0	0	burned 1/96; OK, new growth 5/96; green, good 3 & 5/97; OK, tubercle tips orangish 3/98; green, good 3/99 & 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02; covered in ant dirt 2 & 4/03
21.00	2	10.18	323	3.00	1	1	3.80	1+2fr	3	3.80	1	1	3.33	1fr	1	3.58	2	2A	3.02	0	0	3.20	0	0	2.82	0	0	not burned 1/96; looks good 5/96, 3/97, 5/97, 3/98, 5/98 & 3/99; green, good 4/99; partly covered with litter, green, good 2/00; out of litter, green, good 4/00; green with one yellow tubercle, OK 2/01; green OK 5/01; tag mia, replaced, plant green with a few yellowish tubercle tips, OK 2/02; few spined, green, OK 4/02; some tubercle damage, green, OK 2/03; partly covered in ant dirt, green, OK 4/03
22.00	2	10.56	311	4.50	2	3	4.70	2B+3	1+1A	4.60	0	0	3.94	0	0	4.11	0	0	4.35	0	0	3.90	0	0	dead			not burned 1/96; reddish at base 3/96; OK, greener 5/96; mostly reddish 3/97; purplish 5/97; red with some new green growth at top, bad 3/98; poor, maroon, new spine growth 5/98; spines gray; body green, OK 3/99; reddish goldish green, OK 4/99; purple, OK 2/00; reddish, poor 4/00; green with red tubercle tips, OK 2/01; maroonish, OK 5/01; goldish at base, green above, OK 2/02; purplish-green, OK 4/02; large chamber and exit hole; COD Monellema 2/03
22.10	2	10.66	311				2.00	0	0	2.00	0	0	2.03	0	0	2.23	0	0	2.18	0	0	1.70	0	0	1.59	0	0	to left of 22.20; no fire scars, good 3/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00; yellowish-green, OK 2/01; green, OK 5/01, 2 & 4/02; almost buried in litter, OK 2 & 4/03
22.20	2	10.66	311				2.30	0	0	2.20	0	0	2.45	0	0	2.32	0	0	2.00	0	0	1.91	0	0	1.55	0	0	to right of 22.10; no fire scars, good 3/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00; getting buried, yellowish-green, OK 2/01; green, OK 5/01, 2 & 4/02; almost buried in litter, OK 2 & 4/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
22.30	2	10.00	309				4.60	1B+2	3	4.50	1	1	3.96	0	0	4.42	0	0	4.30	0	0	4.12	2	1	4.17	0	0	no fire scars, good 3/97; a few yellow tubercle tips, good 3/98; poor, mostly yellow 5/98; goldish, OK 3/99 & 4/99; base yellowish, green top, OK 2/00; olive, OK 4/00; some damage to apical meristem an tubercles, green with tan tubercle tips, OK 2 & 5/01; green with some tan tubercle tips, OK apex shifted downward 2/02; olive with some gold tubercle tips, OK 4/02; green with some tan tubercle tips, OK 2/03; olive, OK 4/03
22.40	2	7.78	308				5.30	1B+3	4	4.50	2	2	4.51	0	0	5.27	1	1	6.55	3	5	5.73	3	3 +1A	6.42	0	0	in juniper branches; no fire scars, good 3/97; getting yellowish, OK 3/98; good, a few yellow tubercle tips 5/98; dark maroonish green, OK 3/99; good 4/99; green, good 2 & 4/00; green with maroonish tubercle tips, OK 2 & 5/01; green with some tan and maroonish tubercle tips, good 2/02; green, good 4/02; covered with ant dirt 2/03; almost covered with ant dirt, green, good 4/03
22.50	2	8.73	311							4.50	3	3	3.40	4	3+1A	4.56	2	2	5.20	5	5	5.49	5	7+1A	5.54	0	0	discovered 3/98; OK, yellowish-green 5/98 & 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02; covered with ant dirt 2 & 4/03
23.00	2	4.06	308	1.70	0	0	1.90	1B	1	2.20	0	0	2.04	0	0	2.30	1	1A	2.82	1	0	2.88	1	0	3.29	0	0	not burned 1/96; good 5/96, 3/97, 5/97, 3/98 & 5/98; hunkered down, green, OK 3/99; green, good, coming out 4/99; a little misshapen 2/00; green, OK 2 & 4/00, 2 & 5/01slightly purplish, green, OK 2 & 4/02; green, OK 2 & 4/03
24.00	2	4.13	307	1.70	0	0	2.20	0	0	0.90	2	0	1.05	0	0	1.24	0	0	1.11	0	0	1.07	0	0	1.79	0	0	not burned 1/96; good 5/96; OK, slightly purplish 3/97; green, good 5/97; a few dry tubercles and spines in vicinity, cause unknown, 2 tubercles left, green, OK 3/98; green, good, level with soil 3/99; green, good, popping out 4/99; green, good 2 & 4/00 olive, OK 2/01; green, OK 5/01; hunkered, green, good 2 & 4/02; partly covered by dirt, green, OK 2 & 4/03
25.00	2	4.17	306	1.80	0	0	2.70	1B+1+1fr	2+1A	2.50	1	1	2.26	2fr	2	3.25	1	0	3.47	2	2	2.97	2	1	3.17	2	3	burned 1/96; OK 5/96; green, good 3/97, 5/97, 3/98, 5/98, 3/99, 4/99, 2/00 & 4/00, 2 & 5/01; green with some tan tubercle tips, OK 2/02; maroonish-green, OK 4/02; purplish green, good 2 & 4/03
25.01	2	4.24	304				1.00		0	1.30	0	0	1.32	0	0	1.56	0	0	2.51	0	0	3.52	4	3+1A	5.13	5	5	discovered 5/97; good 3/98, 5/98 & 3/99; olive, OK 4/99; covered by rock 2/00; green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
26.00	2	4.35	297	3.90	2	2	4.90	2B+2+2fr	6	4.70	3	3	3.89	1+4fr	5	4.77	3	3	5.11	3	3	4.80	5	1+1A	5.80	8	9	burned 1/96; OK 5/96; green, good 3/97 & 5/97 getting a few reddish or yellowish tubercle tips, OK 3/98; green, OK 5/98; slightly maroon, OK 3/99 & 4/99; green, good 2 & 4/00, 2 & 5/01; green with some yellowish or reddish tubercle tips, OK 2/02; green, good 4/02, 2 & 4/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
26.10	2	5.36	290				2.10		0	2.50	0	0	2.25	3fr	3A	3.22	2	2	4.20	6	6	3.69	4	3+1A	4.73	4	3+1A	on left of 26.20, discovered 5/97; OK 3/98; good 5/9 & 3/99; green, good 4/99, 2/00 & 4/00, 2/01; slightly maroonish, good 5/01; green, good 2 & 4/02, 2 & 4/03
26.20	2	5.37	290				2.00		0	2.30	0	0	1.88	0	0	2.64	1	1	3.85	3	3	4.06	4	2+1A	4.63	5	4	on right of 26.10, discovered 5/97; good 3/98, 5/98, 3/99; green, good 4/99, 2/00 & 4/00, 2 & 5/01, 2/02; slightly purplish-green at base, OK 4/02; purplish at base, upper stem green, good 2/03, 2 flowers eaten 2/03; green, good 4/03
27.00	2	7.37	285	2.70	2	2	3.40	3	1+1A	4.10	4	4	3.69	4fr	4	4.41	4	4	5.04	5	6+1A	4.37	5	3+2A	5.60	5	1+4A	not burned 1/96; OK, fruit split open 5/96; rock on top, flowers smashed, stem OK 3/97; good 5/97; OK, a little yellowish 3/98; green, good 5/98 & 3/99; buried in grass, grass dying back, plant green, good 4/99 & 2/00; slightly reddish at base, otherwise green, good 4/00; maroonish-green, good 2/01; olive OK 5/01; green, good 2/02; olive, OK 4/02; green, good 2 & 4/03
27.01	2	7.90	279																			1.92	0	0	3.07	3	2	discovered 2/02; green, good 2 & 4/02, 2 & 4/03
27.10	2	10.20	278				4.40	2+4fr	5	4.60	4	1	3.46	4fr	4	4.54	4	2+2A	4.19	4	4	3.49	6	5+1A	4.05	3	1	no fire scars, good 3/97 & 3/98; OK, trampled 5/98; hunkered down 3/99; hunkered down, OK 4/99; green, good 2 & 4/00; sunken slightly on one side, green, OK 2 & 5/01; green, good 2/02; green, OK 4/02; 2 flowers damaged, green, OK 2 & 4/03
27.20	2	10.80	278				2.00	0	0	2.40	1	1A	1.74	0	0	2.06	0	0	1.97	0	0	2.78	3	1+1A	4.10	4	1+3A	no fire scars, good 3/97; almost buried, OK 5/98; tag upside down under rock, plant totally buried 3/99; barely above soil, green, OK 4/99 & 2/00; popped out, dull green, OK 4/00; maroonish, OK 2/01; pale blue-green, OK 5/01; maroonish-green, OK 2 & 4/02 tag mia, replaced, purplish green, good 2/03; green, good 4/03
27.30	2	10.98	277				4.20	1+4fr	4+1A	4.40	1	0	Dead															no fire scars, slightly reddish, OK 3/97; good 3/98; poor, trampled 5/98; plant hard, dry, solid, COD unknown 2/98
27.40	2	10.84	275				3.80	2+1fr	3	4.40	4	3	3.52	4fr	2A	5.90	5	5	6.56	5	7	6.82	7	6+2A	7.28	10	9	no fire scars, good 3/97; partially eaten (~25%), goo 3/98 & 5/98; almost buried 3/99; coming out, green, good 4/99, 2/00 & 4/00; several tubercle tips damaged, green, good 2/01; slightly maroonish-green, good 5/01; green, good 2 & 4/02, 2 & 4/03
27.50	2	11.43	271				3.30	2+1fr	1	3.40	3fr	1	2.93	4fr	4+1A	4.24	4	4	3.65	0	0	3.36	4	3+1A	4.19	4	1	no fire scars, good 3/97 & 3/98; fruit eaten down to base, plant good 5/98; covered with silt 3/99; coming out, purplish, OK 4/99; green, good 2 & 4/00; misshapen, purplish, poor 2/01; misshapen, purplish OK 5/01; light purplish at base, purplish-green, above, OK 2 & 4/02; green, good 2/03, 1 flower knocked off plant 2/03; partly covered with soil, green, OK 4/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
27.51	2	10.55	270																			4.98	6	4+2A	5.55	7	8	discovered 2/02; very slight damage to one tubercle, green, good 2/02; green with some red tubercle tips, OK 4/02; green, good 2 & 4/03
27.60	2	10.09	286										3.76	0	Dead													uprooted, but a few roots still in soil, still green 3/99; maroon with green apex & new spine growth, OK 4/99, taken for weevil study 5/6/99 by WHC; COD unknown, no evidence of weevils
27.70	2	10.24	284										2.75	1fr	1A	3.46	3	3	3.80	1	1	3.75	3	2+1A	4.12	0	0	almost buried 3/99; coming out, olive 4/99; green, good 2 & 4/00; green with some maroonish tubercles, OK 2/01; maroonish, OK 5/01; yellowish green at base, upper stem maroonish green, OK 2/02; green, OK 4/02; covered with ant dirt 2 & 4/03
27.80	2	10.24	284										1.64	0	0	2.87	1	1	3.67	0	0	3.69	3	4+1A	4.53	0	0	good 3/99; green, good 4/99, 2 & 4/00; apical meristem damaged, new apex forming, green, OK 2/01; green, good 5/01, 2 & 4/02; apex covered with ant dirt, green, good 2 & 4/03
27.90	2	7.22	281																						2.37		2	discovered 4/03; green, OK 4/03
28.00	2	9.51	282													1.85	0	0	2.46	0	0	2.54	2	0	2.90	0	0	green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
29.00	2	9.04	288													3.89	3	1+2A	4.16	2	2	3.97	3	3	5.42	5	1	green, good 2 & 4/00, green with some maroonish tubercle tips, good 2/01; green, good 5/01, 2 & 4/02, 2 & 4/03
30.00	2	9.98	290													3.20	2	1+1A	3.63	1	0	3.50	3	4	3.76	0	0	green, good 2/00; slightly reddish, OK 4/00; partially eaten, green, OK 2/01; apex shifted, green, OK 5/01 green, good 2/02; sllightly puplish green, OK 4/02; green with tan tubercle tips, OK 2 & 4/03
31.00	2	11.80	323													2.96	1	1A	3.39	1	1	3.25	1	0	3.67	0	0	green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
32.00	2	5.00	305													2.62	0	0	3.38	1	1	3.42	3	0	3.74	4	4	green, good 2 & 4/00; geen with some maroonish tubercle tips, OK 2/01; olive OK 5/01; green, good 2/02; green, OK 4/02; reddish base, green above, good 2 & 4/03
33.00	2	4.73	309													2.98	1	1	3.07	1	1	3.56	3	3	3.94	4	4	green, good 2 & 4/00, 2 & 5/01, 2/02; olive, OK 4/02 green, good 2 & 4/03
Stake 3 is 20.20 m at 239 degrees from the Camping Area sign pole closest to road; Stake 3 = GPS4 R021918B																												
28.00	3	2.71	22	3.90	1	1	4.80	1B+2+3fr	6	4.90	2	1+1A	5.26	2+2fr	2+2A	5.35	3	2+1A	4.81	3	4	4.50	0	1A	4.70	3	3	burned 1/96; OK 5/96; green, good 3/97, 5/97, 3/98 & 5/98; green, good, flowers partially eaten 3/99; green, good 4/99; yellowish-green, OK 2/00; green, good 4/00, 2 & 5/01; reddish green, OK 2/02; light green with orangish tubercle tips, OK 4/02; green, good 2/03; green with yellowish tubercles OK 4/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
29.00	3	3.35	21	4.10	0	0	4.80	2fr+1A	2+1A	4.40	3?	3A	3.89	2	1+1A	4.43	0	0	5.15	2	2	4.62	2	0	4.96	1	0	burned 1/96; OK 5/96 & 3/97; good 5/97; stepped on, flowers smashed, otherwise good 3/98; poor, yellowish 5/98; green, a few tan tubercles, OK, flowers partially eaten 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01; dark green, OK 2/02; olive, OK 4/02; green, good 2/03; half red half green, OK 4/03
30.00	3	2.81	43	2.60	0	0	2.30	0	mia	2.60	0	0	2.49	0	mia	2.36	0	0	2.28	0	0	dead						slightly burned 1/96; dead plant at base 3/96; OK 5/96; in grass, green, good 3/97; plant & tag mia 5/97; deep in grass, good 3/98, 5/98 & 3/99; pl & tag mia 4/99; green, good, in grass 2 & 4/00, 2/01; green, OK 5/01; just spines and a small piece of dry, corky root left, COD unknown 2/02
31.00	3	4.67	16	2.90	1	0	2.70	2+1fr	3	2.20	0	0	1.82	0	0	1.76	0	0	dead									burned 1/96; good 5/96; OK 3/97; good 5/97; OK, a few reddish tubercles 3/98; green, trampled 5/98; green, OK 3/99 & 4/99, 2 & 4/00; body hollow, COD Monilema 2/01
32.00	3	3.04	10	3.20	0	0	3.00	1+1fr	1+1A	3.00	1	1A	3.27	2	1+1A	3.27	0	0	3.37	0	0	3.30	mia	0	3.21	0	0	burned 1/96; OK 5/96; good, green 3/97, 5/97, 3/98, 5/98 & 3/99; OK 4/99; green, slightly reddish, OK 2/00; green, good 4/00; green with some marronish tubercle tips, OK 2/01; green, good 5/01; tag and plant mia 2/02; green, good 4/02, 2 & 4/03
32.10	3	3.28	17	0.90	na	0	1.30	0	0	1.90	0	0	1.59	0	0	2.36	0	0	2.30	0	0	2.37	0	0	2.62	0	0	not burned 1/96; discovered 5/96, good, originally tagged as 349; retagged, good 3/97, 5/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00; maroonish-green, OK 2 & 5/01; olive, OK 2 & 4/02, 2/03; green, OK 4/03
32.20	3	3.46	10	1.00	na	0	1.20	0	0	1.60	0	0	1.61	0	0	1.83	0	0	2.16	0	0	2.25	0	0	2.60	2	2	not burned 1/96; discovered 5/96, good, originally tagged as 348; retagged, good 3/97, 5/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
33.00	3	3.60	352	3.20	0	0	3.00	3	2+1A	2.90	2	2	3.00	0	0	2.70	0	0	2.91	0	0	2.60	0	0	3.08	2	1	burned 1/96; OK 5/96 & 3/97; good 5/97; a few tan tubercle tips, good 3/98; OK, olive green 5/98 & 3/99 green, OK 4/99, 2 & 4/00; pale green, OK 2/01; green, OK 5/01, 2 & 4/02, 2 & 4/03
33.10	3	3.11	5	0.90	na	0	1.20	0	0	1.20	0	0	1.38	0	0	1.84	0	0	1.80	0	0	1.67	0	0	1.74	0	0	not burned 1/96; discovered 5/96, good, orginally tagged as 347; retagged, good 3/97 & 5/97; sort of misshapen, good 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00; misshapen, green, OK 2 & 5/01; hunkered, green, OK 2/02; green with some yellow and red tubercle tips, OK 4/02; green, OK 2/03; green, good 4/03
33.20	3	3.16	5	1.50	na	0	1.90	0	0	1.70	0	0	1.80	1	1	2.23	1	1A	2.35	0	0	2.73	1	2	3.06	1	1	not burned 1/96; found 5/96, good, originally tagged as 346; retagged, good 3/97, 5/97, 3/98 & 5/98; OK, hunkered, petals eaten 3/99; dull dark green, OK 4/99; green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
33.30	3	3.26	355				1.10		0	1.40	0	0	1.25	0	0	1.72	0	0	2.29	0	0	2.15	1	1A	2.34	1	1	discovered 5/97; good 3/98; buried 5/98; buried, OK 3/99; popped out, green, good 4/99; green, good 2 & 4/00, 2 & 5/01; pale green with one yellow tubercle tip, OK 2/02; green, OK 4/02; green, good 2/03; partly covered in ant dirt, green, good 4/03
34.00	3	3.38	343	2.20	0	0	2.90	2	1+1A	3.40	1	1A	3.07	2+1fr	3A	3.98	2	2	3.94	0	0	3.56	2	2	3.33	2	1+1A	not burned 1/96; good 5/96, 3/97, 5/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
34.10	3	3.22	350							2.10	0	0	2.27	0	0	3.15	0	0	3.42	0	0	3.14	1	1A	3.38	0	0	discovered 3/98; good 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01; slightly reddish green, OK 2/02; olive OK 4/02; green, good 2/03; green, OK 4/03
35.00	3	3.13	1	2.00	0	0	2.30	1B+1	1+1A	2.50	1	1	2.15	1	1A	2.37	0	0	2.48	0	0	2.40	0	0	2.72	2	2	burned 1/96; OK 5/96; good, green 3/97, 5/97, 3/98 & 5/98; OK, a few loose spines 3/99; goldish, OK 4/99; dull green, reddish at base, OK 2/00; green, OK 4/00; apex damaged, purplish, OK 2/01; green with some red tubercles, OK 5/01; green, OK 2 & 4/02, 2/03; green, good 4/03
35.10	3	3.52	3																1.07	0	0	1.36	0	0	1.51	0	0	discovered 2/01; green, OK 2 & 5/01; getting overgown by crustose lichen, green, OK 2 & 4/02; popping out, green, OK 2/03; green, OK 4/03
36.00	3	2.82	355	2.40	0	0	2.80	0	0	mia			3.04	0	0	3.31	0	0	3.12	0	0	3.15	0	0	3.25	0	0	burned 1/96; OK 5/96; in grass clump, good, green 3/97 & 5/97; plant & tag mia 3/98 & 5/98; edge of little bluestem, green, good 3 & 4/99; green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
37.00	3	6.29	322	1.70	0	0	2.50	1	0	3.10	2	1+1A	2.97	1+2fr	3	3.52	2	2	4.01	2	1	3.25	4	0	4.60	4	5	burned 1/96; good 5/96 & 3/97; tag mia, replaced, good 5/97, 3/98, 5/98 & 3/99; good, green 4/99, 2 & 4/00; trampled, green, OK 2/01; maroonish-green, OK 5/01; green, good 2 & 4/02, 2/03; green, OK 4/03
38.00	3	4.52	296	2.90	2	0	3.10	1B+1+2fr	3+1A	2.80	0	0	2.03	0	0	1.71	0	0	2.00	0	0	2.02	0	0	2.33	0	0	burned 1/96; OK 5/96, 3/97 & 5/97; OK to poor, light green, some tubercle tips orange, center sunken 3/98; yellow-orange 5/98; plant collapsing on one side, pup forming 3/99; pup green, good 4/99; only pup measured, old head yellowish, pup green, good 2 & 4/00; old head collapsed, pup green, good 2 & 5/01; pale green, good 2 & 4/02; green, OK 2 & 4/03
39.00	3	5.78	290	1.90	0	0	2.60	1fr	1	2.40	1	1	mia			3.20	1	1	4.00	3	3	4.73	5	3+2A	5.26	3	5	not burned 1/96; OK 5/96; good, green 3/97 & 5/97; almost buried in ant mound, tag mia, OK 3/98; tag relocated, plant good 5/98; tag and plant mia, ant mound 3/99 & 4/99; tag and plant relocated 2/00; green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
40.00	3	5.77	289	3.00	0	0	3.30	3	2+1A	Dead																		burned 1/96; OK 5/96; good, green 3 & 5/97; only loose spines in vicinity, tag mia, COD unknown 3/98

Ancistrocactus tobuschii Data for
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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
41.00	3	5.80	289	2.10	0	0	2.70	1B	0	nd	0	0	2.69	2	1+1A	mia			mia			mia						burned 1/96; OK 5/96; good, green 3/97 & 5/97; totally buried, only spine tips sticking out, tag mia 3/98 & 5/98; tag and plant back, green; good 3/99 & 4/99; plant mia 2 & 4/00, 2 & 5/01, 2 & 4/02
42.00	3	5.18	287	2.00	0	0	2.10	1fr+1A	2A	1.80	0	0	1.96	0	0	2.29	0	0	2.31	0	0	2.41	0	0	2.73	1	1A	burned 1/96; OK 5/96; reddish, poor 3/97; good, green 5/97, 3/98, 5/98, 3/99, 4/99, 2 & 4/00; green, OK 2/01; green, good 5/01, 2 & 4/02, 2 & 4/03
43.00	3	5.35	287	1.90	0	0	2.30	1	1A	2.10	1	1A	1.83	0	0	1.95	1	1	2.37	0	0	2.07	1	1A	2.46	1	0	burned 1/96; OK 5/96 & 3/97; good 5/97, 3/98, 5/98 & 3/99; olive, OK 4/99; green, OK 2/00; green, good 4/00; hunkered, marronish, OK 2/01; green, OK 5/01; hunkered, green, OK 2 & 4/02; green, good 2/03; green, OK 4/03
44.00	3	5.31	287	1.80	0	0	1.80	0	0	1.00	0	0	1.79	1fr	0	2.10	0	0	2.74	0	0	2.75	2	1A	2.86	2	2	burned 1/96; OK 5/96 & 3/97; good 5/97, 3/98, 5/98 & 3/99; olive, OK 4/99, 2 & 4/00, 2/01; green, good 5/01, 2/02; purplish green, OK 4/02; olive, OK 2/03; green, OK 4/03
45.00	3	5.32	287	2.30	0	0	2.30	1	1A	2.30	1	1	2.04	0	0	2.32	1	0	2.55	0	0	mia			mia			on left of 46.00; burned 1/96; OK 5/96; poor & reddish 3/97; OK, dull green 5/97; good 3/98, 5/98 & 3/99; olive, OK 4/99; reddish-green, OK 2/00; dull green, OK 4/00; hunkered, olive, OK 2/01; hunkered reddish-olive, poor 5/01; plant mia 2 & 4/02, 2 & 4/03
46.00	3	5.32	287	1.70	0	0	1.70	0	0	1.90	0	0	1.65	0	0	1.88	0	0	1.97	0	0	1.75	0	0	2.30	0	0	on right of 45.00; slightly burned 1/96; OK 5/96 & 3/97; good 5/97, 3/98, 5/98, & 3/99; olive, OK 4/99; green, good 2 & 4/00; hunkered, green, OK 2/01; green, good 5/01; hunkered, green, OK 2 & 4/02; green, OK 2/03; green, good 4/03
47.00	3	5.37	286	2.40	0	0	2.80	2fr	2	2.50	1	1	2.18	0	0	2.71	1	1	2.69	0	0	2.51	1	1A	2.94	1	1	burned 1/96; OK 5/96; poor, purplish 3/97; OK, dull green 5/97, 3/98, 5/98, 3/99 & 4/99; reddish olive green, OK 2 & 4/00, 2 & 5/01; yellowish olive, OK 2/02; green, OK 4/02, 2/03; green with reddish tubercle tips, OK 4/03
47.01	3	5.41	286				0.80		0	1.10	0	0	1.04	0	0	0.98	0	0	mia			mia			mia			at edge of 47.00 tag; discovered 5/97; OK 3/98 & 5/98; almost buried 3/99; coming out, dull green; OK 4/99, purplish, OK 2/00; olive, OK 4/00; plant mia 2 & 5/01, 2 & 4/02, 2 & 4/03
47.02	3	5.35	286				0.50		0	mia			mia			mia												under rock; discovered 5/97; plant missing 3/98, 5/98, 3/99, 4/99, 2 & 4/00 (tag is here); tag mia 2 & 4/03
48.00	3	5.14	285	1.50	0	0	1.80	1	1A	1.70	0	0	1.44	0	0	1.76	0	0	1.85	0	0	1.93	0	0	2.06	0	0	not burned 1/96; OK 5/96 & 3/97; good 5/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01; green, OK 2 & 4/02, 2 & 4/03
49.00	3	5.18	285	2.70	0	0	3.10	2fr	2	2.60	0	0	2.27	0	0	2.71	0	0	dead									not burned 1/96; OK 5/96 & 3/97, good 5/97; OK 3/98, 5/98 & 3/99; maroonish, OK 4/99; purplish, OK 2/00; olive, OK 4/00; body solid; COD unknown 2/01

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
50.00	3	4.77	285	3.20	1	0	4.20	2+3fr	3+2A	4.20	2	2	3.77	3	3A	3.67	2	2	4.14	0	0	4.10	1	0	4.17	1	0	burned 1/96; OK 5/96, 3/97, 5/97, 3/98; OK, olive green 5/98; flowers partially eaten, green, good 3/99; maroonish, OK 4/99; pale tan-green, OK 2/00; goldish, OK 4/00, 2/01; orangish-green, OK 5/01; green, good 2/02; olive, good 4/02; green, good 2/03 olive, OK 4/03
50.01	3	4.79	285							0.90	0	0	1.09	0	0	1.02	0	0	1.34	0	0	1.23	0	0	1.26	0	0	discovered 3/98; green, good 3/99, 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
51.00	3	5.94	287	2.30	1	0	3.00	0	0	3.60	2	2	3.15	3fr	1A	4.11	2	2	4.59	1	1	4.34	5	2+2A	5.61	6	5+2A	badly burned 1/96; new growth, OK 5/96 & 3/97; in fire ant mound, tag mia, replaced, good 5/97; good, tag mia, replaced, fire ant mound moved 3/98 and 3/99; maroonish, OK 4/99; green with tan base, good 2 & 4/00; one tubercle gone, green with maroonish tubercle tips, OK 2/01; maroonish, OK 5/01; slightly maroonish green, good 2/02; brownish green, OK 4/02; green, good 2 & 4/03
51.10	3	9.87	289				4.60	1B+1+1fr	2+1A	4.90	1	1	3.90	3fr	3A	5.69	4	5	5.97	4	5	4.33	5	1+4A	4.74	5	1	no fire scars, good 3/97, 3/98, 5/98 & 3/99; good, green 4/99, 2 & 4/00; some tubercle tips damaged, green, OK 2/01; slightly trampled, maroonish, OK 5/01, 2 & 4/02; green with some tan and red tubercle tips, OK 2/03; olive, OK 4/03
51.20	3	8.90	283							2.10	1	1A	2.03	2fr	2A	2.91	1	0	3.58	2	3	3.66	1	1	4.59	0	1A	discovered 3/98; OK 3/99; maroonish, OK 4/99; green, good 2 & 4/00; green with some maroonish tubercle tips, OK 2/01; green, good 5/01; dark blue-green, good 2/02; green, good 4/02; partly covered by ant dirt, green, OK 2/03; green, good, ant dirt almost gone 4/03
51.30	3	9.93	289													3.50	0	0	3.88	3	2+1A	4.20	4	3+2A	4.61	0	0	left of 51.40, discovered 2/00; green, good 2 & 4/00, 2/01, 2 & 4/02; covered by ant dirt 2/03 & 4/03; only spines showing but OK, 4/03
51.40	3	9.94	289													4.21		0	4.56	5	3+2A	3.22	3	2+1A	4.85	1	0	right of 51.3, discovered 4/00; green, good 4/00, 2/01; tag mia, replaced 2/01; apex detached, collected, green, with fruit forming, remaining body scarred over, new apex forming, green, OK 5/01; green, good 2 & 4/02; partly covered by ant dirt, green, good 2 & 4/03
51.50	3	7.94	283																			2.46	2	1A	3.63	4	4A	discovered 2/02; green, good 2 & 4/02, 2/03; almost covered in ant dirt, green, OK 4/03
52.00	3	5.62	280	2.50	1	0	3.10	2fr	2	3.10	1	0	3.10	2fr	2	3.40	1	1	2.87	0	dead							burned 1/96; flower smashed 3/96; new growth, OK 5/96, 3 & 5/97; flower smashed, plant good 3/98; yellowish, OK 5/98; poor, yellow 3/99; OK, reddish 4/99 & 2/00, yellowish-red, poor 4/00; soft, olive-maroon, poor 2/01; weevil galleries, COD weevils 5/01

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
53.00	3	6.72	267	4.80	2	1	4.90	2+3fr	4+1A	5.00	4	4A	4.76	5	5A	5.91	4	4	5.07	3	3	5.09	4	3A	5.66	2	3	burned 1/96; good 5/96; under rock, tag mia, replaced, good 3/97; good 5/97; fantastic 3/98; good 5/98 & 3/99; tag mia, replaced, flowers partially eate 4/99; green, very good 2 & 4/00; green with some maroonish tubercle tips, OK 2/01; green, good 5/01, 2 & 4/02, 2 & 4/03
54.00	3	4.78	260	3.30	1	0	3.70	1B+4	4+1A	3.20	2	1	3.12	1	0	2.78	0	0	dead									burned 1/96; flower smashed 3/96; good 5/96 & 3/97; a few orange tubercles, OK 5/97; dark dull green, OK 3/98; purplish 5/98, OK, purplish; petals eaten 3/99 & 4/99; reddish, oK 2/00, olive, OK 4/00; large hole in top, but body solid; COD unknown 2/01
55.00	3	3.47	256	1.90	0	0	2.80	0	0	3.30	0	0	3.45	0	0	3.89	0	0	4.14	0	0	4.28	1	2	4.11	1	1	slightly burned 1/96; good 5/96, 3/97, 5/97, 3/98, 5/98, & 3/99; good, green 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2/03; olive, OK 4/03
56.00	3	3.38	256	2.20	0	0	2.10	0	0	2.40	0	0	2.39	0	0	2.78	0	0	3.20	0	0	dead						badly burned 1/96; new growth, OK 5/96, fire scar still visible at base, good, green 3/97, 3/98, 5/98, 3/99 & 4/99; green, good 2 & 4/00, 2 & 5/01, dead; COD unknown, collected for weevil study 2/02
Stake 4 is 27.52 m at 160 degrees from Camping Area sign pole closest to road; R021918A																												
57.00	4	1.25	262	2.30	0	0	2.60	1+1fr	2	2.80	1	1	2.84	1+1fr	1+1A	4.05	4	4	4.71	2	3	4.74	3	3	5.43	4	5	burned 1/96; OK 4/96, 3/97, 5/97; a few dead orange tubercle tips, OK 3/98, 5/98; green, good, flowers partially eaten 3/99; reddish, OK 4/99; purplish-green, tan at base, good 2/00; a few red and tan tubercles, OK 4/00; large chunk eaten out of one side, plant green with some tan tubercles, OK 2/01; green, good 5/01; maroonish green with some tan tubercles, good 2 & 4/02; green, good 2 & 4/03
57.01	4	1.28	262				2.80	1+1fr	1+1A	3.00	0	0	2.97	2fr	2	3.98	2	2	4.67	2	2	4.15	2	2	4.96	2	3	already tagged, OK 3/97; one tan tubercle, otherwise good 3/98; green, good, fruit partially eaten 3/99; reddish, OK 4/99; purplish-green, tan at base, good 2/00; a few red and tan tubercles, OK 4/00; hole in side, green with tan tubercle tips, OK 2 & 5/01; slightly maroonish green with a few tan tubercle tips, good 2/02; green with a few tan tubercle tips, good 4/02, 2 & 4/03
58.00	4	1.10	253	2.90	0	0	3.00	3	3	2.90	2	2	2.09	2fr	1A	3.01	0	0	3.60	0	0	3.44	2	1+1A	4.34	3	3	burned 1/96; OK 4/96, 3/97; good 5/97; good, one brown tubercle tip 3/98; OK, shrinking 5/98; 2 fruit partially eaten 3/99; green, good 4/99; slightly purplish-green, good 2/00; green, good 4/00; sunker on one side, green, OK 2/01; green, good 5/01; olive OK 2/02; green, OK 4/02, 2 & 4/03

Ancistrocactus tobuschii Data for Lost Maples State Natural Area

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
59.00	4	1.31	246	3.10	2	2	4.00	1+2fr	2+1A	3.90	2	2	3.24	3fr	3A	3.83	2	2	4.20	0	0	3.58	2	1	4.39	3	3	not burned 1/96; OK 4/96, 3/97; good 5/97, 3/98; OK, shrinking 5/98; fruit partially eaten 3/99; reddish OK 4/99; purplish, good 2/00; goldish, OK 4/00; maronish, OK 2 & 5/01, 2/02; purplish green, good 4/02; green, good 2/03, OK 4/03
59.01	4	1.34	246	2.40	0	0	2.20	1+1fr	2	2.30	0	0	2.04	0	0	2.69	1	0	2.85	0	0	2.97	2	2	3.33	2	2	burned 1/96; looks OK 4/96 & 3/97; good 5/97, 3 & 5/98, 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2/03; OK 4/03
59.10	4	2.46	250										1.82		0	2.25	1	1	2.52	0	0	2.47	2	1	3.01	0	2	dull green, OK, discovered 4/99; green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
60.00	4	1.50	243	3.50	2	0	4.30	4	5	4.40	3	2+1A	3.56	1+3fr	4A	4.92	3	3	5.24	2	2	4.96	2	1+2A	5.22	4	4	burned 1/96; OK 4/96 & 3/97; fire scars still visible 3/97; fire scars no longer visible, OK 5/97; a few tan tubercle tips, good 3/98 & 5/98; fruit mostly eaten, very maroon, OK 3/99; very maroon, OK 4/99; lumpy, a little soft, purplish, OK 2/00; goldish, OK 4/00; purplish, OK 2 & 5/01, 2/02; purplish green, OK 4/02, 2/03; yellowish green, OK 4/03
61.00	4	1.55	243	3.60	2	0	4.10	3	3	4.70	2	2	3.10	4fr	3A	4.25	1	1	4.36	0	0	4.29	2	2	4.59	2	2	burned 1/96; OK 4/96 & 3/97; fire scars still visible 3/97; barely visible, good 5/97; a few tan tubercle tips, good 3/98; a few tan tubercle tips, OK 5/98; very maroon, OK, hunkered down 3/99 & 4/99; purplish, good 2/00; goldish, OK 4/00; purplish, OK 2 & 5/01, 2 & 4/02, 2/03; purple green, OK 4/03
62.00	4	1.55	230	2.40	0	0	2.60	2	1	2.50	0	0	2.49	0	0	3.36	1	0	3.66	0	0	3.07	0	0	4.05	0	0	not burned 1/96; OK 4/96; good 3/97; asymmetrical tip growth, loose spines nearby 5/97; good 3/98, 5/9 & 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
63.00	4	2.29	231	2.50	0	0	2.70	0	0	2.90	0	0	2.56	0	0	3.12	0	0	3.27	0	0	2.85	0	0	3.00	0	0	burned 1/96; OK 4/96; good 3/97, 5/97, 3/98, 5/98 & 3/99; green, good 4/99; in grass, green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
63.10	4	2.22	233				1.80		0	1.70	0	0	1.53	0	0	2.21	0	0	2.27	0	0	2.31	0	0	2.52	0	0	discovered 5/97; good 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00, 2 & 5/0, 2 & 4/02, 2 & 4/03
64.00	4	2.83	226	2.70	0	0	3.20	2	2	3.00	0	0	2.80	0	0	2.81	0	0	dead									not burned 1/96; good 4/96; OK 3/97, 5/97, 3/98 & 5/98; OK, maroon 3/99 & 4/99; olive green, OK 2& 4/00; body solid, COD unknown 2/01
65.00	4	3.26	223	3.00	0	0	2.80	1	1	2.80	0	0	2.72	0	0	3.10	0	0	3.22	0	0	3.08	0	0	2.91	0	0	burned 1/96; OK 4/96; good 3/97, 5/97, 3/98, 5/98 & 3/99; green, good 4/99 & 2/00; olive, OK 4/00 & 2/01; green, OK 5/01, 2/02; purplish green, good 4/02; green, with some tan tubercle tips, OK 2/03; green, good 4/03
66.00	4	3.30	223	2.70	0	0	2.60	2	1A	2.90	1	1A	2.56	1fr	0	2.88	1	1	3.13	0	0	2.86	1	1	2.77	0	0	burned 1/96; OK 4/96; flowers open even though overcast 3/97; good 3/97, 5/97, 3/98, 5/98 & 3/99; green, good 4/99; green, little brown at base, good 2/00; olive, OK 4/00, 2/01; reddish-green, OK 5/01, 2/02; purplish green, good 4/02; green, good 2 & 4/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
67.00	4	7.45	240	2.60	0	0	2.80	0	0	2.30	0	0	2.53	0	0	2.01	0	0	dead									not burned 1/96; OK 4/96; OK-poor 3 & 5/97; OK 3/98; OK but getting buried in juniper litter 5/98; buried in juniper litter, poor, goldish 3/99 & 4/99; maybe dead, top flat and sunken, totally buried, no color, firmly rooted 2 & 4/00; body solid; COD unknown 2/01
68.00	4	8.58	241	2.30	0	0	2.60	0	0	2.10	0	0	1.42	0	0	1.78	0	0	1.98	0	0	1.68	0	0	1.93	0	0	not burned 1/96; poor 4/96 & 3/97; OK 5/97, 3/98 & 5/98; almost buried 3/99; popping out, OK, goldish 4/99; dull green, OK 2 & 4/00, 2 & 5/01; pale purplish green, poor 2/02; reddish olive, OK 4/02, 2 & 4/03
68.10	4	8.05	242										2.09		0	1.93	0	0	1.81	0	0	1.71	0	0	1.80	0	0	beside rock, measured in one direction only, green, good, discovered 4/99; green, good 2 & 4/00 & 2/01; green, OK 5/01, 2 & 4/02, 2/03; green, good 4/03
68.20	4	8.27	245													1.69	0	0	1.96	0	0	1.74	0	0	2.01	0	0	discovered 2/00; green good 2 & 4/00, 2 & 5/01, 2 & 4/02; green, OK 2 & 4/03
69.00	4	9.00	249	2.10	0	0	2.10	0	0	2.20	0	0	1.55	0	0	2.03	0	0	1.95	0	0	dead						not burned 1/96; OK 4/96, 3/97, 5/97, 3/98 & 5/98; almost buried 3/99 & 4/99; partially buried, OK 2/00; coming out, goldish, OK 4/00; hunkered, greenish-gold, OK 2/01; hunkered, green, OK 5/01; dead, COD unknown; collected for weevil study 2/02
70.00	4	10.85	241	1.80	0	0	1.60	0	0	Dead																		not burned 1/96; reddish 3/96; OK; reddish 4/96; OK; green, but soil eroded at base 3 & 5/97; stem solid, spines all loose, fungal growth inside 3/98
71.00	4	5.24	261	2.20	1	0	2.20	0	0	2.30	0	0	2.27	0	0	2.59	0	0	2.54	0	0	2.12	0	0	2.51	0	0	not burned 1/96; flower smashed 3/96; good 4/96, 3/97, 5/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02; green, OK 2/03; green, good 4/03
72.00	4	5.95	259	3.20	0	0	3.40	1	1	3.20	0	0	3.11	0	0	3.21	0	0	3.23	0	0	3.30	1	1	3.42	0	0	burned 1/96; OK 4/96; fire scars still visible, OK 3/97; fire scars barely visible, good 5/97; yellowish at base, OK 3/98; maroonish, OK 5/98; yellowish-green, OK 3/99 & 4/99; slightly purplish, OK 2 & 4/00, 2/01; green, good 5/01; maroonish green, OK 2/02; green with some tannish tubercle tips, OK 4/02; olive, OK 2/03; purple-green, OK 4/03
72.01	4	6.05	258	1.90		0	1.80	0	0	1.90	0	0	1.92	mia	0	1.89	0	0	1.42	0	0	1.11	0	0	1.22	0	0	not burned 1/96; discovered 4/96, good, beside rock OK 3/97; good 5/97; OK 3/98 & 5/98; plant and tag mia 2/99; almost buried, green, OK 4/99; green, OK, partially buried in juniper needles 2 & 4/00; hunkered green, OK 2/01; popping out, green, good 5/01; hunkered, green, OK 2/02; green, good 4/02; green, OK 2/03; green, good 4/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
73.00	4	0.65	83	2.70	0	0	2.90	3	3	2.80	2	2	2.51	nd	mia	mia			mia			mia						burned 1/96, OK 4/96, good 3/97, 5/97, 3/98; olive green, OK 5/98; hunkered, green, good 3/99; ant mound, plant mia 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02
73.01	4	0.72	78													0.26		0	0.40	0	0	mia			mia			discovered 4/00; olive, OK 4/00, 2/01; olive, poor 5/01; plant mia 2 & 4/02, 2 & 4/03
73.02	4	0.76	85																			0.39		0	mia			discovered 4/02; green, OK 4/02; plant mia 2 & 4/03
74.00	4	~8.1	282	3.10	0	0	3.50	1	1	4.00	1	1	3.87	0	0	4.42	1	1	4.39	0	1A	4.32	0	2	3.85	0	0	measured over mimosa; burned 1/96; OK 4/96; good 3/97, 5/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02; olive, OK 2/03; green, good 4/03
74.10	4	~7.87	285				0.60	0	0	0.70	0	0	0.80	0	0	0.84	0	0	0.74	0	0	0.69	mia	0	mia			measured over mimosa; not burned, OK 3/97, 3/98, 5/98 & 3/99; dull green, OK 4/99; green, good 2/00; olive, OK 4/00; spines all white, body green, poor 2 & 5/01; plant mia 2/02; green, OK 4/02; plant mia 2 & 4/03
75.00	4	~7.63	284	1.60	0	0	2.00	0	0	1.80	0	0	1.63	0	0	1.87	0	0	2.18	0	0	1.61	0	0	dead			measured over mimosa; burned 1/96; good 4/96, 3/97, 5/97, 3/98 & 5/98; poor, loose in soil 3/99; green, good 4/99, partially covered by juniper litter; OK 2/00; popping out; OK 4/00; green, good 2 & 5/01, 2 & 4/02, large chamber and exit hole; COD Moneilema 2/03
75.10	4	~11.29	284	1.60		0	2.10	1	1	1.90	0	0	1.98	0	0	2.32	0	0	2.19	0	0	1.94	0	0	2.08	0	0	burned 1/96; discovered 4/96, OK; originally tagged as 87.10; good 3/98 & 5/98; OK 3/99; green, good 4/99; green, good, buried, replaced tag 2/00; green, good 2 & 5/01; green, OK 2 & 4/02, 2/03; green, good 4/03
75.20	4	11.30	284										2.18	0	0	1.91	0	0	1.98	0	0	1.77	0	0	2.07	0	0	3-headed clump (75.20, 75.21, 75.22), upper right, green, good 4/99, 2 & 4/00, 2 & 5/01; green, OK 2 & 4/02, 2/03; green, good 4/03
75.21	4	11.31	284										1.85	0	0	2.02	0	0	2.16	0	0	1.79	0	0	1.91	0	0	3-headed clump (75.20, 75.21, 75.22), upper left, green, good 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
75.22	4	11.32	284										1.36	0	0	1.42	0	0	1.60	0	0	1.54	0	0	1.25	0	0	3-headed clump(75.20,75.21,75.22), rear, green, good 4/99, 2 & 4/00, 2 & 5/01; green, OK 2 & 4/02, 2/03; green, good 4/03
76.00	4	~7.66	284	1.70	0	0	1.60	0	mia	mia			mia															measured over mimosa; burned 1/96; hunkered down 4/96 & 3/97; pale & poor 3/97; plant missing 5/97, 3/98 & 5/98; plant and tag mia 3/99 & 4/99
76.10	4	~7.60	285				0.60	0	0	0.50	0	0	0.53	0	0	0.64	0	0	0.87	0	0	0.59	0	0	0.93	0	0	measured in one direction only 3/98, 3/99, 2/00; measured over mimosa; under rock; good 3/97; loose in soil, good 3/98; OK 5/98; good 3/99; green, good 4/99; OK 2/00; green, OK 4/00, 2 & 5/01, 2/02; grayish green, poor 4/02, 2/03; grayish, poor 4/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
76.20	4	~7.61	285				0.70	0	0	0.70	0	0	1.00	0	0	0.99	0	0	1.38	0	0	1.09	0	0	1.04	0	0	on right of 76.3, measured in one direction only 3/98, 3/99, 2/00; measured over mimosa; under rock; goo 3/97, 3/98, 5/98, 3/99; green, good 4/99; OK 2/00; goldish, OK 4/00; green, good 5/01; just spines showing, poor 2/02; olive, OK 4/02; green, OK 2/03; grayish, poor, 4/03
76.30	4	~7.62	285				1.10	0	0	1.10	0	0	1.03	0	0	0.81	0	0	1.27	0	0	1.13	0	0	1.40	0	0	on left of 76.2, measured in one direction only 3/99, 2/00; measured over mimosa; under rock; good 3/9, 5/98; good 3/99; green, good 4/99; OK 2/00; green, OK 4/00; green, good 5/01; green, OK 2 & 4/02, 2/03; grayish, poor 4/03
76.40	4	~7.65	285				1.00	0	0	0.90	0	0	1.06	0	0	0.60	0	0	0.91	0	0	0.52	0	mia	mia			measured in one direction only, 3/99, 2/00; measure over mimosa; under rock; good 3/97 & 5/98; OK 3/99; olive, OK 4/99; OK 2/00; olive, OK 4/00; loose, green, OK 2 & 5/01; accidently uprooted, purplish orange, poor, replanted 2/02; plant mia 4/02, 2 & 4/03
77.00	4	7.53	277	2.30	0	0	2.20	0	0	2.20	0	0	2.42	0	0	2.60	0	0	2.60	0	0	2.36	0	0	dead			burned 1/96; good 4/96, 3/97, 5/97, 3/98 & 5/98; OK 3/99; OK, dull green 4/99; good 2/00; slightly goldish at base, OK 4/00, 2/01; green, OK 5/01; olive, poor 2/02; green, OK 4/02; small chambers and exit hole, COD weevils 2/03
78.00	4	7.97	287	2.10	0	0	2.80	1	1	2.40	0	0	1.72	0	0	2.11	0	0	2.01	0	0	1.79	0	0	1.94	0	0	not burned 1/96; OK 4/96, 3/97, 5/97 & 3/98; good 5/98; OK 3/99; very red, poor 4/99; slightly damaged purple and tan spots, OK 2/00; olive, OK 4/00; shrunken, purplish, poor 2/01; brownish purple at base, green above, OK 5/01; reddish green, OK 2 & 4/02; gold with a few red tubercle tips, poor 2/03; reddish green, OK 4/03
78.10	4	8.00	286							1.10	0	0	1.25	0	0	1.03	0	0	1.43	0	0	1.23	0	0	1.34	0	0	discovered 3/98; good 5/98 & 3/99; green, good 4/99, 2 & 4/00; olive, OK 2 & 5/01, 2/02; hunkered, green, OK 4/02, 2/03; green, OK 4/03
78.20	4	8.89	289													1.55	0	0	1.55	0	0	1.51	0	0	1.87	0	0	discovered 2/00; green good 2 & 4/00, 2 & 5/01; pale olive, OK 2/02; hunkered, green, OK 4/02, 2 & 4/03
79.00	4	9.09	292	2.90	0	0	3.20	2	2	3.70	1	1A	2.15	0	0	3.50	0	0	4.18	0	0	4.53	3	3	4.92	1	1+1A	burned 1/96; good 4/96, 3/97, 5/97, 3/98; OK, something took a bite & spit it out beside the plant 5/98; green, good 3/99 & 4/99, 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
79.10	4	1.35	290										1.12		0	0.97	0	0	1.14	0	0	1.05	0	0	1.14	0	0	green, good, discovered 4/99; buried, green, OK 2/00; popping out, green, OK 4/00; eroded out, green, OK 2 & 5/01, 2 & 4/02; shrunken, pale pinkish gray, poor 2/03; looks dead but firmly rooted 4/03
80.00	4	6.80	288	1.90	0	0	2.20	0	0	1.60	0	0	1.35	0	0	1.79	0	0	1.33	0	0	1.06	0	0	dead			not burned 1/96; OK 4/96, buried in juniper needles, OK 3/97, 5/97, 3/98, 5/98, 3/99 & 4/99; dull green, OK 2 & 4/00; hunkered, olive, OK 2 & 5/01, 2 & 4/02; solid, hard, COD unknown 2/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
80.10	4	12.12	289				1.60	0	0	1.70	0	0	1.30	0	0	1.97	0	0	2.11	0	0	1.98	0	0	2.04	0	0	fire scars, looks OK 3/97; originally tagged as 87.20; fire scars no longer visible, good 3/98; light green, OK 5/98; green, good 3/99 & 4/99; green, good 2/00 tannish at base, OK 4/00; green, good 2/01; olive, OK 5/01, 2 & 4/02, 2/03; green, OK 4/03
81.00	4	6.76	284	1.40	0	0	1.50	0	0	1.60	0	0	1.19	0	0	1.47	0	0	1.20	0	0	1.09	0	0	0.91	0	0	not burned 1/96; looks OK 4/96 & 3/97; buried in juniper needles, looks good 5/97, 3/98 & 5/98; almost totally buried 3/99 & 4/99; green, OK 2 & 4/00; hunkered, green, OK 2 & 5/01, 2/02; popped out, green, OK 4/02; hunkered, green, OK 2 & 4/03
81.10	4	6.85	300				1.80	0	0	1.70	0	0	1.47	0	0	1.65	0	0	1.70	0	0	1.29	0	0	dead			no fire scars, OK 3/97; good 5/97; orangish on one side, OK 3/98; green, OK 5/98, 3/99 & 4/99; reddish, OK 2/00; olive, OK 4/00; reddish-green, OK 2 & 5/01, 2/02; hunkered, just spines showing, looks dead; firmly rooted, poor 4/02; small exit hole; COD weevils 2/03
81.20	4	0.35	302							1.50	0	0	1.41	0	0	1.67	0	0	1.45	0	0	1.45	0	0	1.44	0	0	discovered 3/98; poor 3/99; olive, OK 4/99; green, OK 2 & 4/00; bite out of side, green, OK-poor 2/01; green, OK 5/01, 2 & 4/02, 2/03; green, good 4/03
82.00	4	2.65	81	4.50	4	3	4.30	6+1fr	7+1A	4.90	4	3A	4.81	1	1	5.28	0	3	5.04	4	3	4.88	3	2	4.74	3	3	burned 1/96; reddish, ~ OK 4/96; fire scars still visible, good, green 3/97, 5/97, 3/98, 5/98,3/99, 4/99 2 & 4/00; green with some pale red tubercle tips, OK 2 & 5/01, 2 & 4/02; olive, OK 2/03; green, good 4/03
82.10	4	2.79	96				1.50	0	0	mia			mia			1.71	0	mia	1.78	0	0	1.68	0	0	dead			fire scars, OK 3/97; good 5/97; ant mound in area, tag & plant mia 3/98, 5/98, 3 & 4/99; resurfaced, green, good 2/00; ant mound in area, plant and tag mia 4/00; green, OK 2 & 5/01, 2 & 4/02; hard, solid, dry, COD unknown 2/03
82.20	4	2.63	79																2.16	0	0	2.30	0	0	2.07	0	0	discovered 2/01; green, good 2/01; olive, OK 5/01; green, OK 2 & 4/02; olive, OK 2/03; pale orangish, OK 4/03
82.30	4	2.66	79																2.41	0	0	2.55	0	0	2.54	1	0	discovered 2/01; green, good 2 & 5/01; covered with ant litter, only spines showing 2/02; uncovered, green, good 4/02, 2 & 4/03
83.00	4	5.25	112	1.70	0	0	1.60	1	1	1.70	0	0	1.76	0	0	2.11	0	0	2.20	0	0	2.26	0	0	dead			burned 1/96, OK 4/96; good 3 & 5/97, 3 & 5/98, 3/99; green, good 4/99 & 2/00, pale green, OK 4/00; yellowish-green, OK 2 & 5/01, 2/02; green, good 4/02; hard, solid, dry, COD unknown 2/03
83.01	4	5.26	112	1.50	0	0	1.30	0	0	1.40	0	0	1.53	0	0	2.03	0	0	1.90	0	0	1.98	0	0	dead			burned 1/96, OK 4/96; good 3/97, 5/97, 3/98, 5/98, 3/99; green, good 4/99, 2 & 4/00; yellowish-green, OK 2 & 5/01, 2/02; green, good 4/02; hard, solid, dry, COD unknown 2/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
84.00	4	11.70	140	3.50	0	0	3.80	3	1+2A	4.40	0	0	3.67	2	0	5.13	0	0	4.98	0	0	4.69	0	0	3.89	0	0	badly burned 1/96; with bizarrely deformed pup 3/96; OK, new growth, pup rock-like, spineless, & yellow 4/98; fire scar still visible, good, pup a green nub 3/97; pup white 5/97; pup gone, other plant good 3/98, 5/98 & 3/99; good, green 4/99; green, good 2 & 4/00, 2 & 5/01; tag mia, replaced, plant green, good 2/02; green, good 4/02, 2 & 4/03
85.00	4	15.59	145	4.30	0	0	4.20	2	3	4.80	0	0	3.99	0	0	4.64	0	0	dead									burned 1/96; good, new growth, very green 4/96; flowers open in rain, in little bluestem clump, good 3/97, 5/97, 3/98, 5/98, & 3/99; green, good 4/99, 2 & 4/00; body hollow, COD Moneilema 2/01
86.00	4	15.66	145	3.00	0	0	3.20	1+1fr	2	3.10	1	1	2.90	1	1	3.08	0	0	2.77	0	0	2.36	0	0	dead			burned 1/96; OK 4/96; fire scars still visible, OK 3/97; fire scars gone, good 5/97, 3/98 & 5/98; hunkered 3/99; maroonish, OK 4/99; partially buried, purplish, dull, OK 2/00; goldish, OK 4/00; sunken, purplish olive, poor 2/01; dark olive, OK 5/01; reddis olive, OK 4/02; hard, solid, dry, COD unknown 2/03
87.00	4	15.42	144	3.00	1	0	3.30	1	1	nd	nd	Dead																burned 1/96; OK 4/96; fire scars still visible, OK 3/97; fire scars just barely visible, OK 5/97; just spines left, COD unknown 5/98
Reference Point 5 is 31.25m at 256 degrees from 'No Collecting' sign, post closest to road, left of juniper, over agaritas and mountain laurels;																												
	Stake 5 = GPS5 R021920A; 2001 - Stake out of ground, triangulated from 88.31 and 92.01																											
87.00	5	4.85	27																			3.64	1	1+1A	3.53	0	0	discovered 2/02; purple, OK 2 & 4/02; covered with ant dirt, OK 2/03; mostly covered with ant dirt, green OK 4/03
88.00	5	6.91	41	1.70	0	0	2.00	0	0	2.30	0	0	1.75	0	0	2.14	0	0	2.15	0	0	2.25	0	0	1.98	0	0	burned 1/96; good 4/96 & 3/97, edge of little bluestem clump; buried in clump, good 3/98 & 5/98; poor 3/99; green, OK 5/99;green good 2 & 4/00; green, OK 2/01; green, good 5/01; green, OK 2 & 4/02, 2/03; almost buried, green, OK 4/03
88.10	5	4.68	~68	2.80		0	3.10	1+1fr	2	2.40	0	1	2.13	1fr	1	3.13	1	1	3.76	2	0	3.41	0	0	3.46	3	1	burned 1/96; discovered 4/96, OK, originally tagged as 343; fire scars still visible, at base of fire ant mound, OK 3/97; ant mound gone, plant OK 3/98; mound back, partially covering plant and completely covering tag 5/98; ant mound gone, green, good 3/9 & 5/99; green, good, partially buried 2/00; popping out, green, good 4/00, 2 & 5/01; almost buried in ant mound, green, OK 2/02; partly out, green, OK 4/02; one flower eaten, plant green, good 2/03; green, good 4/03
88.11	5	4.68	64							0.30		0	mia			mia			mia			mia						discovered 5/98; tag and plant mia 2 & 4/00, 2 & 5/01, 2 & 4/02

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
88.20	5	5.09	75	3.00		0	3.40	1+2fr	3	3.30	2	2	2.36	1fr	1disp	3.02	0	0	3.00	0	0	3.14	1	0	3.51	1	0	burned 1/96; OK, reddish 4/96, originally tagged as 344; old fire scars still visible, OK, reddish 3/97; fire scars barely visible, good 5/97; a little yellow-orange on a few basal tubercles 3/98; ants swarming plant, OK 5/98, 3/99 & 5/99; partially buried, misshapen, reddish, tan at base, OK 2/00; reddish-orange green OK 4/00; green with red tubercle tips 2 & 5/01; flowers partly eaten, plant purple, OK 2/02; green, OK 4/02; purplish green, good 2/03; green good 4/03
88.30	5	3.61	52				3.60	3	2	3.80	0	0	2.76	3	1+2A	3.23	2	2	3.57	0	0	2.77	3	1	3.39	2	0	fire scars at base, good 3/97; sort of lop-sided, good 3/98; a few yellowish tubercle tips, OK 5/98; hunkered, OK 3/99; hunkered, OK, orangish 5/99; partially buried, green, good 2/00; hunkered, red, OK 4/00 & 2/01; tubercles misshapen, reddish-green, OK 5/01; hunkered, green, OK 2/02; green with some purple tubercle tips, OK 4/02; flowers partly eaten, plant partly covered with dirt, green, good 2/03;green with purple tubercle tips, OK 4/03
88.31	5	3.54	52													2.88	0	0	3.23	0	0	3.41	2	0	3.97	2	0	discovered 2/00; green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2/03; purplish green, OK 4/03
88.32	5	3.60	52																						0.88	0	0	discovered 2/03; buried, green, OK 2/03; green, OK 4/03
88.33	5	3.60	53																						1.76	0	0	discovered 2/03; buried, green, OK 2/03; green, OK 4/03
88.40	5	4.14	56				3.60	3+3fr	4	2.70	1	0	2.40	1	1A	2.92	0	0	2.75	0	0	2.74	2	1A	3.43	1	0	no fire scars, good 3/97; flowers fallen off, good 3/98 poor, shrunken, spines loose 5/98; maroonish, OK 3/99; getting covered 5/99; beside rock, green, good 2 & 4/00; covered with debris, purplish, OK 2/01; uncovered, dark green, OK 5/01; purplish green, OK 2/02; green, good 4/02; purplish green, good 2/03; purplish green, OK 4/03
88.41	5	3.81	68										1.19		0	1.40	0	0	1.54	0	0	1.52	0	0	1.90	0	0	pedasteled, olive green, OK, discovered 5/99; green OK 2 & 4/00; tag loose, replaced, plant green, OK 2/01; green, good 5/01; hunkered, green, OK 2/02; green, OK 4/02, 2 & 4/03
88.42	5	4.39	62										1.92		0	1.98	0	0	2.27	0	0	2.21	1	0	2.32	1	1A	green, good 5/99, 2 & 4/00 & 2/01; green, OK 5/01; dark green, OK 2/02; green, good 4/02, 2 & 4/03
88.43	5	4.50	62																2.87	0	0	2.97	2	0	3.63	2	1	discovered 2/01; green, good 2 & 5/01, 2 & 4/02, 2 & 4/03
88.50	5	4.30	63				2.70	1	1	2.60	1	1	2.41	1	1	3.03	1	1	3.65	1	1	3.71	2	0	4.72	4	1A	no fire scars, good 3/97, 3/98, 5/98 & 3/99; dull green, OK 5/99; green, good 2 & 4/00, 2 & 5/01; purplish green, OK 2/02; tag mia, replaced, plant green, good 4/02; one flower partly eaten, plant green, good 2/03; partly covered with ant gravel but green, good 4/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
88.60	5	4.95	71				2.10		1	2.00	1	1	1.36	0	0	1.31	0	0	1.76	0	0	mia			mia			no fire scars, good 3/97, 3/98; pulling into soil, OK 5/98 & 3/99; popping out, green, OK 5/99; green, good 2 & 4/00; maroonish, OK 2/01; dull reddish-green, OK-poor 5/01; plant mia 2 & 4/02; plant & tag mia, old ant disturbance in area 2 & 4/03
88.70	5	5.60	71				2.70	2	2	2.20	0	nd	1.36	0	0	1.68	0	0	1.61	0	0	mia			mia			fire scars at base, OK 3/97, 3/98; hunkered, OK 3 & 5/99; partially buried, green, basally discolored 2/00; goldish-green, OK 4/00, 2 & 5/01; plant and tag mia 2 & 4/02, 2 & 4/03
88.80	5	5.96	53													2.28	1	1A	2.19	0	0	2.27	0	0	1.86	0	0	discovered 2/00; green, good 2/00; olive, OK 4/00; green with tan tubercle tips, OK 2 & 5/01, 2 & 4/02, 2/03; green with orange tubercle tips, OK 4/03
88.81	5	5.89	53													1.61	0	0	1.81	0	0	1.65	0	0	1.89	0	0	discovered 2/00; hunkered, green, OK 2 & 4/00, 2/01; coming out, green, OK 5/01; hunkered, purplish, OK 2/02; green, OK 4/02, 2 & 4/03
89.00	5	5.65	79	2.40	0	0	2.70	2	2	2.70	1	1A	1.96	1fr	1A	2.56	1	1	2.33	0	0	2.67	2	0	1.81	0	0	not burned 1/96; good 4/96; reddish at base, OK 3 & 5/97; reddish at base, good 3/98; a little orangish, OK 5/98, 3/99 & 5/99; green, good 2/00; olive, OK 4/00; green with a few red tubercle tips, OK 2 & 5/01; green, OK 2/02; covered with ant dirt, only spines showing 4/02; out, new apex forming, green, OK 2/03; green, good 4/03
89.01	5	5.64	79	0.70	0	0	0.80	0	0	1.00	0	0	0.80	0	0	1.19	0	0	1.32	0	0	1.47	0	0	1.53	0	0	not burned 1/96; good 4/96, to the left of 89, behind 89.02 & 89.03; good 3/97, 5/97, 3/98, 5/98, 3/99 & 5/99; green, good 2 & 4/00, 2 & 5/01, 2/02; partly covered with ant dirt, green, OK 4/02; out, green, OK 2/03; green, good 4/03
89.02	5	5.63	79	0.80	0	0	0.90	0	0	1.00	0	0	1.05	0	0	1.24	0	0	1.33	0	0	1.36	0	0	1.52	0	0	not burned 1/96; good 4/96, left of 89.00, in front of 89.01; good 3/97, 5/97, 3/98, 5/98, 3/99 & 5/99; green, good 2 & 4/00, 2 & 5/01, 2/02; covered with ant dirt, only spines showing 4/02; out, green, OK 2/03; green, good 4/03
89.03	5	5.64	79	0.90	0	0	1.20	0	0	1.10	0	0	0.92	0	0	1.12	0	0	1.30	0	0	1.28	0	0	1.04	0	0	not burned 1/96; good 4/96; to the left of 89.01 and behind 89.04;good 3/97, 5/97, 3/98, 5/98, 3/99 5/99; green, good 2 & 4/00, 2 & 5/01, 2/02; partly covered with ant dirt, green, good 4/02; out, green, OK 2/03; green, good 4/03
89.04	5	5.63	79	0.80	0	0	1.20	0	0	1.10	0	0	1.18	0	0	1.08	0	0	1.16	0	0	1.26	0	0	1.33	0	0	not burned 1/96; good 4/96; left of 89.02 and in front of 89.03; good 3/97, 5/97, 3/98, 5/98, 3/99 & 5/99; green, good 2 & 4/00, 2 & 5/01, 2/02; covered with ant dirt, only spines showing 4/02; out, green, OK 2/03; green, good 4/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
90.00	5	4.82	85	2.90	2	2	3.50	2+2fr	4	3.40	3	3	2.50	2fr	1+1A	3.31	1	1	3.24	1	2	3.14	2	0	3.05	1	0	not burned 1/96; reddish at base 3/96; good 4/96, 3 & 5/97; by rock, yellowish at base, tag loose, by 91.00 3/98; OK 5/98, 3/99 & 5/99; purplish, tan at base, OK 2/00; olive green, OK 4/00; olive with some red tubercle tips, OK 2/01; green with darker tubercle tips, OK 5/01; goldish at base, maroonish green OK 2 & 4/02; reddish green, OK 2/03; goldish-green, OK 4/03
91.00	5	5.00	90	2.20	1	1	2.90	2	2	2.30	1	1	1.78	0	0	2.52	2	2	2.75	0	0	2.75	3	0	2.91	0	0	not burned 1/96; good 5/96, 3 & 5/97, 3/98; pulling into soil, OK 5/98 & 3/99; green, good 5/99; partially buried, green, good 2 & 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
92.00	5	3.78	94	3.70	2	2	4.70	3+2fr	5	2.40	2	Dead																not burned 1/96; good 5/96, 3 & 5/97, 3/98; root solid, dry; COD unknown 5/98
92.01	5	4.75	94							1.90		1	2.31	0	0	2.70	2	2	3.13	0	0	2.62	1	0	1.57	1	0	good, discovered 5/98; good 3/99, 5/99; green, good 2/00; partially in ant dirt, green, OK 4/00; out, green, good 2 & 5/01; partly buried in ant mound, green, OK 2/02; out, green, good 4/02, 2 & 4/03
92.02	5	4.71	95													0.68		0	0.94	0	0	0.94	0	0	1.13	0	0	discovered 4/00; one measurement only 4/00; green, good 4/00, 2 & 5/01, 2 & 4/02, 2 & 4/03
93.00	5	4.86	101	5.10	3	1	5.80	4+4fr	7	6.00	0	0	5.00	3+2fr	3+1A+ 1disp	6.24	5	5	6.68	5	7	6.35	6	2	6.44	6	1	burned 1/96; OK 5/96; fantastic 3 & 5/97; tag loose, by 92, yellow at tubercle bases, OK 3/98; good 5/98, 3/99 & 5/99; green, good 2/00; a few orange tubercle tips, OK 4/00; green with a few orange tubercle tips, good 2/01; green, good 5/01; maroonish green, good 2 & 4/02; green, good 2 & 4/03
94.00	5	5.19	108	2.60	0	0	3.60	1+2fr	3	3.00	1	1	3.34	4fr	1+2disp	3.87	3	3	3.89	3	0	3.72	4	2+1A	3.76	2	1	burned 1/96; OK 5/96; good 3 & 5/97; tag mia, replaced, good 3/98; OK 5/98; green, good, hunkered 3/99; maroonish, OK 5/99; slightly reddish OK 2/00; reddish-orange at base, OK 4/00; green with red tubercle tips, trampled? In path, OK 2/01; maroonish, OK 5/01, 2/02; red, OK 4/02; pale reddish-olive, OK 2/03; goldish-olive, OK 4/03
95.00	5	4.37	101																			2.37		1A	2.39	0	0	discovered 4/02; green, good 4/02; covered with ant dirt 2/03; still covered, OK 4/03
Reference point 6 is 30.30m at 326 degrees from 20mph sign; Stake 6 = GPS6; R021921A																												
95.00	6	0.91	270	3.30	0	0	3.70	5fr	5	4.60	3	1A	3.60	2+3fr	5	4.00	4	3+1A	dead									OK 3/96; good 5/97, 3/98; getting buried 5/98 & 3/99; popping out, green, good 4/99; slightly purplish-green, OK 2 & 5/00; body hollow, COD Moneiterna 2/01

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
95.10	6	3.74	270				2.30	1fr	1	2.50	1	1	2.19	1fr	1	2.67	2	1A+ 1disp	3.15	0	0	3.51	1	1A	3.71	0	0	good 5/97, 3/98, 5/98, 3/99 & 4/99; reddish-green, OK 2/00; olive, OK 5/00; green, good 2 & 5/01; dark olive, OK 2/02; olive with some reddish tubercle tips, OK 4/02; olive, OK 2/03; green, OK 4/03
96.00	6	4.26	340	3.30	3	2	3.90	1fr	1A	3.60	2	2	3.47	3	3	3.15	0	0	2.79	0	0	2.85	0	0	3.30	0	0	OK 3/96; good 5/97, 3/98, 5/98, 3 & 4/99; purplish, OK 2/00; misshapen (stepped on in past?), olive, OK 5/00; some tubercle damage, otherwise green, good 2/01; green, good 5/01, 2 & 4/02, 2 & 4/03
96.01	6	6.45	346							3.60		0	3.95	0	0	4.17	2	1+1A	4.94	2	2	4.99	3	4	5.97	0	0	good, discovered 5/98; good 3/99, 4/99; green, good 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
96.02	6	6.13	339																			2.76		0	2.53	0	0	discovered 4/02; green, good 4/02; green with some orange tubercle tips, OK 2 & 5/03
96.10	6	10.02	345				3.80	1fr	1	5.10	1	1	4.95	1	1	4.49	2	1	4.34	1	1A	4.30	0	0	3.97	0	0	good 5/97; in small fire ant mound, good 3/98 & 5/98 slightly buried, good 3/99 & 4/99; green, good 2 & 5/00; olinve, OK 2/01; slightly maroonish, OK 5/01; pale green with some reddish tubercle tips, OK 2/02; reddish yellowish green, OK 4/02; red, poor 2 & 5/03
96.20	6	10.02	345				4.20	2fr	2	4.80	3	3	3.65	0	0	4.34	1	2	4.40	1	1	3.58	0	0	dead			to right of 96.30, good 5/97, fire ants, good 3/98 & 5/98, slightly buried, yellowish, OK 3/99, coming out, green, good 4/99, green, good 2 & 5/00, 2 & 5/01, orangish green OK 2 & 4/02, removed for weevil study 2/03, COD unknown 3/03
96.30	6	10.01	345				3.60	0	0	4.30	3	3	3.53	0	0	4.14	1	1	4.63	0	0	3.53	0	0	dead			good 5/97, 3/98, 5/98, 3 & 5/99, green, good 2 & 5/00, 2 & 5/01, orangish green, OK 2/02, olive, OK 4/02, removed for weevil study 2/03, COD weevils
96.40	6	10.35	348				3.70	0	0	3.40	0	0	2.49	0	0	2.82	0	0	2.75	0	0	2.76	0	0	dead			closest to stake, OK 5/97, 3/98, good 5/98, almost buried in juniper litter, OK 3/99 & 4/99, green-yellow, OK, partially buried in juniper litter 2 & 5/00, 2 & 5/01, 2/02, partly buried in juniper litter, green with some tan tubercle tips, OK 4/02, removed for weevil study 2/03, COD unknown 3/03
96.50	6	10.39	348				3.10	0	0	3.70	0	0	2.67	0	0	2.69	0	0	2.71	0	0	2.81	0	0	dead			left of 96.60 & behind 96.40, OK 5/97, 3/98, good 5/98, almost buried in juniper litter, OK 3/99 & 4/99, partially buried in juniper litter, green, good 2 & 5/00, partially buried in juniper litter, yellow-green, OK 2 & 5/01, 2 & 4/02, removed for weevil study 2/03, COD unknown 3/03
96.60	6	10.38	348				2.50	0	0	3.00	0	0	2.58	0	0	2.18	0	0	2.15	0	0	2.51	0	0	dead			right of 96.50 & behind 96.40, OK 3/98, good 5/98, almost buried in juniper litter, OK 3/99 & 4/99, partially buried in juniper litter, green, good 2 & 5/00, 2 & 5/01, 2/02, partly buried in juniper litter, almost spineless, green, OK 4/02, removed for weevil study 2/03, COD unknown 3/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
97.00	6	9.95	354	3.30	0	0	4.10	2fr	1+1A	4.10	0	0	3.05	0	0	4.14	1	1	4.17	0	0	3.54	0	0	2.18	0	0	good 3/96 & 5/97; purplish, OK 3/98; green, good 5/98 & 3/99; slightly buried in juniper litter, popping out, green, good 4/99; purplish green, good 2/00; green, good 5/00, 2 & 5/01; maroonish green, OK 2 & 4/02; partly buried in juniper litter, green, OK 2 & 5/03
98.00	6	9.94	354	3.30	0	0	4.00	0	0	4.00	0	0	2.93	0	0	3.75	0	0	4.09	0	0	3.47	0	0	2.69	0	0	good 3/96; purplish, OK 3/98; green, good 5/98 & 3/99; green, good 4/99; dull green, good 2/00; some orange tubercle tips, body green, good 5/00; some tubercle damage, green, good 2/01; green, good 5/01; maroonish green, OK 2/02; green, good 4/02; partly buried in juniper litter, olive, OK 2 & 5/03
98.10	6	9.25	359																			1.65		0	mia			discovered 4/02; green, good 4/02; plant mia 2 & 5/03
99.00	6	10.24	334	2.10	0	0	2.50	2fr	2	3.10	2	2	2.42	1fr	1	2.73	0	0	3.13	0	0	2.64	0	0	2.27	0	0	OK 3/96, 3/98, 5/98, 3 & 4/99; olive green, OK 2/00; green, good 5/00; olive, OK 2/01; green, OK 5/01; green with some red tubercle tips, OK 4/02; partly covered by juniper litter, green, OK 2 & 5/03
100.00	6	9.63	337	2.70	0	0	2.90	1	1A	3.00	0	0	2.66	1	disp?	3.39	0	0	2.80	0								OK 3/96, 3/98, 5/98 & 3/99; dull green, OK 4/99; dark green, good 2/00; green, good 5/00; reddish-orangish gold, poor 2/01; bottom root rot, collected for weevil study 5/01
100.10	6	9.34	340							2.50	0	0	2.35	0	0	2.53	0	0	2.80	0	0	2.52	0	0	dead			good, discovered 3/98; maroon, OK 5/98; green, good 3 & 4/99; green, good 2 & 5/00, 2/01; dull green, OK 5/01; maroonish green, OK 2/02; green, OK 4/02; small chamber and exit holes, COD weevil 2/03
100.20	6	9.95	340																						2.46	0	0	discovered 2/03; greenish-yellow, OK 2 & 5/03
101.00	6	9.65	333	2.40	0	0	3.10	2fr	2	3.30	1	1	2.75	3fr	2+1A	3.87	1	0	3.83	2	1+1A	3.79	1	1	3.65	0	0	OK 3/96; a few tubercles yellow-green 3/97; a few purplish tubercles, good 3/98; being buried in ant mound 5/98; slightly buried, OK 3/99; maroonish, OK 4/99; purplish green, good 2/00; orangish at base, OK 5/00; green with some red and tan tubercle tips, OK 2 & 5/01, 2/02; purplish green, good 4/02; green with red tubercle tips, OK 2 & 5/03
102.00	6	10.16	332	2.60	1	1	3.50	2fr	2	3.30	2	2	2.70	1fr	1	3.29	2	2	2.94	0	0	2.85	0	0	dead			OK 3/96, good 3 & 5/97; a little purplish, OK 3/98, 5/98 & 3/99; green, good 4/99; olive green, OK 2 & 5/00, greenish-yellow, poor 2/01; olive, OK 5/01; almost covered with ant litter, maroonish, OK 2/02; out, hunkered, green, OK 4/02; solid, dry, hard, COD unknown 2/03
103.00	6	9.87	334	2.70	1	1	2.80	1fr	1A	3.30	2	2	2.27	1fr	1	2.96	1	1disp	2.66	0	0	2.27	0	0	dead			OK 3/96, good 5/97, 3/98, 5/98 & 4/99; green, good 2 & 5/00, 2 & 5/01; getting buried in juniper litter and dirt, green, OK 2/02; coming out, green, OK 4/02; solid, dry, hard, COD unknown 2/03

Ancistrocactus tobuschii Data for
Lost Maples State Natural Area

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
104.00	6	10.39	332	2.30	0	0	2.90	1+1fr	2	2.90	1	1	2.39	1fr	1	2.55	0	0	2.91	0	0	2.52	0	0	2.09	0	0	good 3/96; a little yellowish, OK 3/98, 5/98 & 3/99; tag mia, replaced, OK 4/99; yellow, OK 2/00; olive, OK 5/00; yellow-green, OK 2 & 5/01, 2 & 4/02, 2 & 5/03
104.10	6	10.82	336							1.60	0	0	1.16	0	0	1.48	0	0	1.62	0	0	1.33	0	0	1.16	0	mia	discovered 3/98; good 3/98& 5/98; tag loose, plant almost buried 3/99; popping out, dull green, OK 4/99 dull green, OK 2/00; green, good, OK 5/00; partially buried, green, OK 2 & 5/01, 2 & 4/02; totally buried, almost spineless, tan (i.e. no chlorophyll), poor 2/03; pl mia 5/03
104.20	6	10.85	336							0.70	0	0	0.52	0	0	0.47	0	0	0.51	0	0	0.64	0	mia	mia			discovered 3/98; OK 3/98 & 5/98; totally buried, tag chewed, replaced 3/99; almost buried, purplish, OK 4/99; buried, green, OK 2/00; coming out, reddish, OK 5/00; buried, green, OK 2 & 5/01, 2/02; plant mia 4/02, 2 & 5/03
105.00	6	10.39	333	2.10	0	0	2.20	0	0	2.30	1	1	2.02	0	0	2.55	0	0	2.85	1	1	2.53	0	0	2.64	0	0	good 3/96; purplish, OK 3/98 & 5/98; very purple, poor 3/99; purplish, OK 4/99; reddish, OK 2 & 5/00; green with some reddish tubercle tips, OK 2 & 5/01, 2 & 4/02, 2 & 5/03
106.00	6	10.40	333	2.00	0	0	2.50	0	0	2.50	0	0	1.67	0	0	2.33	0	0	2.82	0	0	2.20	0	0	2.12	0	0	OK 3/96; between rocks 3/97; good 5/97; a few yellowish tubercles, OK 3 /98 & 5/98; poor, yellow-green 3/99; olive, OK 4/99; reddish, OK 2/00; a few orangish tubercle tips, OK 5/00, 2 & 5/01; getting covered with juniper litter, green with orange tubercle tips, OK 2 & 4/02, 2 & 5/03
107.00	6	10.28	332	2.90	0	0	3.40	0	0	3.40	1	1	2.85	0	0	3.56	1	1	3.64	0	0	3.07	0	0	2.86	0	0	OK 3/96; good 3 & 5/97; yellowish, OK 3/98, 5/98, 3 & 4/99; seedling in front of plant (107.01), dull green good 2 & 5/00; pale green, OK 2/01; olive, OK 5/01; base goldish, upper body olive, OK 2/02; olive, OK 4/02; olivish-red, OK 2 & 5/03
107.01	6	10.27	332													0.49	0	0	0.61	0	0	0.57	0	0	mia			seedling at base of 107; green, OK, not tagged 2 & 5/00; olivish-red, poor 2/01; olive, OK 5/01; almost spineless, grayish red, poor 2 & 4/02; pl mia 2 & 5/0
107.02	6	10.31	332													0.45		0	0.52	0	0	0.37	0	mia	mia			discovered, not tagged, behind 107 5/00; green, good 5/00; partially buried in juniper litter, green, OK 2 & 5/01; spineless, purple, poor 2/02; plant mia 4/02; 2 & 503
107.03	6	10.29	336																0.64		0	0.49	0	0	dead			discovered 5/01; not tagged, at left upper corner of 107.00 tag; green, OK 5/01; grayish, poor 2/02; green, OK 4/02; just spines left, COD unknown 2/03
107.10	6	10.87	334							2.40	0	0	1.91	0	0	1.98	0	0	2.39	0	0	2.44	0	0	1.71	0	0	discovered 3/98; good 3/98 & 5/98; good, slightly buried in juniper litter 3/99; coming out, green, good 4/99; olive green, OK 2/00; green, good 5/00, 2 & 5/01; green, OK 2 & 4/02; partly buried in juniper litter, green, OK 2 & 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
08.00	6	9.18	333	1.50	0	0	1.70	0	0	1.60	0	0	1.82	0	0	1.98	0	0	2.40	0	0	2.30	2	2A	2.25	0	0	OK 3/96; by rock, measured in one direction only 3/97; good 5/97, 3/98; olive green, OK 5/98; edge of ant mound, green, OK 3 & 4/99; green, reddish tubercles, OK 2/00; green, good 5/00, 5/01, 2 & 4/02; orangish green, OK 2/03; OK 5/03
09.00	6	9.94	337	2.40	0	0	2.90	3fr	3	2.90	1	1	2.24	1	0	3.10	1	1	dead									OK 3/96; good 3/98 & 5/98; flower partially eaten, almost buried in ant mound, tag buried 3/99; out of mound, green, good 4/99; green reddish tubercle tips, OK 2 & 5/00; body with galleries and small exit hole, COD weevils? 2/01
10.00	6	9.55	332	2.90	2	2	3.10	2fr	2	3.40	1	1	3.20	1+2fr	3	3.84	2	2	3.91	0	0	4.57	4	2+1A	4.56	0	0	OK 3/96; good 5/97, 3/98; yellow, OK 5/98; green, good 3 & 4/99; green, good 2/00; basally yellow, OK 5/00; some tubercle damage, green, good 2 & 5/01; green, good 2 & 4/02; tag mia, replaced, partly buried in ant mound, green, good 2/03; mostly out, green, good 5/03
10.01	6	9.46	332				0.70		0	0.90	0	0	0.32	0	0	0.37	0	0	0.51	0	0	0.70	0	0	0.44	0	mia	seedling, discovered 5/97; good 3/98; buried, good 5/98, 3 & 4/99; buried, green, good 2 & 5/00, 2 & 5/01; covered by litter, green, OK 2/02; green, good 4/02; buried, green, OK 2/03; ant mound nearby, pl mia 5/03
10.02	6	9.52	334													0.50		0	0.69	0	0	0.72	0	0	mia			discovered 5/00; not tagged, between 110 and its tag; green, OK 5/00, 5/01; covered by litter, green good 2 & 4/02; 110 tag mia (in ant mound), pl mia 2 & 5/03
11.00	6	9.22	332	2.80	2	2	3.00	4fr	4	3.20	2	2	2.83	3fr	2	3.34	2	2	4.01	2	3	4.16	4	3+1A	5.12	5	2+2A	OK 3/96, 3/98 & 5/98; good 3 & 4/99; green, good 2/00; some yellowish tubercle tips, OK 5/00; green, good 2/01; pale green, OK 5/01; pale green, good 2 & 4/02, 2 & 5/03
12.00	6	9.33	336	2.00	0	0	mia			mia			mia		mia													good 3/96; plant & tag mia 3/97 & 5/97; ant mound in vicinity, plant & tag mia 3/98, 5/98, 3/99 & 4/99
12.10	6	9.90	336	1.60		0	~2.4	0	0	2.30	0	0	2.42	0	0	2.97	1	1	3.40	0	0	3.37	2	2	2.58	0	0	good, discovered 5/96; to the left of 112.2; measured in one direction only 3/97; good 3/98 & 5/98; good, slightly buried 3/99; good 4/99; green, good 2 & 5/00 2 & 5/01, 2 & 4/02; uprooted, green and red, poor 2/03; base spineless & light tan, upper body pale olive, poor 5/03
12.20	6	9.90	336	1.80		0	~2.3	0	0	2.10	0	0	2.65	1fr	1	3.40	1	1	4.21	0	0	4.20	3	2+1A	3.46	0	0	discovered 5/96, good; to the right of 112.2; measured in one direction only 3/97; good 3/98, 5/98 3/99 & 4/99; green, good 2/00; some slightly reddish tubercle tips, good 5/00, 2 & 5/01; green, good 2 & 4/02; uprooted, red & green, poor 2/03; pale olive, OK 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
113.00	6	10.15	327	3.50	3	3	4.60	4fr	4	4.70	3	3	3.74	1+2fr	2+1A	4.95	5	5 disp	6.42	5	6	5.71	5	2+4A	5.76	2	1A	OK 3/96; a little yellowish, OK 3/98; green, good 5/98; OK, yellow-green 3/99; olive, good 4/99; little yellowish at base, good 2/00; green, good 5/00, 2/01 a few yellow tubercle tips at base, otherwise green, good 5/01; goldish at base, otherwise green, OK 2/02; olive, OK 4/02; visited by honeybee, green with olive base, OK 2/03; green, OK 5/03
114.00	6	10.47	326	3.20	0	0	3.80	2fr	2	3.90	0	0	3.38	0	0	3.34	0	0	3.37	0	0	3.55	0	0	3.70	0	0	good 3/96, 3/98, 5/98, 3/99 & 4/99; partially buried, reddish, OK 2/00; maroonish, OK 5/00; reddish-gold poor 2/01; reddish-olive, OK 5/01, 2 & 4/02; very loosely rooted, green, poor 2 & 5/03
115.00	6	9.41	332																						1.27	0	0	discovered 2/03; green, good 2 & 5/03
116.00	6	7.85	334	2.20	1A	0	3.10	1+2fr	2+1A	3.10	0	0	2.59	2	2	2.81	0	0	3.15	0	0	2.79	0	0	2.96	0	0	good 3/96; a little yellowish, OK 3/98, 5/98, 3/99 & 4/99; tubercle tips reddish, OK 2 & 5/00; some tubercle damage, green, good 2 & 5/01; pale blue green OK 2/02; edge of ant mound, green, OK 2/03; green, good 5/03
116.10	6	7.73	338																3.82	0	0	3.46	5	3A	4.07	0	0	discovered 2/01; green, good 2 & 5/01, 2 & 4/02, 2 & 5/03
116.20	6	7.72	334																						3.84	3	1+2A	discovered 2/03; green, good 2 & 5/03
117.00	6	7.40	336	2.20	0	0	3.20	0	0	3.40	2	2	3.07	3 fr	3	3.67	1	1	3.67	1	1	3.73	2	1	3.89	2	2	OK 3/96; a little reddish 3/97; good 3/98, 5/98, 3/99 & 4/99; reddish tubercle tips, good 2 & 5/00; green, good 2 & 5/01, 2/02; green, with a few red tubercle tips, OK 4/02 & 2/03; green, OK 5/03
117.01	6	7.40	336				1.40	0	0	1.20	0	0	1.12	0	0	1.51	0	0	1.91	0	0	1.82	0	0	1.98	1	0	seedling, measured in one direction only 3/97; OK 5/97; good 3/98, 5/98, 3/99 & 4/99; green, good 2 & 5/00, 2 & 5/01; maroonish green, OK 2/02; green, good 4/02; flower partly eaten, plant green, good 2 & 5/03
118.00	6	7.07	333	1.70	1	0	2.50	1A+1fr	1A	2.70	0	1	2.13	0	0	2.35	0	0	1.66	0								fire scars at base, OK 3/96; fire scars barely visible 5/97; no fire scars visible, slightly yellowish, OK 3/98 2 spine clusters & tubercles pulled off, small digging beside, OK 5/98, green, OK 3/99, green, good 4/99, green, OK 2 & 5/00, looks dead, but firmly rooted, collected 2/01
118.10	6	7.25	332				2.80	0	0	2.40	0	0	2.28	0	0	2.58	0	0	2.92	0	0	2.85	1	0	3.04	0	0	good 5/97, 3/98, 5/98, & 4/99; green, good 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
118.20	6	7.79	347				1.80	0	0	1.60	0	0	1.25	0	0	1.79	0	0	2.20	0	0	2.04	1	1A	2.23	1	1	good 5/97, 3/98, 5/98, 3/99 & 4/99; dark green, good 2/00; purplish, OK 5/00; green, good 2 & 5/01; purplish olive, OK 2/02; reddish base, green apex, OK 4/02 & 2/03; olive, OK 5/03
119.00	6	~6.81	333	1.60	0	0	2.30	0	0	2.20	0	0	1.90	0	0	Dead												12 o'clock position in cluster, good 3/96; measured in one direction only 3/97; good 3/98 & 5/98, good, almost buried in ant mound 3/99, out of mound, green, good 4/99; body solid, dry, powdery, COD unknown 2/00

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
20.00	6	~6.81	333	1.60	0	0	2.40	1fr	1	2.30	0	0	2.05	0	0	Dead												2 o'clock position in cluster, good 3/96; measured in one direction only 3/97; good 3/98 & 5/98; good, almost buried in ant mound 3/99; out of mound, green, good 4/99; body solid; dry, powdery, COD unknown 2/00
21.00	6	~6.81	333	1.40	0	0	1.70	0	0	1.70	0	0	1.82	0	0	Dead												4 o'clock position in cluster, good 3/96; measured in one direction only 3/97; good 3/98 & 5/98; good, almost buried in ant mound 3/99; out of mound, green, good 4/99; body solid; dry, powdery, COD unknown 2/00
22.00	6	~6.81	333	1.80	0	0	2.40	2fr	2	2.50	0	0	2.02	0	0	Dead												6 o'clock position in cluster, good 3/96; measured in one direction only 3/97; good 3/98 & 5/98; good, almost buried in ant mound 3/99; out of mound, green, good 4/99; body solid; dry, powdery, COD unknown 2/00
23.00	6	~6.81	333	1.30	0	0	2.00	0	0	1.70	0	0	1.54	0	0	Dead												10 o'clock position in cluster, good 3/96, 3/98, 5/98; good, almost buried in ant mound 3/99; out of mound, green, good 4/99; body solid, dry, powdery, COD unknown 2/00
	Plants 119.00 through 123.00 were all one plant																											
24.00	6	6.95	331	2.20	1	1	2.30	3fr	3	3.10	0	0	2.82	1+1fr	2	2.94	0	0	3.11	0	0	2.95	0	0	3.35	2	0	OK 3/96, 3/98; good 5/98, 3/99 & 4/99; olive green, OK 2/00; yellowish at base, OK 5/00 & 2/01; reddish basally, otherwise green, OK 5/01; pale green, OK 2/02; green, good 4/02; one flower partly eaten, edge of ant mound, green, good 2 & 5/03
24.10	6	6.75	334																1.19	0	0	1.20	0	0	1.17	0	0	discovered 2/01; green, OK 2 & 5/01, 2 & 4/02, 2 & 5/03
25.00	6	6.75	328	3.50	4	4	4.10	5fr	5	3.60	2	3	2.89	3+1fr	4	3.25	1	1	3.59	1	0	3.18	2	3	3.59	0	0	good 3/96; a few orange tubercles, OK 5/97, 3/98 & 5/98; green, good 3/99, 4/99 & 2/00; yellow at base, OK 5/00; some tubercle damage, green, OK 2 & 5/01; green, good 2 & 4/02, 2 & 5/03
25.10	6	5.38	331				3.30	3fr	3	3.10	0	0	2.51	1+1fr	1	3.06	0	0	3.85	2	2	3.08	0	0	3.00	0	0	good 5/97; very yellow-orange, poor 3/98; orange, OK 5/98; olive green, few orange tubercles, OK 3/99 4/99 & 2/00; slightly orangish at base, otherwise green, OK 5/00; ants swarming, pale green, OK 2/01; some yellow tubercle tips, OK 5/01; apex cave in, plant pale maroonish green, OK 2/02; green with some orange tubercle tips, OK 4/02 & 2/03; olive, OK 5/03
26.00	6	6.50	328	2.20	0	0	4.00	0	0	3.90	0	0	3.56	1fr	1	3.29	0	0	3.89	0	0	dead						good 3/96, 3/98 & 5/98; good, dead bee on plant 3/99; green, good 4/99, 2 & 5/00 & 2/01; maroonish at base, otherwise, green, good 5/01; dead; red; not rooted; COD Monellema; collected for weevil study 2/02
27.00	6	6.98	323	2.70	0	0	3.20	1A+2fr	2	3.50	3	2	2.91	1+1fr	0	3.67	3	2	3.73	2	0	3.54	3	0	3.59	2	0	OK 3/96; under rock, measured in one direction only 3/97, 3/98; good 5/97, 3/98; OK 5/98; good 3/99 & 4/99; green, good 2 & 5/00 & 2/01; green, OK 5/01, 2/02; green, good 4/02, 2 & 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
127.01	6	6.81	325																1.00		0	0.84	0	0	1.15	0	0	discovered 5/01; green, OK 5/01, 2/02; green, good 4/02, 2 & 4/03
127.10	6	7.53	324				2.00	1	1	1.80	0	0	1.72	0	0	1.81	0	0	2.49	0	0	2.70	1	0	3.24	0	0	good 5/97, 3/98, 5/98, 3 & 4/99; green, good 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
127.20	6	6.97	321																4.00	0	0	4.07	0	0	3.94	0	0	discovered 2/01; green, good 2 & 5/01, 2 & 4/02, 2 & 5/03
127.30	6	6.78	321																3.73	0	0	3.68	0	0	4.12	0	0	discovered 2/01; yellow-green, OK 2 & 5/01, 2 & 4/02, 2 & 5/03
127.40	6	6.61	320																1.65	0	0	mia			mia			discovered 2/01; green, OK 2 & 5/01; plant mia 2 & 4/02, 2 & 5/03
127.50	6	6.59	320																3.32	0	0	3.73	2	0	4.36	0	0	discovered 2/01; a few damaged tubercles, green, OK 2 & 5/01; green, good 2 & 4/02, 2 & 5/03
127.60	6	6.67	320																1.34	0	0	1.10	0	0	1.04	0	0	discovered 2/01; hunkered, green, OK 2/01; popped out, green, good 5/01; green, OK 2 & 4/02, 2 & 5/03
128.00	6	7.15	317	3.40	2	1	5.30	5fr	5	4.80	3	3	4.61	4+1fr	5	5.08	1	1	5.48	0	0	5.28	2	1+1A	5.41	0	0	good 3/96; a little yellowish, OK, fruit already dispersing 5/97; very yellowish near base, OK 3/98, 5/98, 3/99, 4/99, 2 & 5/00; green, OK 2/01; green, good 5/01; olive, OK 2/02; green, good 4/02; green with some yellowish tubercle tips, OK 2/03; olive, OK 5/03
128.10	6	6.63	312				3.30	2fr	2	3.00	0	0	2.42	0	0	Dead												good 5/97; new apical growth, several tubercles reddish, OK 3/98 & 5/98; yellow-green, OK 3/99 & 4/99; hollow chambers, weevils? 2/00
128.11	6	6.62	312														0	0	mia			mia			mia			seedling of 128.10; discovered 2/00; OK 5/00; plant mia 2 & 5/01, 2 & 4/02, 2 & 5/03
128.20	6	7.30	312							2.00		0	2.49	0	0	2.75	0	0	2.16	0	0	3.29	0	0	3.95	0	0	discovered 5/98, good 3/99 & 4/99; green, good 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
128.30	6	7.37	312							1.90		0	2.21	1	1	2.05	0	0	2.82	0	0	1.55	0	0	1.76	0	0	discovered 5/98, good 3/99 & 4/99; green, good 2 & 5/00; green with some yellowish tubercles, OK 2 & 5/01; green, OK 2 & 4/02, 2 & 5/03
128.40	6	6.31	317																3.09	0	0	2.75	1	1	2.42	0	0	discovered 2/01; a few damaged tubercles, green, OK 2/01; reddish-green, OK 5/01, 2/02; purplish green, OK 4/02; olive, OK 2/03; green, good 5/03
128.50	6	6.35	318																1.54	0	0	1.17	1	1A	1.42	0	0	discovered 2/01; green with some red tubercle tips, OK 2 & 5/01; olive, OK 2/02; green, OK 4/02; green, good 2 & 5/03
129.00	6	7.50	312	2.40	1	1	2.70	1+1fr	2	2.50	0	0	2.46	0	0	2.65	0	0	2.83	0	0	2.97	0	0	2.82	0	0	OK 3/96; a little reddish, OK 3/98, 5/98; 3/99 & 4/99 & 2/00; dull green, OK 5/00& 2/01; olive, OK 5/01, 2 & 4/02, 2 & 5/03
129.10	6	7.70	317																			3.61		0	3.42	0	0	discovered 4/02; green, good 4/02; green with yellowish base, OK 2/03; olive, OK 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
30.00	6	7.45	308	2.20	0	0	2.20	1fr	1	2.40	0	0	2.44	0	0	2.88	1	1	2.85	0	0	3.04	0	0	3.10	0	0	good 3/96; rock flipped on top, partially covering plant, rock removed, plant good 3/98, 5/98, 3/99 & 5/99; dark green with some purplish tubercle tips, OK 2 & 5/00 & 2/01; maroonish-green, OK 5/01; green, good 2 & 4/02; olive, OK 2/03; green, good 5/03
31.00	6	7.41	330	2.70	1	1	3.40	3fr	2+1A	3.30	1	1	2.88	1	1	3.14	1	1	3.85	0	0	3.89	0	1	4.44	0	0	OK 3/96, 3/98 & 5/98; good 3/99 & 5/99; green with a few orange tubercle tips, good 2/00; green with a few orange tubercle tips, OK 5/00; tag mia replaced, plant green with a few yellow tubercle tips, OK 2/01; green, good 5/01; almost covered by ant dirt, green, OK 2/02; out, green, good 4/02, 2 & 5/03
31.10	6	7.55	330																1.44	0	0	1.82	1	0	2.29	0	0	discovered 2/01; green, good 2 & 5/01, 2 & 4/02, 2 & 5/03
32.00	6	9.45	328	3.00	0	0	3.70	3fr	2	4.20	1	1	3.51	3	3	4.41	3	3	5.37	3	5	5.18	5	5	5.47	2	2	old fire scar at base, OK 3/96; scar barely visible, good 5/97; fire scar no longer visible, good 3/98, 5/98, 3 & 4/99; green, good 2 & 5/00; tag mia, replaced, plant green, good 2 & 5/01; green with a few yellowish brown tubercles, good 2 & 4/02, 2 & 5/03
33.00	6	9.71	331	3.80	3	3	4.90	5fr	5	5.00	4	4	4.03	5fr	4+1A	5.19	6	1+ 4disp	6.55	4	2+2A	7.31	10	10+3A	7.94	7	6	OK 3/96; turning red 3/97; seedling (133.01) at base 5/97; totally maroon, good 3/98; maroon, OK 5/98; maroon, OK, shrunken on one side 3/99 & 4/99; mostly purplish, but good 2/00; dark green, good 5/00; slightly purplish-green, good 2 & 5/01, 2 & 4/02, 2 & 5/03
33.01	6	9.68	331							1.20	0	0	1.42	0	0	2.63	1	1	3.08	1	1A	3.56	3	3	3.77	0	0	seedling of 133, 1st seen 5/97, 1st measured & tagged 3/98; good 5/98, 3/99 & 4/99; green, good 2 & 5/00, 2 & 5/01; purplish green, good 2/02; green, good 4/02, 2 & 5/03
34.00	6	8.85	331	2.40	0	0	2.90	1A	1A	3.30	2	2	2.76	1	1A	3.40	0	0	3.85	0	0	4.86	5	4+1A	6.59	8	9	OK 3/96; good 5/97, 3/98; a few yellow & red tubercles, OK 5/98, 3 & 4/99; mottled green, OK 2 & 5/00; some damaged tubercles, green, good 2/01; maroonish-green, OK 5/01; blackish green, good 2/02; green, good 4/02, 2 & 5/03; flowers visited by honeybee and sulphur (?) butterfly 2/03
35.00	6	10.20	327	4.10	2	0	5.30	1+5fr	nd	5.30	3	4	4.92	2+1fr	3	5.19	5	6	5.75	3	3	4.82	0	0	5.33	0	0	OK 3/96; turning red 3/97, 3/98 & 5/98; getting buried 3/99; coming out maroonish, good 4/99; totall out, dark green, good 2/00; orangish-green, OK 5/00 purplish-green with some orange tubercle tips 2/01; purplish-green, good 5/01; reddish orange, poor 2/02; orangish with green apex, OK 4/02; tag mia, replaced, accidentally stepped on, partly covered with juniper litter, green with some reddish tubercles OK 2 & 4/03
35.10	6	10.02	327																			1.60	0	0	1.61	0	0	discovered 2/02; green, good 2 & 4/02 & 2/03; green OK 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
136.00	6	9.67	323	2.50	1	0	3.00	2fr	2	3.00	2	2	2.87	3	3	3.13	3	2+1A	dead									good 3/96, OK, dullish green 3/97, good 3/98, getting buried, good 5/98 & 3/99; reddish, OK 4/99; green with reddish tubercle tips, good 2/00; green with reddish tubercle tips, OK 5/00; large chamber in body, COD Monellema? 2/01
137.00	6	9.80	323	3.00	1	1	3.20	2fr	2	3.10	1	1	2.71	0	0	3.01	1	1	3.14	0	0	3.73	2	2	3.65	0	0	OK 3/96; a little reddish, OK 3/98; green, good 5/98, 3/99, 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02; partly in ant mound, green, good 2/03
137.01	6	9.15	326																1.04		0	1.06	0	0	1.12	0	0	discovered 5/01; green, OK 5/01; purplish green, OK 2/02; green, OK 4/02; green, good 2 & 5/03
138.00	6	9.90	323	2.50	0	0	3.60	3fr	3	4.00	3	3	3.09	3	3	3.98	2	3	5.22	4	5	4.94	3	5	5.68	6	6+1A	to the left of 139, good 3/96, 3/98, 5/98, 3/99 & 5/99; green, good 2 & 5/00; green with some purplish tubercle tips, good 2 & 5/01, 2 & 4/02; purplish green, good 2/03; green, good 5/03
139.00	6	9.92	323	2.00	2	2	3.80	3fr	3	4.20	2	2	4.62	5	5	5.20	7	7	6.73	4	6	7.06	6	7	7.39	5	9	to the right of 138, good 3/96, 3/98, 5/98, 3/99 & 5/99; green, good 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
140.00	6	9.90	320	2.10	0	0	2.00	0	0	1.80	0	0	2.10	0	0	2.52	0	0	2.77	0	0	2.80	1	2	3.52	0	0	good 3/96 & 3/97, 3/98 & 5/98; good at edge of little bluestem clump & ant mound 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
141.00	6	10.71	323	5.20	2+1fr	1	6.00	7fr	5+2A	6.30	3	2+1A	5.63	4fr	4	5.81	2	2	5.91	5	0	dead						OK 3/96, good 5/97, a little reddish, OK 3/98 & 5/98; a few spines loose, a little reddish, OK 3/99; green, good 4/99; green with reddish tubercle tips, OK 2 & 5/00; green with reddish tubercle tips, good, one flower partially eaten 2/01; green, good 5/01; dead, COD unknown, collected for weevil study 2/02
141.01	6	10.68	323	1.60	0	0	2.60	0	0	2.80	0	0	2.48	2fr	1	3.77	2	3	5.14	3	0	3.97	0	0	3.25	0	0	good 3/96, 3/98, 5/98, 3/99 & 4/99; green, good 2 & 5/00, 2 & 5/01; green with red tubercle tips, OK 2 & 4/02; pale green with pale red tubercles, OK 2/03; green, OK 5/03
141.02	6	10.66	323				1.40	0	0	1.70	0	0	1.57	0	0	1.90	0	0	2.31	0	0	2.26	0	0	2.31	0	0	good 3/98, 5/98, 3/99 & 5/99; green, good 2 & 5/00, 2/01; partially buried in juniper litter, green, OK 5/01, 2 & 4/02, 2 & 5/03
141.10	6	10.85	326				3.20	1fr	1	3.10	0	0	3.52	0	0	2.62	0	0	2.63	0	0	2.65	0	0	dead			OK 5/97, 3/98; gray overall, buried in Juniper needles, poor 5/98 & 3/99; coming out, good 4/99; coming out, green, good 2 & 5/00; olive, OK 2 & 5/01; upper part of root exposed, green, poor 2 & 4/02; small chunk eaten out of upper root, plant solid dry, hard, COD unknown 2/03
142.00	6	11.57	323	3.40	1	1	3.90	3fr	3	4.00	2	2	3.70	0	0	4.07	0	0	3.79	0	0	3.52	0	0	mia			OK 3/96; good 3/98, 5/98, 3/99 & 4/99; caving in on one side, green, OK 2/00; new apical growth, green, good, old body poor 5/00; old body bearly visible, new growth green, OK 2 & 5/01; grayish green, poor 2/02; reddish green, OK 4/02; hole where plant was, loose spines in vicinity, plant mia 2 & 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
43.00	6	10.73	315	2.80	2	2	3.80	3fr	3	3.70	3	3	3.49	2+1fr	3	4.47	3	3	5.95	5	6	6.39	5	7	6.51	3	4	good 3/96, 3/98; dull green, OK 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01; dark green, good 2 & 4/02, 2 & 5/03
44.00	6	11.73	317	2.80	1+1fr	2	3.40	3fr	3	3.40	0	0	3.14	1fr	1	3.16	2	2	3.48	0	0	3.52	0	0	3.55	0	0	good 3/96; OK, dull reddish green 5/97, 3/98 & 5/98; OK, dull reddish-green, getting buried 3/99; coming out, green, good 4/99, 2 & 5/00; out, green, good 2 & 5/01; green, OK 2 & 4/02, 2 & 5/03
44.10	6	13.31	321							4.10	2	3	3.57	1fr	1	4.10	1	2	3.97	0	0	3.75	0	0	3.70	0	0	discovered 3/98, reddish, OK & 5/98; reddish, OK, ants in soil cracks and holes around plant 3/99; reddish, OK 4/99 & 2/00; brownish-green, OK 5/00; reddish, OK-poor 2 & 5/01; small chunk out of side, scarred over, plant red, poor, misshapen 2/02; base red, apex green, OK 4/02 & 2/03; base dull light tan, apex olive, OK 5/03
45.00	6	10.95	318	2.60	0	0	3.20	2fr	2	3.70	2	2	3.07	2+1fr	3	3.98	3	1+2A	4.38	2	0	4.45	3	5	5.01	3	4	OK 3/96; good 3/98 & 5/98; OK, spines dull gray, body yellow-green 3/99; dark green, good 4/99, 2 & 5/00; blue-green, good 2/01; green, good 5/01; bluis green, good 2/02; green, good 4/02, 2 & 5/03
46.00	6	5.51	319	2.30	0	0	2.80	0	0	3.00	0	0	2.71	0	0	3.18	0	0	3.66	0	0	3.52	2	2	3.53	0	0	good 3/96, 3/98; OK 5/98; good 3 & 4/99; green, good 2 & 5/00, 2 & 5/01; blackish green, OK 2/02; reddish green OK 4/02 & 2/03; olive, OK 5/03
46.01	6	5.61	318																			1.15	0	0	1.17	0	0	discovered 2/02; olive, OK 2/02; green, good 4/02 & 2/03; green, OK 5/03
47.00	6	4.95	306	2.30	0	0	2.80	2fr	1+1A	2.90	1	1	2.51	1fr	0	2.53	1	0	2.73	0	0	2.36	1	1A	2.92	0	0	OK 3/96, 3/98 & 5/98; OK, maroonish 3 & 4/99, 2 & 5/00; olive with some yellow tubercles, OK 2 & 5/01; grayish olive, poor 2/02; olive, OK 4/02; purplish green, OK 2/03; olive, OK 5/03
47.10	6	4.83	319				1.20	0	0	0.80	0	0	1.10	0	0	0.94	0	0	1.15	0	0	1.29	0	0	1.38	0	0	maybe double headed 3/97; OK 5/97; definitely double-headed, the left head of 147.10 & 147.11, OK 3/98; good 5/98, 3/99 & 4/99; misshapen, green, OK 2/00; olive, OK 5/00; green, OK 2 & 5/01; green, good 2 & 4/02; olive, OK 2 & 5/03
47.11	6	4.83	319							0.70	0	0	0.61	0	0	0.79	0	0	0.84	0	0	1.06	0	0	0.78	0	0	the right head of 147.10 & 147.11, not tagged, OK 3/98 & 3/99; good 4/99; green, OK 2/00; olive, OK 5/00, 5/01; getting over grown by crustose lichen, green, OK 2/02; out, green, good 4/02; olive, OK 2 & 5/03
47.20	6	4.85	321										1.81	0	0	1.78	0	0	1.63	0	0	1.21	0	0	dead			edge of rock, green, good 3 & 4/99; old fire scar at base, green, OK 2 & 5/00; olive, OK 2/01; green, good 5/01, 2 & 4/02; solid, dry, hard, COD unknown 2/03
47.30	6	4.93	313										2.79	0	0	3.22	0	0	3.27	1	1	3.59	2	1	3.78	0	0	green, good 3 & 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
47.40	6	4.71	316													2.45	0	0	2.49	0	0	2.67	1	0	2.71	0	0	green, good 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
47.50	6	4.74	316													2.12	1	0	2.33	0	0	2.14	0	0	2.10	0	0	green, good 2/00; yellowish-green, OK 5/00; green, good 2 & 5/01, 2 & 4/02 & 2/03; green, OK 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
148.00	6	5.25	308	1.90	0	0	1.90	0	0	2.10	0	0	1.73	0	0	1.89	0	0	2.06	0	0	1.61	0	0	dead			old fire scar at base, OK-poor 3/96; reddish 5/96; dead 3/97; yellowish-gray, firmly rooted, not dead 5/97; yellowish-green, OK 3/98 & 5/98, OK, green, a little misshapen 3/99; golden, new spine growth, poo 4/99, old fire scar at base, purplish-yellowish green, poor 2/00; maroonish, OK 5/00; maroonish-yellow, poor 2/01; purple, poor 5/01, hard, dry, firmly rooted, gray, dead? 2 & 4/02; body hard, dry, solid, COD unknown 2/03
148.10	6	5.70	309				2.20		0	2.20	0	0	1.90	0	0	2.28	0	0	2.18	0	0	1.96	0	0	1.94	0	0	discovered 5/97; OK, 3/98 & 5/98; poor 3/99; green, good 4/99; yellowish, OK 2 & 5/00; olive, OK 2/01; green, OK 5/01, 2 & 4/02, 2 & 5/03
149.00	6	11.04	316	1.70	0	0	1.60	0	0	1.30	0	0	1.13	0	Dead													poor 3/96; red, spines gray 3 & 5/97; dark body, white gray spines, poor, maybe dead 3/98; probably dead 5/98, 3/99, 4/99; measured in one direction onl 3/99; removed by WHC 5/6/99; COD unknown, no evidence of weevils
150.00	6	10.96	316	2.30	0	0	2.20	0	0	2.30	1	1	2.06	0	1	2.86	1	1A	3.34	1	1A	3.44	1	1	3.08	0	0	old fire scars, OK 3/96; good 3/97; OK, dull green 5/97; good 3/98; no fire scars visible, dull green, OK 5/98; green, good 3/99, 4/99, 2 & 5/00, 2 & 5/01; green, with some slightly reddish tubercle tips, OK 2 & 4/02; olive, OK 2 & 5/03
151.00	6	11.04	316	2.60	0	0	3.00	1fr	1	2.70	0	0	Dead															OK 3/96, 1/3 of stem caved in, poor 3/98, misshapen, maroonish, OK 5/98; just spines clusters left, COD unknown 3/99
152.00	6	11.45	316	1.60	0	0	1.80	0	0	2.00	0	0	1.77	0	0	1.65	0	0	1.64	0	0	1.84	0	0	0.91	0	0	by rock, to the right of 153, OK 3/96; measured in one direction only, OK 3/98 & 5/98; maroonish, OK 3/99; green, good 4/99; green, OK 2 & 5/00, 2 & 5/01; purple, poor 2/02; purplish green, OK 4/02 & 2/03; dark purple. poor 2/03
153.00	6	11.45	316	1.30	0	0	1.30	0	0	1.20	0	0	0.88	0	0	0.88	0	0	1.11	0	0	mia			mia			to the left of 152, OK 3/96, 3/98; buried, poor 5/98; popping out, maroonish green, OK 3/99 & 4/99; hunkered, green, OK 2 & 5/00, 2 & 5/01; plant mia 2 & 4/02, 2 & 5/03
154.00	6	11.77	314	3.10	0	0	3.90	0	0	3.90	0	0	3.66	0	0	3.86	0	0	3.88	0	0	4.00	0	0	3.89	0	0	good 3/96; shaded 3/97, 3/98, 5/98, 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01; dull green, OK 2/02; green, good 4/02; olive, OK 2/03; green, good 5/03
155.00	6	11.84	314	2.40	0	0	2.10	0	0	2.10	0	0	1.99	0	0	1.84	0	0	1.93	0	0	1.28	0	0	dead			OK 3/96; shaded 3/97, 3/98 & 5/98; shaded, yellow-green, OK; almost buried 3/99; coming out, goldish, OK 4/99, 2 & 5/00, 2 & 5/01; hunkered, yellow, poor 2 & 4/02; hard, dry, solid; COD unknown 2/03
156.00	6	10.70	316	3.50	0	0	Dead																					dead 3/96 & 5/96; COD unknown; just spines left 3/97
157.00	6	10.90	317	2.70	0	0	2.70	1fr	1A	2.80	1	1	2.23	1fr	0	2.95	1	1	2.99	0	0	2.91	0	0	2.76	0	0	OK 3/96; good 3/98; getting buried, good 5/98; OK, squishy 3/99; olive, OK 4/99; green, good 2 & 5/00; olive, OK 2 & 5/01; green, OK 2/02; green, good 4/02, 2 & 5/03

Ancistrocactus tobuschii Data for Lost Maples State Natural Area

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
157.10	6	10.99	316				3.00	1	1	2.70	1	1+1A	2.58	2+1fr	2	3.13	1	1	3.61	0	0	4.22	2	1	3.97	0	0	OK 5/97; in grass clump, good 3/98; in grass clump & ant mound, good 5/98 & 3/99; one flower eaten, green, good 4/99; dark green, good 2/00; maroonish, OK 5/00; slightly maroonish-green, good 2 & 5/01; goldish at base, green above, good 2/02; green, goo 4/02, 2 & 5/03
158.00	6	10.18	314	2.50	0	0	3.10	1	1	3.40	1	1	3.52	3	3	3.77	0	0	4.32	0	0	4.47	2	2	3.86	0	0	good 3/96, 3/98, 5/98, 3/99 & 4/99; yellowish dull green, OK 2 & 5/00; green with basal yellow tubercles, OK 2 & 5/01; partially covered by ant mound, green, good 2 & 4/02; mound gone, plant green, OK 2 & 5/03
158.10	6	4.56	313	1.30	na	0	1.40	0	0	1.30	0	0	1.26	0	0	1.60	0	0	2.02	0	0	2.19	0	0	2.01	0	0	discovered 5/96, good, 3/98; OK 5/98 & 3/99; green, good 4/99; pulled into soil, green, good 2 & 5/00, 2 & 5/01; popped out, green, good 2/02; hunkered, green, OK 4/02, 2 & 5/03
159.00	6	10.37	311	2.70	0	0	3.00	1+2fr	3	3.20	3	3	3.12	3	3	2.95	2	2	3.18	0	0	3.04	0	1A	3.20	0	0	OK 3/96, 3/98; good 5/98 & 3/99; reddish-orange at base, OK 4/99; reddish, OK 2 & 5/00 & 2/01, red with new green apical growth, OK 5/01; red base, green, above, OK 2 & 4/02 & 2/03; green with yellowish base, OK 5/03
159.01	6	10.60	314										0.95		0	0.64	0	0	0.90	0	0	0.96	0	0	0.95	0	0	discovered 5/99; green, OK 5/99; green, OK, hunkered 2 & 5/00; olive, OK 2 & 5/01, 2 & 4/02 & 2/03; green, OK 5/03
160.00	6	10.00	308	2.60	0	0	3.40	2	2	3.30	1	1A	3.42	2	0	3.81	2	2	3.31	0	0	3.37	0	0	3.23	0	0	OK-poor 3/96; good 3/97; OK, yellowish green 5/97; good 3/98, 5/98, 3/99; good, green 4/99; light purplish at base, OK 2/00; yellowish at base, OK 5/00; green with some red tubercle tips, OK 2 & 5/01; yellowish green, OK 2 & 4/02; green with some red tubercles, OK 2/03; green apex with yellowish base, OK 5/03
161.00	6	10.10	305	3.30	0	0	3.90	2	1+1A	3.70	0	1	3.25	0	0	3.71	1	1	3.69	0	0	3.59	0	0	dead			poor 3/96, OK, maroonish green 5/97, 3/98, 5/98, 3/99; dark green, slightly red, good 4/99; 2 & 5/00, 2/01; reddish-green, OK 5/01, 2 & 4/02; several small chambers and exit holes; COD weevils 2/03
162.00	6	11.06	307	2.80	0	0	2.90	0	0	2.70	0	0	2.43	0	0	2.52	0	0	2.24	0	0	2.20	0	0	dead			OK 3/96, 3/98, 5/98, 3/99, 4/99 & 2/00; dull green, OK 5/00, 2/01; grayish-green; poor 5/01, 2/02; reddish green, OK 4/02; dry; hard; solid; COD unknown 2/03
162.10	6	10.88	305																2.13	0	0	2.13	0	0	dead			discovered 2/01; yellowish-green, OK 2 & 5/01; brownish olive, hunkered, poor 2 & 4/02; large cavity COD Monellema 2/03
163.00	6	10.46	302	2.30	0	0	3.20	0	0	3.30	0	1A	Dead															OK 3/96; good 5/97, 3/98 & 5/98; huge larva (probably Monellema) collected 3/99
164.00	6	11.89	302	2.60	0	0	3.00	0	0	3.10	0	0	2.70	0	0	2.43	0	0	dead									good 3/96, 3/98, 5/98, 3 & 4/99; light green, a few orangish tubercle tips 2/00; orangish, OK 5/00; tag mia, plant dead, just spines left, COD unknown 2/01

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
165.00	6	5.52	290	1.90	0	0	2.20	0	0	2.40	1	1	1.89	0	0	1.46	0	0	2.47	1	1	2.63	0	0	2.69	0	0	to the left of 166 & 167, OK 3/96, 3/98, 5/98; maroon, OK 3 & 4/99; one measurement only, green good 2 & 5/00, 2/01; dark green, OK 5/01; slightly maroonish green, OK 2/02; green, good 4/02; hunkered, green, OK 2 & 5/03
165.10	6	4.41	296				4.50	1+4fr	5	4.60	1	1	4.00	1+2fr	3	4.65	0	0	4.75	0	0	4.34	0	0	3.78	0	0	good 3/97; a few orangish tubercle tips, OK 3/98 & 5/98; green, good 3 & 4/99; reddish , good 2/00; a few orangish tubercle tips, OK 5/00; purplish-green, OK 2/01; olive, OK 5/01; purplish green, OK 2 & 4/02; ~25% stem eaten, scarred over, rest of plant reddish green, OK 2/03; green, OK 5/03
166.00	6	5.47	290	1.60	0	0	1.80	0	0	2.00	0	0	1.82	0	0	2.01	1	1	1.89	0	0	1.72	0	0	1.52	0	mia	in between 165 & 167, OK 3/96; good 3/98, 5/98, 3/99 & 4/99; dull green, OK 2 & 5/00; maronish, OK 2/01; sunken, maroon, poor 5/01; maroonish green, OK 2 & 4/02 & 2/03; pl mia 5/03
167.00	6	5.47	290	1.30	0	0	1.40	0	0	1.40	0	0	1.34	0	0	2.33	0	0	1.49	0	0	1.50	0	0	1.25	0	0	to the right of 165 & 166, OK 3/96; good 3/98, 5/98, 3/99 & 4/99; reddish-green, OK 2/00; green, good 5/00, 2 & 5/01; green, OK 2 & 4/02, 2 & 5/03
167.10	6	5.51	285				1.90		0	1.70	0	0	1.22	0	0	1.30	0	0	dead									old fire scar (white tubercles) visible at base, OK, discovered 3/97, OK 3/98, 5/98 & 3/99; maroonish, OK 4/99; green, OK 2 & 5/00; just spines left, COD unknown 2/01
167.20	6	4.44	287				2.30		0	2.50	0	0	2.03	1fr	1	2.66	0	0	2.29	0	0	2.24	0	0	2.08	0	0	discovered 5/97, good, 5/97, 3/98, 5/98, 3/99 & 4/99 green with reddish tubercle tips 2/00; green with yellowish tubercle tips, OK 5/00; rock flipped on, removed, green, OK 2/01; green with some yellow tubercle tips, OK 5/01; reddish purplish green, OK 2/02; purplish green, OK 4/02; olive, OK 2/03; hunkered, green, OK 5/03
167.30	6	4.32	288				1.00		0	1.10	0	0	1.09	0	0	0.97	0	0	dead									discovered 5/97; ant mound, tag mia, replaced, good 3/98 & 5/98, OK 3/99; green, good 4/99 & 2/00; split across top, some dead spines, green, OK 5/00, just spines left, COD unknown 2/01
167.40	6	3.50	284							5.10	2	2	4.11	2+3fr	5	4.99	2	1+disp	5.68	3	1	5.60	3	2+1A	6.52	3	nd	discovered 3/98, good 5/98; green, good, 4/99, 2 & 5/00; two flowers partially eaten, plant green, good 2/01; green, good 5/01; two flowers partly eaten, plant green, good 2/02; green, good 4/02; 1 flower partly eaten, plant green, good 2/03
167.50	6	3.98	285																1.64	0	0	1.60	0	0	1.37	0	0	discovered 2/01; green, good 2/01; reddish-orange, poor 5/01; green with reddish tubercle tips, OK 2 & 4/02; olive, OK 2/03; loose old spines over new spine growth, plant green, OK 5/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
68.00	6	5.33	273	3.00	4	3	4.00	4fr	4	3.50	2	2	3.11	2fr	2	3.55	2	2	3.39	1	0	3.07	1	0	3.08	0	0	OK 3/96; very orangish-red, OK 3/98 & 5/98; maroonish-green, OK 3 & 4/99; reddish, OK 2/00; yellowish at base, otherwise green, OK 5/00; maroon, OK 2 & 5/01; accidentally stepped on, gree with some reddish tubercle tips, OK 2/02; reddish green, OK 4/02; red, OK 2/03; squishy, dull light tan & spineless at base, green above, poor 5/03
69.00	6	4.32	274	3.20	2	2	4.10	3fr	3	4.00	2	2	2.88	1+2fr	2+1A	3.65	2	2	3.98	0	0	3.51	2	0	4.25	6	5A	good 3/96; OK, yellowish green 3/97, 3/98; pulling into ground, yellowish, OK 5/98; green, OK, sinking into ground on one side 3/99; no longer sinking, green, good 4/99; green, good 2 & 5/00; dull green with purplish tubercles, OK 2 & 5/01, 2/02; green with reddish tubercles, OK 4/02; purplish green, good 2/03; olive, OK 5/03
69.01	6	4.49	278																			1.86	0	0	2.33	0	0	discovered 2/02; reddish, poor 2 & 4/02; base exposed, old fire scar?, greenish red, OK 2 & 5/03
69.10	6	4.52	287				4.00	3fr	3	3.60	1	1	2.94	1fr	1	4.10	0	0	3.74	0	0	3.48	3	0	3.20	0	0	good 5/97, 3/98 & 5/98; green, good 4/99, 2 & 5/00; hunkered, loose spines, green, OK 2/01; green with tannish tubercles at base, OK 5/01; green with a few tan tubercle tips, good 2 & 4/02; green, good 2 & 5/03
70.00	6	5.77	273	4.30	3	3	5.50	2+2fr	4	5.60	2	2	5.31	1+2fr	3	5.68	1	1	6.33	0	0	6.49	2	3	6.38	0	0	good 3/96; fantastic 3/98 & 5/98; good 3 & 4/99; green, good 2 & 5/00, 2/01; dark bluish-green, good 5/01; partly covered in ant dirt, green, good 2/02; almost out, one fruit partly eaten, plant green, good 4/02; green, good 2 & 5/03
70.10	6	6.19	278																			3.01	0	0	3.82	0	0	discovered 2/02; dull green, OK 2 & 4/02; purplish green, OK 2 & 5/03
71.00	6	4.65	268	2.90	1	1	3.40	2fr	2	3.20	0	0	2.74	1fr	1A	3.25	1	1	3.75	1	0	3.87	4	0	4.56	3	3	good 3/96; one fruit missing top 3/97; OK, dull green 5/97; very reddish, poor 3/98; reddish, OK 5/98; yellow-green, OK 3 & 4/99; purplish, OK 2/00; orangish, OK 5/00; green with red tubercles, OK 2/01; maroonish, OK 5/01, 2 & 4/02, 2 & 5/03
72.00	6	3.41	265	2.80	1	0	3.60	3fr	3	3.50	3	3	1.95	0	Removed; dead													plant smashed 3/96; OK 5/96; reddish tubercle tips, OK 3/98 & 5/98; looks dead, but firmly rooted 3/99; probably dead 4/99; collected by WHC 5/6/99; COD unknown; no evidence of weevils
73.00	6	2.65	264	3.10	1+2fr	3	3.70	4fr	4	3.90	3	3	3.39	3	2+1A	3.33	2	1+1A	3.91	2	1+1A	3.61	4	2+1A	4.33	3	2+1A	OK 3/96; red 3/97; gold-yellow, poor 5/97; totally maroon with a few tan tubercle tips, OK 3/98 & 5/98; goldish, poor 3/99; OK, yellow on one side 4/99; purplish, slightly shrunken, OK/poor 2/00; orangish at base, OK 5/00; purplish, OK 2/01; green with some purplish tubercles, OK 5/01; reddish purple, OK 2/02; orangish green, OK 4/02; purple, OK 2/03; one flower eaten 2/03; purplish green, OK 5/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
174.00	6	4.67	266	2.90	1+2fr	2	3.40	3fr	3	3.10	0	0	2.71	1fr	1	2.70	0	0	3.10	1	1	3.12	1	1	3.36	0	0	good 3/96; turning red 3/97; some orangish tubercles 5/97; reddish with some orangish tubercle tips, OK 3/98 & 5/98; green, good 3/99 & 4/99; purplish, OK 2/00; slightly purplish green, OK 5/00; green, good 2 & 5/01; dull green, OK 2/02; green with some reddish tubercle tips, good 4/02; green, good 2 & 5/03
174.10	6	4.62	264																3.37	0	0	3.38	0	0	3.36	0	0	discovered 2/01; purplish-green, OK 2 & 5/01; purple, OK 2 & 4/02; green, OK 2 & 5/03
175.00	6	5.09	266	3.00	3?	2	3.60	3fr	3	3.40	1	1	2.82	2fr	2	2.74	0	0	3.26	0	0	3.36	2	0	3.49	0	0	flowers smashed 3/96; OK 5/96; a little reddish 3/97; a little reddish, OK 3/98, 5/98, 3 & 4/99; orangish, OK 2 & 5/00; olive with reddish tubercle tips, OK 2/01; dull green, OK 5/01, 2 & 4/02; green, good 2 & 5/03
175.01	6	5.07	266	0.60	0	0	0.90	0	0	0.90	0	0	0.47	0	0	0.75	0	0	0.62	0	0	0.64	0	0	mia			good 3/96, 3/98 & 5/98; very poor, just a tubercle left 3/99; green, good 4/99; dull green, OK 2 & 5/00, 2/01; buried, green, OK 2/02; out, green, OK 4/02; plant mia 2 & 5/03
176.00	6	4.82	268	2.80	1+1fr	2	2.60	0	0	2.70	0	0	2.30	0	0	2.33	1	1	2.57	0	0	2.84	1	0	2.90	0	0	good 3/96, 3/98; shaded but good 5/98; green, good 3 & 4/99, 2 & 5/00, 2 & 5/01; green with a few tannish tubercle tips, OK 2/02; green, OK 4/02; green, good 2 & 5/03
177.00	6	4.85	268	2.70	1	1	3.60	3fr	3	3.20	0	0	2.36	1fr	1	2.94	1	1	3.13	0	0	3.14	3	0	3.25	0	0	good 3/96; shaded but good 3/98, 5/98 & 3/99; green, good 4/99; buried in grass clump, green, good 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
178.00	6	4.88	268	3.40	0	0	4.20	2fr	1+1A	4.20	0	0	3.21	2	2	3.85	2	2	3.79	0	0	3.25	3	1A	3.42	0	0	good 3/96; one fruit may be aborted 3/97; good 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00; pill bug eating plant, plant purplish-green, OK 2/01; 10% chunk gone, scarred over, green, OK 5/01; somewhat covered by ant dirt, green, good 2/02; out, green, good 4/02, 2 & 5/03
178.01	6	4.73	273										2.95		0	2.81	2	1+1A	2.70	0	0	2.68	0	0	3.29	0	0	discovered 5/99; green, good 5/99, 2 & 5/00; blue-green, OK 2/01; purplish-green, OK 5/01; brownish olive, OK 2/02; partly in ant mound, green, OK 2/03; green, good 5/03
179.00	6	4.95	268	3.20	0	0	4.20	2fr	2	4.40	2	2	2.85	0	0	3.90	2	2	3.84	1	1	3.87	1	1A	4.71	6	5+1A	good 3/96, 3/98, 5/98, 3 & 4/99; green, good 2 & 5/00; purplish-green, OK 2 & 5/01; dark green, good 2 & 4/02, 2 & 5/03
180.00	6	5.72	268	1.20	0	0	1.40	0	0	1.40	0	0	1.42	0	0	1.73	0	0	2.03	0	0	1.95	0	0	2.45	0	0	almost buried, OK 3/96; popping up through crustose lichens, measured in one direction only 3/97; popped out 5/97; good, 3/98; OK 5/98; hunkering down 3/99; coming out, green, good 4/99 & 2/00; hunkered, green, OK 5/00; coming out, dull green OK 2/01; green, OK 5/01; hunkered, blue green, OK 2 & 4/02, 2/03; almost buried, green, OK 5/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
181.00	6	6.13	268	2.40	0	0	2.70	2fr	2	2.80	1	1	2.36	1fr	1	2.77	1	1	2.26	0								OK 3/96; reddish, OK 3/98, 5/98, 3 & 4/99; slightly soft; reddish-green, OK 2 & 5/00; orange, poor 2/01; root rot, collected for weevil study 5/01
182.00	6	6.37	268	1.80	0	0	1.90	0	0	2.40	0	0	1.89	0	0	2.35	0	0	2.89	0	0	2.27	0	0	2.17	0	0	OK 3/96; almost buried 5/96; coming out 5/97; above ground, good 3/98 & 5/98; almost buried 3/99; coming out, green, good 4/99; green, good 2 & 5/00; pale green OK 2/01; green, good 5/01; hunkered, olive, OK 2 & 4/02, 2/03; green, OK 5/03
182.01	6	6.18	269																0.28		0	mia			mia			discovered 5/01; green, good 5/01; plant mia 2 & 4/02; 2 & 5/03
183.00	6	6.25	268	0.80	0	0	0.80	0	0	1.00	0	0	0.99	0	0	1.00	0	0	0.92	0	0	mia			mia			OK 3/96, 3/98; pulling underground, OK 5/98; poor, hunkered 3/99; coming out, dull green, poor 4/99; dull green, OK 2 & 5/00; hunkered, green with gold and orange tubercles, OK 2/01; buried, very poor 5/01; plant mia 2 & 4/02, 2 & 5/03
183.10	6	6.32	268							1.20	0	0	1.15	0	0	1.17	0	0	1.06	0	0	0.56	0	0	mia			discovered 3/98, good 5/98; hunkered, OK 3/99; green, good, popped out 4/99; half-buried, green, good 2 & 5/00; almost buried in juniper litter, olive, OK 2 & 5/01, 2/02; only spines showing 4/02; pl mia 2 & 5/03
184.00	6	5.90	256	3.00	1	0	3.90	5fr	6	4.90	3	1	4.10	4fr	3+1A	4.90	2	disp	6.16	4	2	7.17	6	7	7.41	7	6	OK 3/96; buried in fire ant mound, OK 5/97; out of mound, good 3/98; getting buried again 5/98, 3/99; totally out, green, good 4/99, 2 & 5/00; all flowers an some tubercles partly eaten, but plant green, good 2/01; green, good 5/01; two flowers eaten, plant green, good 2 & 4/02; 3 flowers partly eaten, plant green, good 2 & 5/03
185.00	6	4.82	249	3.10	2	2	3.90	4fr	3+1A	3.80	2	3	2.57	2+2fr	1+1disp	3.25	3	1A+ 1disp	3.22	3	0	3.40	1	0	4.01	5	1	good 3/96; a few reddish tubercle tips, OK 3/98, 5/98, & 3/99; hunkered, maroonish, OK 4/99; purplish, OK 2/00; light purplish-green, OK 5/00; one flower partly eaten, purplish, OK 2/01; purplish-green, OK 5/01; one flower eaten, plant maroonish green, OK 2 & 4/02; one flower partly eaten, plant green, good 2 & 5/03
185.10	6	3.73	253				3.40		3	3.30	1	1	2.83	2fr	2	3.42	2	1 disp?	4.77	4	4	5.18	6	5+1A	6.16	4	6	good, discovered 5/97; a few yellowish tubercle tips, partially buried in ant mound, OK 3/98, 5/98; green, good, out of mound 3/99 & 4/99; slightly purplish, OK 2/00; yellowish pale green, OK 5/00; body pale green, tubercles dark green, OK 2/01; maroonish tubercle tips, body pale green 5/01; green with slightly maroonish tubercle tips, good 2 & 4/02; green, good 2 & 5/03
185.20	6	3.50	245													3.55		0	dead									discovered 5/00; misshapen, yellowish basally, otherwise green, OK 5/00; body hollow, COD Moneilema 2/01

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
186.00	6	4.78	249	3.10	2	2	3.60	1fr	1	3.30	1	1	3.15	1	1	3.73	3	3	4.31	0	0	3.77	3	0	4.58	4	1+1A	good 3/96; a little reddish, OK 5/97; good 3/98, 5/98, 3 & 4/99, 2 & 5/00, 2/01(tag mia, replaced); green, good 5/01, 2/02; reddish green, OK 4/02; one flower partly eaten, plant green, good 2 & 5/03
187.00	6	4.80	249	1.60	0	0	2.70	1fr	1	2.30	0	0	2.03	0	0	2.50	0	0	3.21	0	0	2.82	2	0	3.07	1	0	good 3/96; a few orangish tubercles, OK 5/97, 3/98 & 5/98; green, good 3 & 4/99, 2 & 5/00, 2 & 5/01; reddish green, OK 2 & 4/02; one flower partly eaten. plant green with red tubercles, OK 2/03; green, good 5/03
187.01	6	4.80	249																			1.68	0	0	2.06	0	0	not tagged, on left of 187.00, discovered 2/02; green good 2 & 4/02, 2 & 5/03
187.10	6	5.15	245																1.07	0	mia	mia			mia			discovered 2/01; green, good 2/01; plant mia 5/01, 2 & 4/02, 2 & 5/03
188.00	6	9.87	269	3.20	0	0	3.40	0	0	3.40	0	0	3.18	0	0	3.09	0	0	3.09	0	0	3.18	0	0	dead			OK 3/96, good 3/98 & 5/98; getting buried by juniper litter, OK 3/99; tag uprooted and chewed, replaced, plant coming out, green, OK 4/99; green, good 2 & 5/00, 2 & 5/01; partly covered by juniper litter, green OK 2 & 4/02; small chambers and exit holes, COD weevils 2/03
189.00	6	10.09	264	2.50	0	0	2.50	0	0	Dead																		OK poor 3/96; reddish, hunkered down, bad 5/97, stem solid, dry, COD unknown 3/98
189.10	6	6.00	262				2.70	0	0	2.80	0	0	2.53	2fr	1A	3.02	0	0	3.67	0	0	3.40	3	1+1A	4.68	4	4A	yellowish green, OK 5/97, 3/98, 5/98, 3/99 & 4/99; olive green, OK 2/00; yellowish, OK 5/00; pale green with reddish tubercle tips, OK 2 & 5/01; partly covered by ant litter, pale green with reddish tubercle tips, OK 2/02; uncovered, pale green, OK 4/02; all flowers partly eaten, plant green, good 2 & 5/03
189.20	6	6.45	262				2.90	1fr	1	2.70	0	1	2.28	1fr	1	2.69	0	0	4.01	2	2	4.12	1	2	3.88	0	0	very dark green, OK 5/97; very dark green, good 3/98 & 5/98; good, hunkered 3/99; coming out, green, good 4/99; purplish, good 2/00; dark green, few spines, good 5/00; one flower partly eaten, plant blue-green, good 2 & 5/01; purplish green OK 2 & 4/02; purple, OK 2/03; green, good 5/03
189.21	6	6.48	262																0.66	0	0	0.51	0	0	0.84	0	0	not tagged, behind on right of 189.20, discovered 2/01; green, good 2 & 5/01, 2 & 4/02, 2/03; green, OK 5/03
189.30	6	6.53	264				6.20	6fr	6	5.80	2	1	Dead															great 5/97, 3/98 & 5/98; stem not hollow or dry solid; COD unknown 3/99
189.40	6	6.90	264				2.70	2fr	2	2.60	1	1	2.10	2fr	1	2.97	0	0	3.09	0	0	2.99	0	0	2.56	0	mia	good 5/97, 3/98; shrinking into ground, OK 5/98 & 3/99; coming out, green, good 4/99; green, good 2 & 5/00, 2 & 5/01; slightly hunkered, green, OK 2 & 4/02; almost covered by juniper litter, green, OK 2/03; plant & tag mia 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
89.50	6	7.76	258																1.77	0	0	1.46	0	0	1.25	0	0	left of 189.6, discovered 2/01; green, good 2 & 5/01; yellowish green with some red tubercles, OK 2/02; olive, OK 4/02; almost covered by juniper litter, green, OK 2 & 5/03
89.60	6	7.77	258																1.65	0	0	1.57	0	0	1.55	0	0	right of 189.5, discovered 2/01; green, good 2 & 5/01; green, OK 2 & 4/02; almost covered by juniper litter, green, OK 2 & 5/03
90.00	6	10.51	264	2.50	1	0	3.10	2fr	2	3.20	1	0	2.66	0	0	3.08	0	0	3.60	0	0	3.19	0	0	3.00	0	0	OK 3/96, 3 & 5/98, 3/99; maroonish, OK 4/99; olive green, good 2/00; dark green, good 5/00; green with maroonish tubercle tips, good 2 & 5/01; reddish green, OK 2 & 4/02, 2/03; green, OK 5/03
91.00	6	10.17	264	2.70	0	0	3.00	2	2A	3.40	0	0	2.39	0	0	3.15	1	1	3.76	0	0	3.28	0	0	2.95	0	0	OK 3/96, 3 & 5/98, 3/99; green, good 4/99; olive green, OK 2/00; slightly reddish at base, OK 5/00; green with some reddish tubercle tips, good 2 & 5/01; yellowish green, with some tan tubercle tips, OK 2 & 4/02; leaning, olive, OK 2/03; green, OK 5/03
91.10	6	10.17	262																1.29	0	0	1.13	0	0	1.03	0	0	discovered 2/01; hunkered, green, good 2 & 5/01; buried, green, OK 2 & 4/02, 2 & 5/03
92.00	6	11.50	259	2.40	0	0	3.10	1A+1fr	1	3.20	1	1	2.73	2fr	1+1A	3.67	0	0	4.05	1	0	3.81	0	0	3.61	0	0	OK 3/96; good 3/98; pulling into soil, OK 5/98; green good 3/99 & 4/99; purplish, good 2 & 5/00; pale purplish-green, good 2 & 5/01; purplish green, OK 2 & 4/02, 2 & 5/03
93.00	6	10.52	260	2.90	1	1	3.70	2fr	2	3.90	1	1A	2.65	2fr	2	3.60	1	1	3.64	2	2	3.62	0	0	3.38	0	0	reddish, OK 3/96; maroon, OK 3 & 5/97, 3/98; buried, poor 5/98; resurfacing, OK 3/99; reddish, OK 4/99; soft, olive green, OK 2/00; orangish, OK 5/00; green with orangish tubercle tips, OK 2 & 5/01; green with reddish tubercle tips, OK 2 & 4/02; green, OK 2 & 5/03
94.00	6	9.98	260	2.30	0	0	2.40	0	0	2.60	0	0	2.16	0	0	2.56	0	0	3.17	2	2	2.78	0	0	2.78	0	0	old fire scar, OK 3/96; very reddish, very poor 3/98, 5/98, 3/99; yellowish, OK 4/99; fire scarred, purplish-yellowish, fair/OK 2/00; maroonish basally, OK 5/00; maroonish basally, good 2 & 5/01; pale orangish red at base, green above, OK 2 & 4/02, 2 & 5/03
95.00	6	8.88	259	3.30	2	2	4.40	1A+2fr	2	4.00	3	3	3.80	2	2	3.86	2	1+1A	4.15	0	0	3.16	1	1A	dead			good 3/96; getting slightly yellow, OK 5/97, 3/98, 5/98, 3/99 & 4/99; tubercle tips slightly purplish-green, good 2/00; tubercle tips slightly purplish-yellowish, OK 5/00; green with purplish tubercle tips, OK 2/01; yellowish-green, OK 5/01; partly covered by juniper litter, green with a few purplish tubercles, OK 2 & 4/02, large chambers and exit holes, COD Monellema 2/03
95.10	6	8.46	264				3.10	0	0	2.70	1	0	2.32	0	0	3.05	0	0	2.85	0	0	2.85	1	1	2.60	0	0	good 5/97; a few yellowish tubercle tips, getting buried in juniper litter, OK 3/98; poor 5/98 & 3/99; yellow-green, OK 4/99; green, good 2 & 5/00, 2/01; partly eaten, scarred over, green, OK 5/01; misshapen, green, OK 2 & 4/02, 2 & 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
195.20	6	8.29	260				2.20		1	2.60	0	0	1.96	0	0	Dead												good, discovered 5/97; good 3/98 & 5/98; almost buried in juniper litter, poor 3/99; reddish, OK 4/99; solid, dry, hard as a rock, COD unknown 2/00
196.00	6	8.92	258	2.70	1A	0	3.30	2fr	2	3.00	0	0	2.48	0	0	3.03	1	0	3.33	0	0	2.84	0	0	2.82	0	0	OK 3/96, dead plant between 196 & 196.01; dead plant gone, poor, orangish 5/97; slightly reddish, OK 3/98, 5/98 & 3/99; yellow-green, OK 4/99; slightly reddish, OK 2/00; orangish tubercle tips, OK 5/00; green with maroonish tubercle tips, OK 2 & 5/01, 2/02; green, OK 4/02; partly buried in juniper litter, plant green, OK 2 & 5/03
196.01	6	8.95	258	1.60	0	0	2.10	0	0	2.30	1	1A	2.13	1fr	1	2.28	0	0	2.50	0	0	2.73	0	0	2.27	0	0	good 3/96, dead plant between 196.01 & 196; dead plant gone 5/97; good 3/98; buried, poor 5/98; yellow green, OK 3 & 4/99; green, OK 2 & 5/00, 2 & 5/01, 2 & 4/02; partly buried in juniper litter, plant green, OK 2 & 5/03
197.00	6	8.72	258	1.20	0	0	1.50	0	0	1.90	0	0	1.16	0	0	2.19	0	0	2.32	0	0	2.30	0	0	2.12	0	0	good 3/96, 3/98 & 5/98; yellow-green, squishy, OK 3/99; firm, green, good 4/99; green, good 2 & 5/00, 2/01; slightly reddish-green, OK 5/01; buried in juniper litter, green, OK 2 & 4/02, 2 & 5/03
198.00	6	9.43	259	2.50	1	0	3.10	2	2	2.90	0	0	2.38	0	0	2.83	1	1	2.85	0	0	2.64	0	0	dead			OK 3/96; turning red & yellow 3/97 & 5/97; tubercle tips reddish, OK 3/98, 5/98 & 3/99; yellow-green, OK 4/99; green, good 2/00; a few reddish tubercle tips, OK 5/00, 2 & 5/01; almost buried in juniper litter, green, OK 2 & 4/02; just spines left, COD unknown 2/03
199.00	6	9.49	259	1.30	0	0	2.10	0	0	2.30	0	0	1.95	0	0	2.40	0	0	2.56	0	0	2.14	0	0	2.60	0	0	good 3/96, 3/98 & 5/98; OK 3/99; green, good 4/99; half buried in juniper needles, lumpy, green, good 2 & 5/00; coming out, green, good 2/01; olive, OK 5/01; almost buried in juniper litter, green, OK 2 & 4/02, 2 & 5/03
200.00	6	10.07	259	2.20	0	0	2.60	2fr	2	2.30	0	0	1.96	0	0	2.40	0	0	2.85	0	0	2.72	1	0	dead			good 3/96; OK, turning a little orangish 5/97; a few reddish tubercle tips, good 3/98; OK 5/98, good 3/99 green, good 4/99; green, good; partially buried in ant mount 2 & 5/00; green with some orange tubercle tips, OK 2 & 5/01, 2 & 4/02; hard, dry, solid; COD unknown 2/03
201.00	6	10.25	259	1.40	0	0	1.70	0	0	1.50	0	0	1.11	0	0	1.45	0	0	1.44	0	0	1.57	0	0	1.77	0	0	OK 3/96; old fire scar at base; OK 3/98, 5/98, 3/99 & 4/99; dull green, OK 2 & 5/00; green good 2 & 5/01, 2 & 4/02, 2/03; hunkered, olive, OK 5/03
202.00	6	8.36	256	2.90	1	1	3.10	2fr	2	3.10	0	0	2.75	2fr	2	2.86	0	0	3.06	0	0	2.54	0	0	2.27	0	0	OK 3/96; reddish 5/96, smaller dead one beside; dead one gone, live plant reddish 3/97; yellowish, poor 5/97; reddish, poor 3/98; reddish, OK 5/98, 3/99; goldish, OK 4/99; olive green, OK 2/00; goldish, OK 5/00; some tubercles damaged, plant maroonish-orangish-green, OK 2 & 5/01; very misshapen, reddish olive, OK 2 & 4/02; base of stem collapsing, apical growth olive, OK 2 & 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
203.00	6	8.90	253	3.00	2	2	3.20	2fr	1	3.20	1	1	2.73	2	2	2.88	0	0	3.29	0	0	3.78	4	2+1A	4.79	1	0	smashed 3/96; OK 5/96; poor, orangish tubercles 5/97; tubercle tips orangish, OK 3/98, 5/98, 3/99 & 4/99; stepped on 5/99; purplish, OK 2/00; almost totally red, new green apical growth, OK 5/00; purplish-green, OK 2 & 5/01; two flowers partly eaten, green with maroonish green tubercle tips, OK 2 & 4/02; one flower partly eaten, plant green with some purple tubercles 2/03; green with some tan tubercle tips, OK 5/03
203.10	6	7.50	254				3.50	1fr	1	3.40	1	1	2.92	1	1	3.59	1	1	3.76	0	0	3.62	0	0	3.81	0	0	good 5/97, 3/98, 5/98, 3/99; green, good 4/99; tubercles purplish, good 2 & 5/00, 2/01; green, good 5/01, 2 & 4/02, 2 & 5/03
203.20	6	8.93	254				2.30	0	0	2.30	0	0	2.35	0	0	2.59	1	1	2.53	0	0	3.17	3	3	3.06	1	0	good 5/97, 3/98, 5/98, 3 & 4/99; green, good 2 & 5/00, 2 & 5/01, 2 & 4/02; green, OK 2 & 5/03; one flower partly eaten 2/03
203.30	6	7.99	254																3.73		0	dead						discovered 5/01; green, good 5/01; dead; COD unknown; collected for weevil study 2/02
203.31	6	7.92	254																0.51		0	0.49	0	0	mia			discovered 5/01; green, good 5/01; green, OK 2 & 4/02; plant mia 2 & 5/03
204.00	6	8.69	246	2.90	1+1fr	2	4.10	1+2fr	3	3.50	2	2A	3.36	3	3	3.46	0	0	3.46	0	0	3.56	1	0	3.40	0	0	good 3/96; a few yellowish tubercle tips, OK 3/98 & 5/98; green, good, hunkering 3/99; coming out 4/99; green, OK, probably stepped on 2/00; green, good 5/00; purplish-green, OK 2/01; green, good 5/01; one flower eaten, plant green, good 2 & 4/02; hunkered, green, OK 2/03; green, OK 5/03
205.00	6	8.19	246	2.00	0	0	2.90	1	1	3.20	0	0	3.58	3	4	4.26	0	0	4.62	0	0	4.27	0	0	4.46	0	0	old fire scar, good 3/96, 3/98, 5/98, 3/99; good, green 4/99, 2 & 5/00, 2 & 5/01; green with a few red tubercle tips, good 2 & 4/02; green, good 2 & 5/03
206.00	6	8.08	246	1.00	0	0	1.50	0	0	1.70	0	0	1.63	0	0	2.43	0	0	2.72	1	1A	2.85	1	1A	3.09	0	0	OK 3/96; old fire scars; OK 3/98; totally buried in ant mound 5/98; mound gone, maroon, OK 3/99; orangish, OK 4/99; slightly purplish, good 2/00; olive, OK 5/00; slightly purplish-green, good 2/01; purple, becoming misshapen, OK 5/01; orangish purple, OK 2 & 4/02, 2/03; green, OK 5/03
206.10	6	4.87	230							2.90		0	3.88	2	2	4.32	1	1	5.09	2	2	4.32	2	2	4.51	0	0	good, discovered 5/98; good 3/99; green, good 4/99, 2 & 5/00; green with a few yellow tubercle tips, good 2 & 5/01; a few tubercles eaten, plant green ,OK 2/02; green with a few tan tubercle tips, good 4/02; green with some oragne tubercle tips, OK 2/03; green, good 5/03
206.20	6	2.49	183										3.83	4	4	4.88	2	0	5.88	3	1	5.84	3	2	5.42	0	0	discovered 3/99; good, green 4/99; dark green, good 2 & 5/00, 2 & 5/01, 2 & 4/02; red, OK 2/03; green with some reddish tubercles, OK 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
206.30	6	4.35	193													3.54		0	3.70	0	0	2.71	0	0	mia			discovered 5/00; green, good 5/00; dull green OK 2/01; slightly reddish-green, OK 5/01; top ripped off, stump left in ground, might resprout or pup 2/02; one small green tubercle, poor 4/02; plant mia 2 & 5/03
206.40	6	2.25	190																						2.66		0	discovered 5/03; green, OK 5/03
Reference point 7 is in the next opening down the main road from Reference point 6. Stake 7 = GPS7; R022021A																												
207.00	7	0.57	197	1.70	0	0	2.40	2fr	1+1A	3.00	0	0	2.25	3	3	2.72	3	3	2.97	1	0	dead						good 3/96, 3/98, 5/98, 3/99; a few tan tubercles, OK 4/99 & 2/00; a few orange tubercles, otherwise green, good 5/00; green, good 2 & 5/01; just spines left, COD unknown 2/02
208.00	7	0.59	197	1.30	0	0	2.20	1fr	1	2.60	1	1	2.66	3	3	2.88	2	2A	dead									good 3/96, 3/98, 5/98, 3/99; maroonish 4/99; maroonish, OK 2/00; orangish, OK 5/00; body solid, COD unknown 2/01
209.00	7	0.44	186	3.50	1	1	3.70	3fr	3	4.30	3	2+1A	2.67	0	Dead													OK 3/96; purplish green, OK 3/98; orangish, OK 5/98; shrinking into and pulling away from soil 3/99; COD unknown 4/99
209.10	7	0.59	170	2.40		0	2.70	2A	0	3.20	1	1	3.03	2	2	3.07	2	2	3.42	0	0	3.15	0	1	3.54	1	2	OK, discovered 5/96; orangish at base, OK 3/98, 5/98 & 3/99; maroonish, OK 4/99 & 2/00; light green with yellow splotches, OK 5/00; tag mia, replaced, plant purplish-green, OK 2/01; slightly misshapen, green, OK 5/01, 2 & 4/02; green, good 2 & 5/03
209.20	7	2.32	181										1.15		0	1.42	0	0	1.71	0	0	1.92	0	0	1.66	0	0	discovered, green, good 4/99; dark green, OK 2/00; green, good 5/00, 2 & 5/01, 2 & 4/02; almost covered by juniper litter, green, OK 2/03; out, green, good 5/03
210.00	7	4.87	174	2.40	2	0	3.40	2fr	1+1A	3.10	1	1	3.10	3fr	3	3.37	0	1	3.47	2	0	3.57	2	1	3.46	2	0	OK 3/96; measured in one direction only, under rock 3/97; measured in one direction only, OK 3/98, 5/98, 3/99; getting buried in ant mound, green, good 4/99; out of ant mound, green, OK 2 & 5/00; green, good 2 & 5/01, 2 & 4/02, 2/03; olive, OK 5/03
211.00	7	4.67	169	4.40	1+2fr	0	4.70	1A+4fr	3+2A	4.60	2	2	4.28	3fr	1+2A	4.17	2	2	4.22	1	0	4.10	3	1+1A	4.20	0	0	OK 3/96; very purplish-gold, poor 3/98, 5/98, 3/99; goldish, OK 4/99; goldish-red, OK 2/00; orangish, OK 5/00; olive, OK 2 & 5/01; dull purplish olive, OK, open flower visited by honey bee 2/02; orangish olive OK 4/02; green, OK 2 & 5/03
211.10	7	4.87	167													1.44		0	dead									discovered under rock 5/00; one measurement only, green, good 5/00; just spines left, COD unknown 2/01
212.00	7	4.87	176				2.40	0	0	2.60	0	0	2.10	0	0	2.98	1	1	3.30	0	0	dead						OK 3/98, 5/98 & 3/99; green, good 4/99 & 2/00; purplish green, OK 5/00, 2/01; yellowish-green, OK 5/01; dead, dry, corky inside, COD unknown 2/02
212.10	7	3.49	178										1.12	0	0	1.00	0	0	1.25	0	0	1.29	0	0	1.53	0	0	loosely rooted on litter & soil, reddish green, OK 3/99, 4/99 & 2/00; olive, OK 5/00, 2 & 5/01; maroonish olive, OK 2 & 4/02, 2 & 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
212.20	7	4.23	181													1.49	0	0	1.51	0	0	1.66	0	0	1.77	0	0	discovered under rock 2/00; green, OK 2/00; grayish base, apically green, OK 5/00, 2 & 5/01; green OK 2 & 4/02, 2/03; green, good 5/03
213.00	7	4.89	176	2.10	2	2	2.30	0	0	2.60	0	0	1.98	1	0	2.54	0	0	2.82	0	0	dead						OK 3/96; measured in one direction only 3/97, OK 3/98, 5/98, 3/99, green, good 4/99; dark green, OK 2 & 5/00; purplish-green with some red tubercle tips 2/01; yellowish-green, OK 5/01; dry and powdery inside, COD - fungus? 2/02
214.00	7	5.61	174	3.70	0	0	3.70	4fr	4	3.90	2	2	3.14	3fr	1	Dead												OK 3/96, tubercle tips maroon; OK 3/98, 5/98 & 3/99, tag mia, replaced 3/99; green, good 4/99; fungus?, dry, powdery, dead 2/00
215.00	7	5.38	160	3.30	1+1fr	2	4.30	3fr	3	4.20	2	2	Dead															OK 3/96, a little orangish 5/97, orangish & reddish, OK 3/98 & 5/98; solid, dry, corky inside, COD unknown 3/99
215.10	7	5.30	150							2.60	0	0	1.99	0	0	2.37	0	0	2.02	0	0	2.38	1	1	1.85	0	0	discovered 3/98, a few tubercle tips orangish 3/98 & 5/98; olive green, OK 3/99; green, good 4/99; dull green, some reddish tubercle tips, OK 2 & 5/00; partly covered in old ant litter, yellow-green, OK 2/01 green, good 5/01, 2 & 4/02; olive, OK 2 & 5/03
215.20	7	5.50	152							1.00	0	0	0.97	0	0	1.01	0	0	1.21	0	0	1.34	0	0	1.20	0	0	discovered 3/98; good 3/98 & 5/98; good, totally buried 3/99; popping out, green, good 4/99, 2 & 5/00 green, OK 5/01, 2/02; green ,good 4/02; green, OK 2 & 5/03
215.30	7	5.22	144							2.70	0	0	2.45	0	0	2.41	0	0		0	dead							OK 3/98, 5/98, 3/99, 4/99, 2/00, dull green, OK 5/00 orangish-olive, poor 2/01, collected for weevil study, COD - rot 5/01
215.40	7	5.38	148																2.54	0	0	2.10	0	0	2.13	0	0	discovered 2/01; green, OK 2/01; green, good 5/01; reddish green, OK 2/02; green with some red tubercle tips, OK 4/02; green, OK 2 & 5/03
216.00	7	5.31	164	2.70	0	0	3.20	1fr	1	Dead																		OK 3/96; stem solid & dry; COD unknown 3/98
216.10	7	5.84	165							1.20	0	0	Dead															discovered 3/98, on left of pair 216.10 & 216.20, good 3/98, reddish, OK 5/98; spines loose, body solid 3/99, COD unknown
216.20	7	5.84	165							1.60	0	0	1.06	0	0	1.54	0	0	2.37	0	0	1.81	0	0	2.64	0	0	discovered 3/98; on right of pair 216.10 & 216.20; good 3/98; reddish, OK 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01; green, OK 2 & 4/02; covered in ant dirt 2/03; out, green with some red tubercle tips, OK 5/03
216.30	7	6.52	170																1.85	0	0	2.29	2	0	3.18	1	1	discovered 2/01; green, good 2 & 5/01, 2/02; green, OK 4/02; green, good 2 & 5/03
216.40	7	6.17	168																1.17	0	0	1.30	0	0	1.88	0	0	discovered 2/01; green, good 2 & 5/01, 2 & 4/02, 2/03; almost buried in ant dirt, green, OK 5/03
217.00	7	1.79	128	2.80	1	1	3.40	2+1fr	3	3.60	3	3	3.99	2+1fr	2+1disp	4.19	2	2	4.68	0	0	4.70	2	2	4.99	2	1A	good 3/96; a little reddish, OK 3/98 & 5/98; green, good 3/99, 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02; flowers eaten, plant green, good 2 & 5/03

Ancistrocactus tobuschii Data for Lost Maples State Natural Area

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
8.00	7	1.33	159	2.30	0	0	2.30	0	0	2.10	0	0	1.93	0	0	2.15	1	1	dead									OK 3/96, 3/98 & 5/98; poor, hunkering, maroon 3/99 green, good 4/99; maroonish, OK 2/00; hunkering, green, OK 5/00; body dry, powdery, COD unknown 2/01
9.00	7	1.82	121	3.00	1	1	3.30	2	2	2.90	1	0	2.95	0	0	3.65	0	1A	3.47	2	2A	3.59	0	0	dead			OK 3/96, 3/98, 5/98, 3/99, green, good 4/99; very dark green, OK 2 & 5/00; green, good 2 & 5/01; green, OK 2/02; olive, OK 4/02; collected for weevil study 2/03; COD unknown 3/03
0.00	7	2.17	121	3.20	0	0	3.30	2+1fr	3	Dead																		OK 3/96; fungus inside 3/98
0.10	7	2.30	82				4.00	1+3fr	1A	4.50	3	3	4.48	0	0	4.79	2	2	4.46	0	0	4.55	0	0	4.91	0	dead	good 3/98 & 5/98; a few brown tubercle tips, good 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02, 2/03; collected for weevil study 5/03; COD unknown 3/03
0.20	7	4.21	125				2.10		0	2.30	0	0	2.05	0	0	2.16	0	0	2.38	0	0	2.06	0	0	1.91	0	0	good, being covered by crustose lichen on one edge, pushing lichen away 5/97; popped out, OK 3/98 & 5/98; tag chewed, replaced, maroon, OK 3/99 & 4/99; olive green, OK 2/00; green, good 5/00; maroonish, OK 2 & 5/01; purple, OK 2 & 4/02, 2 & 5/03
0.21	7	4.06	126				2.80		0	2.20	0	0	2.08	0	0	2.28	0	0	2.09	0	0	1.85	0	0	2.02	0	0	good 5/97; OK 3/98 & 5/98; poor, sunken, grayish 3/99; maroonish, OK 4/99; green, good 2 & 5/00; hunkered, green, OK 2/01; popped out, green, OK 5/01; hunkering, green, OK 2/02; popped out, green, OK 4/02, 2/03; grayish, poor 5/03
0.30	7	4.57	125				2.40		0	2.60	0	0	2.11	0	0	2.48	0	0	2.55	0	0	2.27	0	0	2.15	0	0	OK 5/97; good 3/98, 5/98 & 3/99; tag loose 3/99; green, good 4/99, 2/00; maroonish, OK 5/00; green, OK 2 & 5/01; purplish, OK 2/02; purplish green, OK 4/02; yellowish-green, OK 2/03; green, OK 5/03
0.40	7	4.51	123				2.10		0	2.30	0	0	2.04	0	0	2.02	0	0	1.90	0	0	1.48	0	dead				OK 5/97; purplish, OK 3/98, 5/98 & 3/99; tag loose 3/99; olive, OK 4/99; green, OK 2/00; elongating, green, OK 5/00, 2 & 5/01; purplish, poor 2/02; hard, corky, solid, COD - unknown 4/02
0.50	7	4.37	120				1.70		0	Dead																		old fire scars at base; OK 5/97; stem solid, COD unknown 3/98
1.00	7	1.21	128	2.90	0	0	2.90	1fr	1	3.00	0	0	2.74	0	0	2.92	1	1A	3.54	2	0	3.79	2	2	4.53	3	3	OK 3/96; purplish 3/97; green with a few brown tubercles 5/97, 3/98; mostly red, OK 5/98; olive green, OK 3/99 & 4/99; very dark green, OK 2/00; slightly misshapen, green, OK 5/00; blue-green, good 2 & 5/01; olive, good 2 & 4/02; one flower eaten, plant purplish green, good 2/03; green, good 5/03
1.10	7	0.86	126	3.10		0	3.90	2fr	2	3.90	2	2	4.14	1	1	4.94	3	3	dead									OK, discovered 5/96; a few tan tubercle tips, OK 3/98 & 5/98; slightly maroon, OK 3/99; maroon, OK 4/99; dark green, a few tan tubercle tips 2/00; green with a few tan tubercle tips, good 5/00; just spines left, COD unknown 2/01

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
222.00	7	1.10	115	2.20	1	0	3.10	2	2A	2.60	0	0	2.17	2	2	2.88	1	1A	3.62	1	dead							OK 3/96, partially buried, OK 3/98 & 5/98, maroon, OK 3/99, maroonish green, OK 4/99, 2/00, hunkering, green, OK 5/00, red, orange, and green tubercles swollen and bloated, about to pop, weird 2/01, one large chamber, COD Moneilema 5/01
223.00	7	1.22	115	1.50	0	0	1.90	1+1fr	2A	2.20	1	1	2.28	2	2	2.86	1	1	3.10	3	1+1A	3.63	3	2	4.39	2	1A	good 3/96, 3/98; withdrawing, OK 5/98; OK, maroor edge of ant mound 3/99; green, good, ant mound gone 4/99; very dark green, OK 2 & 5/00; dark gree good 2 & 5/01, 2 & 4/02; flowers eaten, plant green, good 2 & 5/03
224.00	7	0.96	100	3.20	2	2	3.50	3fr	1+2A	3.50	2	2	3.14	3	3	4.08	2	2	4.53	2	1	4.54	3	5	5.07	3	3	OK 3/96, 3/98, 5/98 & 3/99; OK, maroonish 4/99; edge of ant mound, tag mia, replaced, green, good & 5/00; slightly maroonish-green, good 2 & 5/01; green with orangish tubercles at base, OK 2 & 4/02; 2 flowers eaten, plant green, good 2 & 5/03
225.00	7	1.24	100	2.90	2	1	3.00	2fr	2	2.90	0	0	2.79	3	3	3.24	2	1	4.40	1	1	4.36	0	2	4.95	3	1	OK 3/96; partially buried, OK 3 & 5/98; slightly buried, green, good 3 & 4/99; dull green, OK 2 & 5/00; green, good 2 & 5/01, 2 & 4/02; flowers eaten, plant green, good 2/03; green, OK 5/03
225.01	7	1.23	100	1.20	0	0	1.00	0	0	1.40	0	0	1.16	0	0	0.93	0	0	1.47	0	0	1.17	0	0	1.99	0	0	OK 3/96; buried 5/96; measured in one direction onl 3/97 & 3/99; above ground 5/97; OK 3/98 & 5/98; buried, ~10 o'clock on 225, out of ground, OK 4/99; green, OK 2/00; almost buried, OK 5/00; popped ou green good 2 & 5/01, 2 & 4/02, 2 & 5/03
226.00	7	1.32	100	2.80	1	1	2.80	1+1fr	2	3.10	2	2	2.64	2	2+1A	3.44	3	3	3.91	2	2	3.81	3	2+1A	4.97	3	3	good 3/96, 3/98, 5/98 & 3/99; light green, OK 4/99 & 2/00; green, good 5/00, 2 & 5/01, 2 & 4/02; flowers eaten, plant green, good 2 & 5/03
227.00	7	1.33	88	2.60	1	1	2.70	1fr	1	2.80	1	1	2.43	2	2	3.30	1	1	4.13	1	1	4.58	3	5	5.07	0	2	good 3/96; a little purplish, OK 3/98, 5/98 & 3/99; green, good 4/99; light green, a few tan tubercle tips OK 2/00; getting misshapen, green, OK 5/00; green good 2 & 5/01, 2 & 4/02, 2 & 5/03
228.00	7	5.25	111	1.80	0	0	1.70	0	0	1.50	0	0	mia			Dead												OK 3/96; old fire scars, yellowish, poor 3 & 5/97; almost buried, few spines, green, OK 3 & 5/98, 2mn seedling in area 3/99; mia 4/99; dry, powdery, fungus? 2/00
228.10	7	4.11	104				2.30		1	2.40	0	0	1.94	0	0	2.43	0	0	2.58	0	0	2.63	1	0	2.87	0	0	good, discovered 5/97; a little smashed by rock flipped on top, rock removed, green, OK 3/98, 5/98, 3/99; green, good 4/99, 2 & 5/00, 2/01 (accidently sat on) & 5/01, 2/02; dark green, OK 4/02; green, good 2 & 5/03
228.20	7	4.65	105				2.50		0	2.60	0	0	2.17	0	0	2.42	0	0	2.57	0	0	2.32	0	0	2.55	0	0	old fire scars at base, OK, discovered 5/97; good 3/98, 5/98 & 3/99; green, good 4/99 & 2/00; yellowish, OK 5/00; green apically, yellow at base, OK 2 & 5/01; green with some reddish tubercle tips, OK 2 & 4/02; green, good 2 & 5/03

Ancistrocactus tobuschii Data for
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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
228.21	7	4.68	105				0.60		0	0.70	0	0	0.53	0	0	0.65	0	0	0.78	0	0	mia			mia			OK, discovered 5/97; root exposed on one side, plar OK 3/98; root not exposed, plant OK 5/98; hunkered OK 3/99; popping out, green, OK 4/99, 2 & 5/00; spineless, blue-green, poor 2/01; new spine growth, green, OK 5/01; plant mia 2 & 4/02, 2 & 5/03
228.22	7	4.68	109													0.43	0	0	0.74	0	0	0.69	0	0	0.76	0	0	discovered 2/00; hunkered 2/00; green, OK 5/00; popped out, blue-green, OK 2 & 5/01; green, OK 2/02; olive, OK 4/02, 2/03; grayish green, poor 5/03
228.24	7	4.90	105																1.07	0	0	mia			mia			discovered 2/01; green, OK 2/01; green, good 5/01; plant mia 2 & 4/02, 2 & 5/03
228.30	7	4.86	105				1.40		0	1.40	0	0	1.28	0	0	1.54	0	0	1.69	0	dead							slightly buried in juniper needles, good, discovered 5/97; popping out, good 3/98 & 5/98; pulling back in, OK 3/99; green, good 4/99, 2 & 5/00; red, orange, and green, OK 2/01; COD root rot 5/01
229.00	7	5.25	112	1.30	0	0	1.40	0	0	1.20	0	0	0.84	0	0	0.78	0	0	1.23	0	0	mia			mia			OK 3/96; almost buried 5/96 & 3/97; coming out 5/97; almost buried, OK 3/98 & 5/98; buried, OK 3/99; popping out, OK 4/99; buried, OK 2/00; hunkered, green, OK 5/00; buried, green, OK 2 & 5/01; plant mia 2 & 4/02, 2 & 5/03
230.00	7	6.66	104	3.00	0	0	2.60	0	0	2.60	0	Dead																good 3/96; tubercle tips yellow 3/97; poor, new growth 5/97; OK 3/98; red & mushy inside; COD unknown 5/98
231.00	7	5.91	101	2.50	0	0	3.00	0	0	2.90	0	0	1.83	0	0	2.03	0	0		0	dead							good 3/96; almost buried in juniper litter 5/96, 3/97, 5/97, 3/98, 5/98, 3/99, 4/99, 2/00; almost buried in juniper litter, green, OK 5/00, 2/01; COD root rot 5/01
232.00	7	5.85	101	2.80	0	0	2.80	0	0	2.60	0	0	1.95	0	Removed; dead													good 3/96; OK 3/98 & 5/98; poor, gray, loose 3/99; almost buried in juniper litter 4/99; dead, removed by WHC 5/6/99; COD unknown; no evidence of weevils
233.00	7	5.32	101	2.40	0	0	2.60	0	0	2.50	0	0	2.40	0	0	Dead												old fire scars, reddish, poor 3/96; red, spines gray 3/97 & 5/97; red, OK 3/98 & 5/98; poor, maroon, gray spines 3/99; goldish, OK 4/99; solid, dry, hard as a rock; COD unknown 2/00
234.00	7	5.27	101	2.00	0	0	Dead																					old fire scars 3/96, dead 5/96; COD unknown
234.10	7	3.60	95				4.20	1+2fr	3	3.80	0	1	3.58	0	0	4.37	0	0	4.97	3	1	5.04	1	0	5.46	0	0	"floating" in little bluestem clump, good 3/97, 5/97, 3 & 5/98, 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
234.20	7	3.00	108				3.30	1	1	3.70	1	1+1A	3.69	0	0	4.05	1	1A	5.00	1	0	5.43	1	1	5.55	0	0	good 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
234.30	7	3.01	108				3.70	1	1	3.80	0	0	3.90	0	0	4.34	2	1	4.74	2	0	4.78	1	1	5.24	0	0	good 3/98, 5/98, 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4.02, 2 & 5/03
234.40	7	3.97	100																1.09	0	0	1.03	0	0	1.26	0	0	discovered 2/01; green, OK 2/01; tag loose, green, good 5/01, 2 & 4/02, 2/03; hunkered, green, OK 5/0

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
35.00	7	5.28	104	0.60	0	0	0.90	0	0	mia			mia			mia			dead									OK 3/96; mia 3/98, 5/98, 3/99, 4/99, 2 & 5/00; dead plant uprooted next to tag, dry powdery inside, COD unknown 2/01
35.10	7	4.73	105				1.10		0	1.30	0	0	0.81	0	0	1.27	0	0	1.53	0	0	1.50	0	0	1.54	0	0	good, discovered 5/97; getting covered by crustose lichen, OK 3/98 & 5/98; buried by lichen, OK 3/99; popping out, green, good 4/99, 2 & 5/00, 2 & 5/01; hunkered, green, OK 2 & 4/02, 2 & 5/03
36.00	7	5.05	100	2.90	0	0	2.80	0	0	2.80	0	0	2.14	0	0	3.10	0	0	2.80	0	0	2.63	0	0	2.61	0	0	OK 3/96, 3/98 & 5/98; hunkered, OK 3/99; back out, olive, OK 4/99; green, good 2/00; green, OK 5/00, 2 & 5/01, 2/02; green, good 4/02; green, OK 2 & 5/03
36.10	7	5.13	~104	1.20		0	1.50	0	0	1.20	0	0	1.16	0	0	1.11	0	0	1.31	0	0	0.88	0	mia	1.03	0	0	OK, discovered 5/96; buried 3/97; coming out 5/97; covered by flipped rock, rock removed, good 3/98; OK 5/98; buried in juniper litter, OK 3/99 & 4/99; green, OK 2/00; coming out, green, good 5/00; almost buried in juniper litter, green, OK 2 & 5/01; totally buried in juniper litter, green, OK 2/02; plant mia 4/02; buried in juniper litter, green, OK 2 & 5/03
37.00	7	3.87	84	3.10	2	2	3.50	1+1fr	2	3.70	2	2	3.60	3	2+1A	4.06	2	1+1A	5.09	3	4	5.21	3	4	4.54	0	0	OK 3/96; good 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00; floweres partly eaten, one tubercle damaged, ants swarming, green, good 2/01; green, good 5/01, 2 & 4/02; green with a few red tubercletips, OK 2/03; green, good 5/03
38.00	7	3.96	79	2.80	1	0	3.30	3	3	2.90	1	1	2.82	2	2	Dead												good 3/96, a few reddish tubercles, good 3/98; OK 5/98 & 3/99; green, good 4/99, solid, dry, COD unknown 2/00
39.00	7	2.96	86	3.90	2	2	4.30	4fr	2+2A	4.70	3	3	4.52	3+1fr	3	5.25	3	3	5.86	2	2	4.89	1	2	5.51	0	0	good 3/96, 3/98, 5/98 & 3/99; green, good 4/99, 2/00; a few tan tubercle tips, otherwise green, good 5/00; small chunk eaten out, green, good 2/01; green, good 5/01; one flower eaten, plant green, good 2/02; green, good 4/02; flowers removed, plant green, good 2 & 5/03
40.00	7	3.47	82	4.60	2	2	4.70	4fr	3+1A	4.50	2	2	3.44	1+2fr	3	4.41	3	3	5.35	5	3+1A	5.64	4	6	6.00	2	0	OK 3/96; good 5/97; a little reddish, OK 3/98 & 5/98; green, good 4/99, 2 & 5/00, 2 & 5/01; tag mia, replaced, green, good 2/02; green, good 4/02; one flower eaten, plant green, good 2 & 5/03
41.00	7	1.09	82	2.20	0	0	2.50	1fr	1	2.70	1	1	1.56	0	0	2.20	1	1A	3.17	2	2	3.12	2	3	3.18	1	1	good 3/96; getting a little reddish, OK 5/97, 3/98; pulling into soil, OK 5/98 & 3/99; green, good 4/99; slightly buried, green, OK 2 & 5/00; out, purplish-green, good 2/01; green, OK 5/01, 2/02; orangish green, OK 4/02; olive, OK 2/03; green, OK 5/03
42.00	7	1.00	69	3.30	1	1	4.30	4fr	3+1A	4.00	3	1+2A	3.47	3fr	3	1.76	0	0	dead									good 3/96; getting orange tips on tubercles, OK 5/97 3/98, smashed, OK 5/98, OK, purplish 3/99, goldish 4/99; probably dead 2/00, looks like just spines; Dead? 5/00, just spines left, COD trampling 2/01

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243.00	7	0.98	69	2.20	1	0	2.60	3fr	1	3.10	1	1A	2.90	3fr	2	2.63	0	0	mia			mia			mia			good 3/96; getting orange tips on tubercles, OK 5/97 3/98; smashed, OK 5/98, OK, purplish 3/99; some orange tubercle tips, OK 4/99 & 2/00, covered with ant litter, probably dead 5/00; tag and plant mia 2 & 5/01; tag relocated, ant mound gone, plant still mia 2 & 4/02, 2 & 5/03
244.00	7	0.97	64	2.30	1	0	2.90	1fr	1A	2.90	0	0	2.54	1fr	1	3.32	0	0	4.80	3	3	4.67	3	2+1A	5.72	4	6	OK 3/96, 3/98, 5/98, 3/99; some tan tubercle tips, OK 4/99 & 2/00; pale green, OK 5/00; green, good 2 & 5/01; misshapen, green with a few tan tubercle tips, OK 2 & 4/02; green, good 2 & 5/03
245.00	7	1.35	68	3.80	2	1	4.10	4fr	4	4.10	3	3	3.58	1+4fr	5	4.48	4	4	5.47	4	2+1A	5.68	6	10	6.31	6	7+1A	OK 3/96; good 3/98; OK 5/98; good 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02; 1 flower eaten, plant green, good 2 & 5/03
245.01	7	1.31	65																0.69		0	0.64	0	0	0.79	0	0	not tagged, in front of 245 tag, discovered 5/01; green, good 5/01; grayish green, OK 2/02; almost buried, green, OK 4/02; coming out, green, OK 2 & 5/03
246.00	7	2.25	68	2.30	0	0	3.10	1fr	1	mia			mia			mia												good 3/96; mia 3/98 & 5/98; a few old spine clusters in vicinity 3/99; no trace 4/99, 2 & 5/00
247.00	7	2.27	68	3.20	1+1fr	2	3.70	3fr	3	Dead																		old fire scars, good 3/96; fungus inside 3/98
248.00	7	2.93	66	2.60	1+1fr	2	3.10	3fr	2	3.30	2	1	2.45	2fr	2	2.83	2	2	3.75	2	1+1A	3.57	3	3	4.04	0	0	OK 3/96, 3/98 & 5/98; hunkered, tag pulled off nail, digging in vicinity, OK 3/99; a few orange tubercle tips, OK 4/99; green, good 2 & 5/00, 2 & 5/01; green with pale reddish tubercle tips, OK 2/02; green, OK 4/02; green, good 2 & 5/03
248.10	7	3.15	73				2.00	0	0	1.90	0	0	1.30	0	0	1.48	0	0	2.11	0	0	mia			mia			OK 3/98, 5/98 & 3/99; hunkered, maroonish 4/99; hunkered, green, OK 2 & 5/00; maroonish-green, OK 2 & 5/01; ant mound in area, plant and tag mia 2 & 4/02, 2 & 5/03
248.20	7	2.58	80							1.70	0	0	1.11	0	0	2.02	0	0	2.61	0	0	2.88	2	2	3.56	2	1+1A	discovered 3/98; good 3/98 & 5/98; totally buried, poor 3/99; coming out, green, good 4/99, 2/00; hunkering, green, OK 5/00; coming out, green, OK 2/01; green, good 5/01, 2 & 4/02; 1 flower eaten, plant green, good 2 & 5/03
248.30	7	2.10	75							5.70	6	5+1A	6.27	7	7	7.42	11	11	8.31	9	4	8.71	12	17	10.37	0	14+3A	discovered 3/98; great 3/98, 5/98, 3 & 4/99; tag mia, replaced 2/00; great, green 2 & 5/00, 2 & 5/01, 2/02; one flower eaten 2/02; green, great 4/02, 2 & 5/03
249.00	7	3.15	65	3.00	0	0	3.50	3fr	2+1A	3.70	2	2	3.36	2fr	2	3.45	1	1	4.60	3	2	4.75	5	2+3A	4.88	2	1A	OK 3/96; blackish-green, good 5/97; tag moved, replaced, purplish, OK 3/98; yellow tubercle tips, OK 5/98; very purple, OK 3/99; orangish 4/99; purplish, OK 2/00; orangish, OK 5/00; blue-green, OK 2/01; reddish-green, OK 5/01; purplish, OK 2/02; reddish green, OK 4/02; purplish green, OK 2 & 5/03
249.10	7	3.22	67																1.84	0	0	2.09	1	1	2.25	0	0	discovered 2/01; green, OK 2 & 5/01; green, good 2/02; green, OK 4/02, 2 & 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
50.00	7	3.02	63	1.60	0	0	2.00	1fr	1	2.00	0	0	1.59	0	0	1.67	0	0	2.45	1	1	2.08	1	0	2.51	1	0	OK 3/96, 3/98 & 5/98, 3/99; olive, OK 4/99; purplish, OK 2/00; dull green, OK 5/00; green OK 2 & 5/01, 2 & 4/02; 1 flower partly eaten, plant purplish, OK 2/03 green, good 5/03
51.00	7	3.01	63	2.90	0	0	3.60	2fr	2	3.60	0	0	3.02	1fr	1	3.79	3	3	5.62	3	1	5.87	7	6+2A	6.72	5	5	reddish 3/96; greening up, OK 5/96; maroon 3/97; getting orangish 5/97; maroon, OK 3/98, 5/98 & 3/99; green with few orange tubercle tips 4/99; purplish, OK 2/00; yellowish-purplish- green, OK 5/00; purplish-green, good 2 & 5/01; purple, OK 2/02; slightly goldish green, good 4/02; reddish green, OK 2/03; green with some tan tubercle tips, good 5/03
52.00	7	2.99	56	2.20	0	0	2.70	3fr	3	Dead																		good 3/96; old fire scars, light green, OK 5/97; only a few spines left, COD unknown 3/98
53.00	7	3.49	73	2.50	0	0	3.00	2fr	2	3.00	1	1	2.99	1+1fr	2	3.44	1	1	4.27	3	2	4.26	2	2	4.47	0	0	OK 3/96; a few red tubercle tips, OK 3/98 & 5/98; goldish, OK 3/99 & 4/99; dull green with a few tan tubercle tips, OK 2 & 5/00; green, good 2 & 5/01, 2/02; green with some red tubercle tips, OK 4/02; green, OK 2/03; green, good 5/03
53.01	7	3.51	73	1.30	0	0	1.80	0	0	1.70	0	0	1.90	0	0	2.07	0	0	2.40	0	0	2.62	1	1	2.89	0	0	old fire scars, OK 3/96; originally tagged as 355; OK 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02; small chunk eaten, scarred over, green, OK 2/03; green, good 5/03
54.00	7	3.64	66	2.10	0	0	2.60	0	0	2.70	0	0	2.43	0	0	2.94	1	1A	4.35	1	1	4.10	6	2+4A	5.30	3	0	good, dead plant nearby 3/96, 3 & 5/97; dead plant gone, live plant looks good 3/98; OK 5/98; green, good 3/99, 4/99, 2 & 5/00, 2 & 5/01; green, OK 2/02; green, good 4/02, 2/03; green, OK 5/03
55.00	7	3.72	67	2.40	0	0	2.90	0	0	3.00	1	1	2.66	0	0	3.62	2	2	5.81	4	5	5.67	3	3	4.95	0	0	good 3/96 & 3/98; good, edge of fire ant mound 3/99 mound gone, plant green, good 4/99; slightly reddish good 2/00; green, good 5/00; slightly purplish, good & 5/01; green with a few pale reddish tubercles, goo 2/02; goldish base, green above, good 4/02; olive, OK 2 & 5/03
56.00	7	3.80	67	2.00	0	0	1.80	0	0	2.10	0	0	1.65	0	0	2.31	0	0	2.59	0	0	2.55	0	0	dead			OK 3/96; sort of buried, good 5/97, 3/98; OK 5/98, good; buried in edge of fire ant mound 3/99; on left, mostly out, green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02; hard, solid, dry; COD unknown 2/03
56.01	7	3.83	69													1.17	0	0	1.49	0	0	1.59	0	0	1.28	0	0	discovered 2/00; green, good 2 & 5/00; partly buried green, OK 2 & 5/01, 2/02; hunkered, maroonish green, OK 4/02, 2/03; olive, OK 5/03
57.00	7	3.80	67	2.30	0	0	2.60	0	0	2.30	0	0	2.28	0	0	2.27	0	0	2.43	0	0	dead						OK 3/96, 3/98; good 5/98; good, buried in edge of fire ant mound; tag mia, replaced; small 2mm seedling between 256 and 257 tags 3/99; seedling mia, mostly out, on right, green, good 4/99; pale green, OK 2/00; green, good 5/00, 2 & 5/01; just spines left, COD unknown 2/02

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
258.00	7	3.75	62	3.70	0	0	3.70	2fr	2	3.90	0	0	3.23	0	0	3.47	2	1A	5.36	5	3	5.48	4	2+1A	5.67	0	0	OK 3/96; red tips 3 & 5/97, 3/98 & 5/98; OK 3/99; goldish at base, OK 4/99; green, good 2 & 5/00, 2 & 5/01, 2 & 4/02; goldish at base, green above, OK 2/03; olive, OK 5/03
259.00	7	3.52	46	2.40	1	0	2.70	0	0	2.60	0	0	2.22	2fr	2	2.18	1	1	2.67	1	1A	2.77	2	1+1A	2.84	1	0	OK 3/96; getting dull reddish 5/97; reddish tubercle tips, OK 3/98 & 5/98; almost buried, OK 3/99; coming out, olive, OK 4/99 & 2/00; green with a few orangish tubercle tips, OK 5/00; green, good 2 & 5/01, 2 & 4/02; green with some reddish tubercle tips, OK 2 & 5/03
260.00	7	3.87	45	2.30	0	0	2.90	2fr	2	2.90	2	2	3.08	0	0	3.30	2	2	3.30	1	0	3.21	1	1	2.59	0	0	good 3/96; a few orangish tubercle tips, OK 3/98 & 5/98; almost buried in soil & litter, OK 3/99; popped out, green, good 4/99, 2 & 5/00; yellowish-green, OK 2/01; green with some reddish tubercle tips, OK 5/01, 2 & 4/02; hunkered, green, OK 2 & 5/03
261.00	7	3.73	44	2.80	2	2	2.90	3fr	3	3.20	2	2	2.70	2fr	2	3.61	3	3	4.17	4	4	4.09	3	2A	5.14	5	6+1A	reddish 3/96; turning green, OK 5/96; reddish-green 3 & 5/97; reddish, flowers & one tubercle tip stepped on (deer or dogs?), poor 3/98 & 5/98; puplish green, in ant bed, OK 3/99; out of ant mound, maroonish, OK 4/99 & 2/00; orangish basally, green above, OK 5/00; purplish-green, OK 2 & 5/01, 2/02; small (10%) chunk pulled off, scarred over, purplish green, OK 4/02, 2/03; purplish green, good 5/03
262.00	7	3.60	40	2.10	1	1	2.40	1fr	1	2.70	0	0	2.17	0	0	2.59	2	1A	3.81	3	2	4.12	1	2	4.20	0	0	reddish, OK 5/96; light green 5/97; a few reddish tubercle tips, OK 3/98 & 5/98; green, good, almost buried in ant bed 3/99; ant bed gone, popped out, green, good 4/99; green with some tan tubercles, OK 2 & 5/00; green, good 2/01; partly covered with ant dirt, green, good 5/01; green, good 4/02; green, OK 2/03; green, good 5/03
263.00	7	4.78	41	3.30	2	2	3.90	1	1	4.20	1	1	4.04	0	0	4.43	3	3	4.47	1	0	4.27	0	0	3.64	0	0	good 3/96; shaded, good 5/97, 3/98 & 5/98; OK, almost buried, only spines above soil 3/99; coming out, green, good 4/99, 2 & 5/00, 2 & 5/01; getting buried in juniper litter, green, OK 2 & 4/02, 2 & 5/03
264.00	7	4.39	42	3.40	1+1fr	1	3.70	1	1	3.60	2	2	3.59	2fr	1+1A	3.53	0	0	3.52	0	0	3.73	1	0	3.80	0	0	OK 3/96, 3/98, 5/98 & 3/99; olive, OK 4/99; green, good 2 & 5/00, 2 & 5/01; tag mia, replaced, ants building mound around plant, plant green, good 2/02 misshapen, green, OK 4/02, 2 & 5/03
265.00	7	4.51	41	4.00	0	0	4.40	2fr	2	3.90	0	0	3.54	1fr	1	4.18	1	1	3.99	1	0	4.21	0	0	dead			OK 3/96, 3/98, 5/98, 3/99; olive; OK 4/99; green, good 2 & 5/00, 2/01; getting misshapen, green, good 5/01, 2 & 4/02; removed for weevil study 2/03; COD: unknown 3/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
65.10	7	4.19	33				1.60	0	0	1.50	0	0	1.79	0	0	2.05	1	1	2.25	0	0	1.90	0	0	1.51	0	0	good 5/97, 3/98; almost buried 5/98; almost buried, good 3/99; popping out, green 4/99; popping out, green, good 2/00; hunkering, green, good 5/00; green, OK 5/01; almost buried, green, OK 2 & 4/02, 2 & 5/03
65.20	7	4.41	31				2.00	0	0	1.70	0	0	1.73	0	0	1.76	0	0	2.07	0	0	2.08	0	0	1.67	0	0	good 5/97, 3/98; getting buried, good 5/98, 3/99; green, good 4/99; getting buried, green, good 2 & 5/00, 2 & 5/01; reddish green, OK 2 & 4/02, 2/03; green, OK 5/03
66.00	7	3.05	44	2.20	1	1	3.10	2fr	2	3.60	1	1	3.75	4fr	4	4.11	2	2	5.20	5	6+1A	5.47	6	9	6.09	7	9	good 3/96; getting a few orange tubercles, OK 5/97; good 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01; flowers visited by honey bees, and small orange butterfly, green with slightly maroonish cast, good 2/02; green with some yellow tubercles, good 4/02; green, good 2 & 5/03
67.00	7	3.30	44	2.60	1	1	3.10	3fr	3	3.30	2	2	2.18	0	0	3.24	3	3	4.49	6	6	3.90	5	4+1A	3.95	3	4+1A	OK 3/96, 3/98 & 5/98; olive green, OK 3/99 & 4/99; green, good 2 & 5/00, 2/01; covered with deer shit, green, good 5/01; flowers visited by honey bees and small orange butterfly 2/02; partly covered by ant mound, misshapen, green with some tan tubercle tips, OK 2 & 4/02; green, good 2 & 5/03
68.00	7	3.31	44	2.00	0	0	2.70	2fr	2	2.90	2	2	1.97	0	0	3.09	3	3	4.23	5	1	3.39	6	4+1A	3.85	0	0	OK 3/96; good 3/98 & 5/98; olive green, OK 3/99 & 4/99; green, good 2 & 5/00, 2/01; getting covered with ant dirt, green, good 5/01; flowers visited by honey bees and small orange butterfly 2/02; edge of ant mound, orangish basally, green above, OK 2 & 4/02; green, OK 2/03; green, good 5/03
68.01	7	3.17	40																			1.04	0	0	1.35	0	0	discovered 2/02; purplish green, OK 2/02; green, good 2 & 5/03
68.02	7	3.22	40																			0.68		0	0.57	0	0	discovered in rock 4/02; green, good 4/02; green, OK 2 & 5/03
69.00	7	2.97	48	2.40	0	0	mia	mia	Dead																			OK 3/96; COD unknown, loose spine clusters in vicinity, tag removed 5/97
70.00	7	3.18	40	1.60	0	0	2.20	1fr	1	2.70	1	1	1.98	2fr	2	2.43	0	1disp	3.26	2	1+1A	3.25	2	1+1A	3.55	3	3	good 3/96, 3/98, 5/98; measured in one direction only, good 3/99; green, good 4/99; pale green, OK 2/00; green with some orange tubercle tips, OK 5/00 2 & 5/01, 2 & 4/02; green, good 2 & 5/03
71.00	7	3.28	38	3.10	0	0	3.20	2fr	2	3.10	2	1+1A	2.92	1fr	1	3.29	3	3	dead									OK 3/96, 3/98, 5/98 & 3/99; olive, OK 4/99; pale green, Ok 2/00; green with some orange tubercle tips, OK 5/00, dry, powdery inside, COD unknown 2/01
72.00	7	3.26	38	2.00	0	0	2.60	1fr	1	2.30	0	0	1.99	0	0	2.21	1	1	3.11	2	2	2.89	1	1	dead			OK 3/96, 3/98, 5/98 & 3/99; OK, maroonish 4/99 & 2/00; olive, OK 5/00, purplish-green, OK 2 & 5/01; brwonish green, OK 2/02; olive, OK 4/02; just spines left, COD unknown 2/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
273.00	7	3.45	35	1.70	0	0	2.50	1fr	1	2.70	2	2	2.40	0	0	3.32	3	3	4.01	2	0	4.70	5	4+1A	4.57	3	3	good 3/96; getting a little orangish 5/97; good & green 3/98 & 5/98; buried in ant mound & grass clump, OK 3/99; coming out, green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
273.10	7	3.73	32				4.40	5fr+1A	5	4.40	4	3+1A	3.89	4fr	4	4.61	5	5	5.38	5	8	5.63	8	7+1A	6.06	8	6	purplish, OK 3/98, 5/98, 3/99, 4/99, 2/00; orangish, OK 5/00; maroonish-greenn good 2 & 5/01, 2 & 4/02 2/03; goldish green, OK 5/03
273.11	7	3.65	37																1.15		0	1.08	0	0	1.33	0	0	discovered 5/01; green, good 5/01, 2 & 4/02, 2 & 5/03
273.12	7	3.83	32																0.91		0	0.78	0	0	0.52	0	mia	discovered 5/01; green, good 5/01; green OK 2 & 4/02; under rock and buried, poor 2/03; plant mia 5/03
274.00	7	3.39	33	1.90	0	0	2.40	0	0	2.50	0	0	2.31	1fr	1	2.73	2	2A	3.45	2	0	3.68	3	2+1A	4.17	2	2	OK 3/96; good 5/97, 3/98, 5/98; OK, 3/99; hunkered, green 4/99; hunkered, green, good 2 & 5/00; flowers partly eaten, plant green with some tan tubercle tips, OK 2 & 5/01; green with some red tubercle tips, good 2 & 4/02; green, OK 2/03; green, good 5/03
274.10	7	3.36	32				1.20	0	0	1.60	0	0	1.43	0	mia	mia			2.77	0	0	2.74	3	2	3.68	0	0	OK 5/97; good 3/98 & 5/98; practically buried, OK 3/99; tag and plant gone without a trace 4/99, 2 & 5/00; plant slightly covered with ant gravel, green, OK 2 & 5/01; floweres visited by honey bees, out of gravel, green, good 2/02; green, good 4/02, 2 & 5/03
275.00	7	5.27	39	2.40	0	0	2.20	0	0	2.40	0	0	2.83	0	0	2.77	0	0	2.33	0	0	dead						good 3/96; shaded, dull green, OK 5/97; good 3/98, 5/98 & 3/99, olive, OK 4/99; green, OK 2/00; getting buried in juniper needles, green, OK 5/00; new apex coming out, green, OK 2 & 5/01; dry, corky inside, COD unknown 2/02
276.00	7	4.96	36	1.70	0	0	1.70	0	0	2.00	0	0	1.82	0	0/dead													OK 3/96, 3/98, 5/98, 3/99, olive, OK 4/99, poor, shrunken, missing spines, orangish at base, removed by WHC 5/6/99; no weevil damage, COD unknown
276.01	7	4.98	36	1.30	0	0	1.20	0	0	1.20	0	0	1.06	0	0/dead													OK 3/96, almost buried, OK 5/97, 3/98, 5/98, 3/99 & 4/99; removed at same time as 276.00 by WHC 5/6/99; no weevil damage, COD unknown
276.02	7	5.11	35							1.40		0	1.17	0	0	1.42	0	0	1.40	0	0	1.66	0	0	1.68	0	0	discovered 5/98, good; OK, almost buried 3/99; coming out, maroonish, OK 4/99; green, OK 2 & 5/00, 2 & 5/01, 2 & 4/02; 2 & 5/03
277.00	7	5.03	34	2.80	1	0	3.40	3fr	3	3.40	0	0	2.86	0	0	3.11	1	1	3.21	2	0	3.14	0	0	2.84	0	0	good 3/96, 3/98 & 5/98; OK, hunkered 3/99; popped out, green, good 4/99, 2 & 5/00, 2/01; green with rec spots, OK 5/01, 2 & 4/02; green with orange spots, OK 2 & 5/03
278.00	7	5.01	30	2.90	1	1	3.40	1fr	1A	3.10	0	0	2.19	0	0	2.56	0	0	2.67	0	0	2.15	0	0	2.12	0	0	good 3/96; shaded, good 5/97; partially buried, good 3/98; OK 5/98, 3 & 4/99; green, good, partially buried 2 & 5/00, 2 & 5/01; just spines showing, green, OK 2 & 4/02, 2/03; barely out, green, poor 5/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
78.10	7	5.31	31				1.90	0	0	1.70	0	0	1.48	0	0	1.53	0	0	1.11	0	0	1.57	0	0	1.55	0	0	OK 5/97; almost buried, OK 3/98, 5/98 & 3/99; coming out, green, good 4/99; almost buried, green, OK 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
78.20	7	5.44	31							1.00		0	1.03	0	0	1.10	0	0	mia			mia			mia			discovered 5/98, buried, good 5/98 & 3/99; totally buried in juniper litter, green, OK 4/99 & 2/00; almost totally buried, green, OK 5/00; plant mia 2 & 5/01, 2 & 4/02, 2 & 5/03
79.00	7	3.86	28	1.00	0	0	1.70	0	0	1.90	0	0	1.52	0	0	2.36	0	0	2.67	1	0	1.86	0	0	2.64	0	0	OK 3/96; good 5/97, 3/98; partially buried, OK 5/98 & 3/99; popped out, green, good 4/99, 2 & 5/00; partly buried, green, OK 2 & 5/01; misshapen, green with a brown tubercle, OK 2/02; green, good 4/02, 2 & 5/03
80.00	7	4.17	28	1.90	0	0	2.00	0	0	2.10	0	0	2.24	0	0	2.15	0	0	2.87	0	0	3.30	1	0	3.07	0	0	in fire ant mound 3/96 & 5/97; OK 5/96; good 5/97; totally covered by fire ant mound, tag mia, replaced, good 3/98, 5/98 & 3/99; coming out green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
81.00	7	5.00	20	2.20	0	0	2.10	0	0	2.20	0	0	1.87	0	0	nd	mia	0	mia			mia			mia			OK 3/96; almost buried, OK 3/98; coming out, OK 5/98, under edge of rock, OK 3/99; green, good 4/99 mia 2/00; totally buried, only spines visible, may be dead, no diameter taken; poor 5/00; plant mia 2 & 5/01, 2 & 4/02, 2 & 5/03
82.00	7	5.19	21	2.20	0	0	1.70	0	0	2.40	0	0	1.71	0	mia	mia			mia			mia						good 3/96; buried 3/97; almost buried, OK 5/97; 3/98; buried 5/98 & 3/99; gone without a trace 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02
82.10	7	7.73	11							2.50	0	0	1.62	0	0	1.55	0	0	1.52	0	0	1.69	0	0	1.78	0	0	in rock crack, almost buried in juniper needles, OK 3/98, 5/98, 3/99, 4/99, 2 & 5/00; only spines showing, green, OK 2/01; coming out, green, OK 5/01; buried, green, poor 2/02; coming out, green, OK 4/02; buried in juniper litter, OK 2/03; poor 5/03
82.20	7	7.69	10													1.23		0	0.96	0	0	1.19	0	0	mia			discovered 5/00; almost buried in juniper litter, green OK 5/00; only spines showing, green, OK 2/01; buried, green, OK 5/01, 2/02; just spines showing 4/02; plant mia 2 & 5/03
83.00	7	4.98	20	2.30	0	0	2.70	0	0	2.40	0	0	1.57	0	0	1.73	0	0	1.55	0	0	1.53	0	0	1.22	0	0	good 3/96; completely beneath rock 3/97; very pale green, OK 5/97, 3/98 & 5/98; almost buried, OK 3/99; coming out, olive 4/99; green, OK 2 & 5/00; buried, green, OK 2 & 5/01, 2 & 4/02; barely coming out, green, OK 2 & 5/03
84.00	7	4.67	21	2.10	0	0	2.00	0	0	Dead																		poor, shriveling 5/96, old fire scars at base, shrunken & very bad 3 & 5/97; fungus inside 3/98
85.00	7	4.61	21	2.10	0	0	3.00	0	0	2.90	0	0	2.19	0	0	1.91	0	0	2.19	0	0	1.95	0	0	1.28	0	0	OK 3/96, 3 & 5/98; almost buried, OK 3/99; coming out, OK 4/99; tag mia, replaced 2/00; partially buried green, OK 2 & 5/00; only spines showing, yellow-green, OK 2/01; coming out, green, OK 5/01; only spines showing, green, OK 2/02; almost buried, green, OK 4/02; buried in juniper litter, poor 2 & 5/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
286.00	7	4.49	20	2.90	0	0	3.10	0	0	3.20	0	0	2.48	0	0	2.19	0	0	2.51	0	0	1.88	0	0	dead			OK 3/96; getting buried 5/97, 3/98, 5/98; getting buried, OK 3/99; getting buried, green, good 4/99, 2 & 5/00; partly buried, olive, OK 2 & 5/01, 2 & 4/02; large chamber, COD Monellema 2/03
287.00	7	4.01	24	2.00	0	0	2.30	1A	0	2.30	0	0	2.16	0	0	2.10	0	0	1.99	0	0	1.74	0	0	dead			good 3/96, 3/98 & 5/98; measured in one direction only, OK 3/99; green, good 4/99; pale green, OK 2/00; almost buried in litter; green, OK 5/00; coming out, yellowish-green, OK 2/01; covered by dirt and litter 5/01; green, OK 2 & 4/02; just spines left, COD unknown 2/03
288.00	7	4.04	24	2.00	0	0	2.60	0	0	2.70	1	1	2.12	0	0	2.58	0	0	3.11	1	0	2.76	0	0	2.44	0	0	OK 3/96, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2/01; mostly covered by juniper litter, green, OK 5/01; mostly out, green, OK 2 & 4/02; green, OK 2 & 5/03
289.00	7	2.78	18	2.90	3	3	3.30	3fr+1A	3	3.40	3	2+1A	2.92	3fr	1	4.24	5	5	5.38	3	2	5.52	6	5+1A	6.17	0	0	good 3/96; tag removed or lost in ant mound, replaced, a few orange tubercle tips, OK 3/98 & 5/98 tag mia, replaced, green, good 3/99, 4/99, 2 & 5/00; flowers partly eaten, green, good 2 & 5/01; green, good 2 & 4/02, 2 & 5/03
289.10	7	3.20	18				1.70	0	0	2.10	1	1	2.11	0	0	2.82	2	2	2.83	0	0	2.30	1	0	2.86	0	0	good 5/97, 3/98; getting buried, good 5/98, 3/99; good, green, getting buried 4/99, 2 & 5/00; partly covered with ant gravel, OK 2/01; out, green, OK 5/01; misshapen, green, good 2 & 4/02, 2/03; getting buried, green, OK 5/03
290.00	7	2.99	33	1.00	0	0	1.20	0	0	1.30	0	0	1.49	0	0	1.73	0	0	2.73	0	0	2.15	2	2	2.91	2	2	OK 3/96; good 3/98 & 5/98; buried, misshapen, OK 3/99; almost buried, green, OK 4/99; coming out, green, good 2 & 5/00, 2/01; almost spineless, green, OK 5/01; olive, OK 2 & 4/02; hunkered, green, good 2 & 5/03
291.00	7	1.96	28	2.40	1	1	3.20	3fr	3	3.20	2	2A	2.86	3fr	3	4.13	3	2+ 1disp	4.90	5	5	4.49	6	4+2A	5.05	4	4	OK 3/96; reddish 3 & 5/97, 3/98 & 5/98; poor, pulling into soil, shrinking, yellow-green 3/99; popping out, yellowish, OK 4/99; olive, OK 2/00; green, good 5/00 green with purplish and reddish tubercle tips, OK 2/01; green with a few yellow tubercle tips, good 5/01; green with red tubercle tips, OK 2/02; green with some yellow tubercle tips, OK 4/02; maroonish green, good 2/03; green, OK 5/03
292.00	7	2.07	29	2.20	2	1	3.20	1A+1fr	1+1A	3.10	1	1	2.34	2fr	1	3.25	2	2	3.68	3	2	3.64	4	2+2A	4.31	5	5	good 3/96, 3/98; OK 5/98; green, good 3/99, 4/99, 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
293.00	7	2.08	29	1.70	0	0	2.70	2fr	2	2.50	1	1	2.70	2fr	1	3.20	2	2	3.21	1	1A	3.68	3	1+2A	4.10	1	1	good 3/96, 3/98; OK 5/98, & 3/99; olive, OK 4/99; green with a few tan tubercle tips, OK 2 & 5/00; flower partly eaten, plant green, good 2 & 5/01; green, good 2 & 4/02, 2 & 5/03
293.10	7	2.16	42							4.20	3	3	4.04	3	4	4.59	3	3	5.80	4	4	6.60	7	7	7.63	8	11	great, discovered 3/98; grayish, poor 5/98; green, great 3/99, 4/99, 2 & 5/00; flowers partly eaten, plan green, good 2 & 5/01, 4/02, 2 & 5/03

Ancistrocactus tobuschii Data for Lost Maples State Natural Area

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
93.11	7	1.94	50																1.29		0	1.48	0	0	2.70	2	2	discovered 5/01; green, OK 5/01; green, good 2 & 4/02, 2 & 5/03
93.20	7	2.31	33													0.78		0	1.27	0	0	1.20	0	0	2.10	1	2A	discovered 5/00; green, OK 5/00, 2/01; green, good 5/01; green, OK 2 & 4/02; green, good 2/03; olive, OK 5/03
93.30	7	2.59	34													1.85		0	2.27	0	0	3.05	3	1+2A	3.77	4	2+2A	discovered 5/00; green, good 5/00, 2 & 5/01; slightly maroonish green, good 2/02; green, good 4/02, 2 & 5/03
93.40	7	2.65	33													1.51		0	2.22	2	1A	2.56	3	1A	3.18	1	1	discovered 5/00; green, good 5/00, 2 & 5/01; maroonish green, good 2/02; green, good 4/02, 2 & 5/03
93.50	7	2.66	34													0.90		0	1.37	0	0	1.50	0	0	1.58	0	0	right of 293.60; discovered 5/00; green, good 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
93.60	7	2.67	35													0.46		0	0.57	0	0	0.59	0	0	0.83	0	0	left of 293.50; discovered 5/00, OK 5/00, 2 & 5/01; grayish green, OK 2/02; green, OK 4/02, 2 & 5/03
93.70	7	2.96	37																1.05	0	0	1.19	0	0	1.78	0	0	discovered 2/01; green, good 2 & 5/01, 2 & 4/02, 2 & 5/03
93.80	7	3.07	37																						1.06	0	0	discovered 2/03; green, good 2 & 5/03
94.00	7	0.82	2	2.70	1+1fr	1	3.40	2fr	2	3.30	2	2	3.27	3fr	1+2A	3.89	4	2+2A	5.20	5	5	5.37	7	3+4A	5.58	4	5	reddish, OK 3/96 & 5/97, 3/98, 5/98 & 3/99; green, good 4/99; slightly reddish, OK 2/00; olive green, OK 5/00; green, good 2 & 5/01; green with yellowish tubercle tips, OK 2/02; olive, OK 4/02; green, OK 2/03; maroonish green, OK 5/03
94.01	7	1.17	7																1.03		0	mia			mia			discovered 5/01; green, good 5/01; plant mia 2 & 4/02, 2 & 5/03
94.10	7	1.12	~26	1.20		0	1.60	0	0	2.30	2	2	2.12	2fr	1	3.36	4+1fr	4+1A	4.28	4	1	4.64	7	5+2A	5.78	8	10	discovered 5/96, good, 3/98, 5/98 & 3/99; goldish at base, OK 4/99; green, good 2 & 5/00; two flowers partly eaten, plant green with gold tubercle tips, OK & 5/01; green with a few tan tubercle tips, good 2 & 4/02; green, good 2 & 5/03
94.20	7	2.00	7				1.20		0	1.50	0	0	1.52	0	0	2.66	1	1A	4.24	4	1	4.17	4	2+2A	4.97	4	2A	good, discovered 5/97; measured in one direction only, good 3/98; OK 5/98; maroon, OK 3/99; dull green, OK 4/99; green with slightly purple tubercle tips, OK 2/00; pale green, OK 5/00; purplish green, good 2 & 5/01; purple, OK 2/02; reddish gold, OK 4/02; 2 flowers eaten, plant green, good 2 & 5/03
94.30	7	1.86	9							2.00	1	0	1.92	1fr	0	2.44	1	disp?	3.07	0	0	3.04	3	2+1A	4.68	4	4	discovered 3/98, originally tagged as 294.1, retagged, good 5/98 & 3/99; green, good 4/99, 2/00; dull green, OK 5/00; green, good 2 & 5/01, 2 & 4/02, 2 & 5/03
95.00	7	3.61	343	2.30	0	0	3.00	2fr	2	2.60	0	0	2.37	0	0	2.91	0	0	2.64	0	0	2.35	0	0	dead			good 3/98; dull green, OK 3/98, 5/98, 3/99, 4/99, 2/00; green, good 5/00; getting buried in juniper litter green, OK 2 & 5/01, 2 & 4/02; hard, dry, solid, COD unknown 2/03
96.00	7	3.19	336	2.30	0	0	2.80	nd	1	2.90	0	0	1.73	0	0	Dead												OK 3/96, totally shaded by grass; OK 3/98, 5/98 & 3/99, grass dying, popping out, dull green, OK 4/99; body solid, COD unknown 2/00

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
296.10	7	3.19	356				2.70	2fr	1	2.90	1	1	2.46	0	0	3.32	1	1	3.45	0	0	3.08	0	0	2.89	0	0	good 3/98, 5/98 & 3/99; good, green 4/99, 2 & 5/00; pale green, OK 2/01; partly covered by juniper litter, green, OK 5/01; green with some red tubercle tips, OK 2/02; green, OK 5/02, 2 & 5/03
296.20	7	2.60	7													2.31	1	1	3.43	3	3	3.28	3	1	5.51	6	5+1A	discovered 2/00; green, good 2 & 5/00, 2 & 5/01, 2 & 4/02, 2 & 5/03
297.00	7	3.12	321	2.10	0	0	2.60	0	0	2.30	1	1A	1.60	0	0	2.35	0	0	2.89	0	0	2.85	2	1+1A	2.82	0	0	OK 3/96; good 5/97, 3/98; OK 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 5/02; hunkred, green, OK 2 & 5/03
298.00	7	2.24	299	3.60	1	0	3.90	3A+1fr	1A	4.60	3	1+2A	Dead															OK 3/96; under rock 3/97, 3/98 & 5/98; solid; dry, COD unknown 3/99
298.10	7	1.92	283				3.10		3	3.10	1	1	3.44	2fr	2	3.10	2	2	dead									a little yellowish, OK; discovered 5/97; tag mia, replaced, plant purplish, OK 3/98 & 5/98; goldish, OK 3/99; body green, orangish tubercle tips, OK 4/99; slightly purple, OK 2/00; green with some orange tubercle tips, OK 5/00; just spines left, COD unknown 2/01
299.00	7	4.23	261	2.20	1	1	2.70	2fr	2	2.90	1	1	2.78	1fr	1	3.47	1	1	4.39	2	0	3.65	3	3A	4.65	3	3	OK 3/96, 3/98, 5/98 & 3/99; dull green at base, OK 4/99; edge of ant bed, green, good 2 & 5/00; flower peaking out of ant gravel, plant covered, green, OK 2/01; ant gravel almost gone, apex sunken, plant green, OK 5/01; green, good 2 & 5/02, 2 & 5/03
299.10	7	4.21	266	1.70	na	0	2.00	1fr	1	1.70	0	0	1.60	0	0	2.22	1	1A	3.17	1	0	dead						discovered 5/96; old fire scars, good; dull green, OK 5/97, 3/98, 5/98, 3/99, 4/99; green, good 2 & 5/00; only spines showing thru ant gravel 2/01; ant gravel almost gone, apex shifted and sunken, plant green, OK 5/01; just spines left; COD ants 2/02
299.20	7	3.91	253										2.30		0	2.31	0	0	2.75	0	0	2.57	1	1	3.20	2	0	discovered 5/99; green, good 5/99; pale green, OK 2/00; olive, OK 5/00; covered with ant gravel, green, OK 2/01; uncovered, apex sunken but with new growth, tubercles reddish, OK 5/01; misshapen, green, OK 2/02; green, good 5/02, 2 & 5/03
299.30	7	3.75	249													3.01	0	0	3.08	1	0	2.65	0	0	3.04	2	0	discovered 2/00; green, good 2/00; olive, OK 5/00, 2/01; misshapen, olive, OK 5/01; green with red tubercle tips, misshapen, OK 2/02; green, good 5/02 2 & 5/03
299.40	7	4.14	276																			1.30	0	0	1.56	0	0	discovered 2/02; olive, OK 2/02; green, good 5/02, 2 & 5/03
299.50	7	4.43	278																			1.40		0	2.24	0	0	discovered 5/02; green, good 5/02, 2 & 5/03
299.60	7	3.10	275																						1.32		0	discovered 5/03; green, good 5/03
299.70	7	3.15	279																						1.11		0	discovered 5/03; green, good 5/03
300.00	7	0.40	265	3.60	4	0	5.10	1+5fr	5	5.00	5	5	5.26	2	2	5.86	6	7	6.82	7	0?	5.30	1	1	5.71	3	6	smashed 3/96; good 5/96, 3 & 5/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00; flowers partly eaten, plant green, good 2/01; covered with ant dirt, green, OK 5/01; out of ant dirt, caved in on two sides but plant green, good 2/02; green, good 5/02, 2 & 5/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
01.00	7	3.52	211	3.70	4	4	4.40	3fr	1+2A	4.20	2	2	3.78	0	0	3.97	0	0	4.53	0	0	dead						good 3/96, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2/01; mostly covered with ant gravel, green, OK 5/01; just spines left, COD ants 2/02
02.00	7	3.13	204	2.50	0	0	3.30	1+1fr	1+1A	3.40	2	2	2.10	0	Dead													to the left of 303, OK 3/96, purplish, OK 3/98, 5/98 & 3/99; dead 4/99; removed by WHC 5/6/99; no weevil damage, COD unknown 5/99
02.10	7	1.94	236							3.70	3	3	3.19	3fr	2	4.30	5	5	5.27	4	3	4.56	3	3	5.46	6	3	discovered 3/98; OK 5/98 & 3/99; green, good 4/99, 2 & 5/00; one flower eaten, plant green, good 2 & 5/01; one flower eaten, plant pale green, OK 2/02; green, OK 5/02; 4 flowers eaten, plant green, good 2 & 5/03
03.00	7	3.13	204	2.20	0	0	2.60	0	0	2.60	0	0	1.44	0	Dead													to the right of 302; OK 3/96, purplish, OK 3/98, 5/98 & 3/99; Dead 4/99; removed by WHC 5/6/99; no weevil damage, COD unknown
03.10	7	2.02	205										2.87		0	2.99	1	1	3.44	2	1	3.42	1	1A	3.22	2	0	discovered 4/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 5/02; 1 flower eaten, plant green, OK 2 & 5/03
04.00	7	9.00	220	2.40	0	0	2.30	1fr	1A	2.30	0	0	Dead															OK 3/96, 3/98 & 5/98; hard, dry, solid; COD unknown 3/99
04.10	7	9.34	251	2.10		0	2.60	1fr	1	2.50	0	0	2.52	0	1	2.83	0	0	2.68	0	0	2.54	0	0	2.35	0	0	discovered 5/96, good, 3/98, 5/98, & 3/99; green, good 4/99; reddish green, OK 2/00; green, OK 5/00; olive, OK 2 & 5/01; hunkered, green, OK 2/02; popping out, green, OK 5/02, 2 & 5/03
04.20	7	9.55	247	2.50		1	3.10	1fr	1A	3.00	1	1A	2.84	0	0	2.97	0	0	2.66	0	0	2.60	0	0	dead			discovered 5/96; old fire scar at base, good; purplish OK 3/98 & 5/98; dull green, OK 3/99 & 4/99; yellowish-green with some red tubercle tips; poor 2/00; purplish, OK 5/00; light olive, OK 2 & 5/01; hard, olive, poor 2 & 5/02; hard, solid, dry, COD unknown 2/03
04.30	7	8.95	248	2.80		0	2.80	0	0	2.70	0	0	2.60	0	0	2.44	0	0	2.03	0	0	dead						discovered 5/96; poor, shriveling, very bad 3/97; old fire scars, OK 5/97, 3/98 & 5/98; poor 3/99; OK, new green growth 4/99; a little new growth, otherwise gray, poor 2 & 5/00; gray, poor 2 & 5/01; hard, dead, COD unknown; collected for weevil study 2/02
04.40	7	6.31	261																			4.42	4	1+3A	4.49	2	1	discovered 2/02; green, good 2 & 5/02, 2 & 5/03
04.50	7	10.05	222																			1.94	0	0	2.25	0	0	discovered 5/02; green, good 5/02, 2/03; green, OK 5/03
04.60	7	10.04	221																			1.31		0	1.58	0	0	discovered 5/02; hunkered, olive, OK 5/02; green, OK 2 & 5/03
04.70	7	10.41	216																			1.54		0	2.01	0	0	discovered 5/02; green, OK 5/02; green, good 2 & 5/03
04.80	7	10.46	216																			1.35		0	1.65	0	0	discovered 5/02; olive, OK 5/02; green, good 2/03; green, OK 5/03
05.00	7	8.44	279	2.50	0	0	Dead																					good 3/96; dead, 3/97; COD unknown
05.01	7	8.53	282				1.30		0	mia			mia			mia												edge of fire ant mound, good 5/97; no mound, no plant 3/98, 5/98, 3/99, 4/99, 2 & 5/00

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
306.00	7	8.36	282	2.80	1	0	2.90	1	0	3.00	2	2	2.68	0	0	2.47	0	0	2.69	0	0	2.54	0	0	2.60	0	0	OK 3/96; becoming ayssmetrical 5/97, 5/98; OK 3/99 & 4/99; reddish green, OK 2 & 5/00; partly eaten, green, OK 2/01; green, good 5/01; green with reddish tubercle tips, OK 2 & 5/02; green, good 2/03 green, OK 5/03
306.10	7	3.52	280	1.30		0	mia			mia			mia															discovered 5/96, OK; originally tagged as 360, plant & tag mia 3/97, 5/97, 3/98, 5/98, 3/99 & 4/99
306.20	7	8.25	272	2.70		0	3.30	1+2fr	3	3.40	0	0	3.71	0	0	3.87	0	0	4.16	0	0	4.88	3	5	5.12	2	2	discovered 5/96, good, 3/98, 5/98, & 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 5/02, 2/03; green with some tan tubercle tips, good 5/03
307.00	7	8.50	283	2.80	0	0	Dead																					reddish, poor 3/96; COD unknown; just spines left, tag removed 3/97
308.00	7	9.42	286	3.60	1	2	4.00	4fr	4	3.50	1	1	3.50	0	0	3.42	2	1+1A	3.75	0	0	3.25	2	1	3.54	1	1A	reddish, poor 3/96; reddish, OK 5/97, 3/98; orange, sinking in the center, poor 5/98; olive green with a few orange tubercles, OK 3/99; orange, OK 4/99, 2 & 5/00; olive with pale red tubercles, OK 2/01; green with reddish tubercles, OK 5/01, 2/02; orange base, green above, OK 5/02; green with some reddish tubercle tips, OK 2/03; green, good 5/03
309.00	7	8.61	282	2.50	0	0	2.90	1fr	1	Dead																		good 3/96; dead, fungus inside 3/96
310.00	7	11.70	293	2.10	0	0	mia			2.60	1	1	2.21	0	0	2.35	0	0	2.58	0	0	2.45	0	0	2.51	0	0	through juniper; good 3/96; plant & tag mia 3 & 5/97; relocated, good 3/98; OK 5/98; green, good 3/99 & 4/99; pale green with a few gold and red tubercle tips, OK 2/00; olive, OK 5/00; green, good 2 & 5/01; slightly maroonish green, OK 2 & 5/02, 2/03; olive, OK 5/03
311.00	7	9.55	262	2.60	0	0	2.40	0	0	2.40	0	0	1.88	0	0	1.98	0	0	1.73	0	0	2.04	0	0	1.80	0	0	OK 3/96, 3/98 & 5/98; poor, almost buried 3/99; coming out, green, OK 4/99 & 2/00; purplish, OK 5/00; green, OK 2 & 5/01; purplish green, OK 2/02; green, OK 5/02; orangish green, OK 2/03; green, OK 5/03
311.10	7	10.80	267				2.80	0	0	2.80	0	0	2.85	0	0	2.84	0	0	3.18	0	0	3.14	0	0	3.03	0	0	good 3/98, 5/98 & 3/99; green, good 4/99; olive, OK 2 & 5/00; pale green, OK 2/01; green, OK 5/01, 2/02 green, good 5/02, 2 & 5/03
312.00	7	11.92	276	2.70	0	0	3.30	0	0	2.70	0	0	2.79	0	0	2.89	0	0	3.13	0	0	2.95	0	0	2.90	0	0	OK 3/96; shaded in the afternoon; reddish, poor 3/98 & 5/98; goldish, OK 3/99 & 4/99; reddish-yellowish green, OK 2/00; maroonish, OK 5/00; green with maroonish tubercle tips, OK 2/01; maroonish, OK 5/01; reddish green, OK 2/02; goldish green, OK 5/02; reddish-olive, OK 2/03; gray and spineless at base, green apex, OK 5/03
313.00	7	7.09	305	2.70	0	0	3.20	0	0	2.90	0	0	2.52	0	0	3.30	0	0	4.08	0	0	4.64	0	0	4.67	0	0	OK 3/96, 3/98; grayish, poor 5/98 & 3/99; green, OK 4/99; green, good 2 & 5/00, 2 & 5/01, 2 & 5/02, 2 & 5/03
314.00	7	7.12	305	2.50	0	0	2.90	0	0	2.70	0	0	2.48	0	0	2.23	0	0	2.00	0	0	2.09	0	0	1.95	0	0	OK 3/96; grayish, poor 3/97, 5/97 & 3/99; green, few orange tubercle tips, OK 4/99; green, OK 2 & 5/00, 2 & 5/01, 2 & 5/02, 2 & 5/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
15.00	7	9.93	304	3.10	1	1	3.30	3fr	3	3.00	0	0	Dead															reddish, OK 3/96, 3 & 5/97; reddish, poor 3/98; OK 5/98; solid, dry, COD unknown 3/99
16.00	7	10.06	306	2.70		1	4.20	4fr	4	4.40	3	3	3.63	0	0	4.90	5	5	5.82	0	0	dead						discovered 5/96; good 5/98 & 5/97; 3/98; OK 5/98; green, good 3/99 & 4/99; 2 & 5/00; partly covered with ant dirt, green, good 2 & 5/01; COD ants 2/02
16.01	7	9.98	306	1.40	0	0	2.00	0	0	2.20	0	0	2.34	0	0	3.08	2	1+1A	3.91	0	0	2.97	0	0	3.50	0	0	good 3/96, 3/98; OK 5/98 & 3/99; green, good 4/99, 2 & 5/00; partly covered with ant dirt, green, good 2/01; out, green, OK 5/01; partly covered with ant dirt, green, good 2/02; out, green, good 5/02; a few tubercles missing, scarring over, green, OK 2 & 5/03
17.00	7	10.22	308	3.70	1	0	4.40	5fr	4+1A	4.60	4	4	4.58	1+2fr	3	4.78	4	4	5.31	3	0	5.27	2	0	3.25	0	0	good 3/96, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00, flowers partly eaten, plant green, good 2/01; partly covered with ant dirt, green, good 5/01; forming three heads, one with flowers, measured as one stem, green, good 2 & 5/02; heads measured separately; 317.00 is behind and right of 317.02 and317.03; green, good 2 & 5/03
17.01	7	10.07	308				0.60	0	0	0.70	0	0	mia			mia			mia									good 5/97, 3/98 & 5/98; plant mia 3/99, 4/99, 2 & 5/00, 2 & 5/01
17.02	7	10.19	308																						2.89	0	0	discovered 2/03; right of 317.03 and in front of 317.00; green, good 2 & 5/03
17.03	7	10.21	308																						3.14	0	0	discovered 2/03; left of and between 317.00 and 317.02; green, good 2 & 5/03
18.00	7	9.79	309	2.70	0	0	3.10	2fr	1+1A	3.30	1	1	3.02	0	0	2.70	0	0	2.83	0	0	1.98	0	dead				OK 3/96, 3/98, 5/98 & 3/99; tubercle tips goldish, OK 4/99; reddish green, OK 2/00; yellowish green, OK 5/00; partly covered with ant dirt, yellow-green, OK 2/01; out, green, OK 5/01; looks dead, but firmly rooted 2/02; dead, COD unknown; collected for weevil study 5/02
19.00	7	10.02	311	2.60	0	0	mia	mia	3fr	3.70	0	0	3.29	0	0	4.38	0	0	4.74	0	0	dead						OK 3/96; plant & tag mia 3/97; relocated in shade 5/97; good 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00; covered with juniper litter, green, OK 2/01; covered with juniper litter, only spines visible 5/01; dry and corky inside, COD unknown 2/02
20.00	7	7.96	197	2.40	0	0	3.00	1A+1fr	1	2.80	0	0	1.71	0	Dead													OK 3/96, 3/98 & 5/98; poor, hunkered 3/99; dead 4/99; removed by WHC 5/6/99; no evidence of weevils, COD unknown
21.00	7	3.60	333	2.80	1	1	3.00	2fr	2	Dead																		good 3/96; fungus inside 3/98
21.10	7	3.50	332	2.30		0	2.50	0	0	2.50	0	0	2.02	0	0	1.89	0	0	2.82	2	1A	2.90	2	1A	2.82	0	0	discovered 5/96, OK 5/96; good 3/98 & 5/98; OK, loose spines in vicinity & new apical meristem forming 3/99; green, good 4/99; dull green, OK 2/00; green, good 5/00, 2 & 5/01; maroonish green, OK 2/02; green, good 5/02; green, OK 2 & 5/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
321.20	7	2.82	332	2.00		1	2.50	2fr	2	2.70	2	1+1A	2.74	3fr	1	3.04	3	1+2A	4.01	3	2	3.99	4	4	3.26	3	3	discovered 5/96, good, 3/98; OK 5/98 & 3/99; maroonish 4/99; maroonish, OK 2/00; green with some orangish tubercles, OK 5/00; flowers peaking out of ant gravel, one flower partly eaten, plant green OK 2/01; plant out of ant gravel, green, good 5/01; visited by honey bees and small orange butterflies, plant green with some maroonish tubercle tips, good 2 & 5/02; reddish, OK 2/03; olive, OK 5/03
321.30	7	3.79	331										2.02	0	0	2.25	1	1A	2.57	0	0	2.40	2	0	2.18	0	0	discovered 3/99, dull green, OK 3/99, 4/99, 2/00; olive, OK 5/00; maroonish, green, OK 2/01; green, OK 5/01; green, good 2 & 5/02; olive, OK 2 & 5/03
321.40	7	3.96	291													4.23	3	3	4.85	2	2A	4.40	5	1	5.84	4	3	discovered 2/00; green, good 2 & 5/00; partly covered with ant gravel, green, good 2/01; out, green, OK 5/01; green, good 2 & 5/02, 2 & 5/03
322.00	7	3.29	320																			nd		0	dead			discovered 5/02; hunkered, green 5/02, dry, hard, solid, COD unknown 2/03
322.10	7	4.37	295																						2.24		0	discovered 5/03; green, good 5/03
Reference point 8 - between 6 & 7, and park manager's residence; Stake 8 = GPS8; R022121B; stake uprooted, replaced in vicinity																												
322.00	8	7.76	233	2.40	0	0	Dead																					OK 3/96; COD unknown
323.00	8	7.30	224	3.00	0	0	2.90	0	0	3.30	0	0	2.24	0	0	1.49	0	0	1.73	0	0	mia			mia			OK 3/96 & 3/97, shaded; OK 3/98 & 5/98; tag loose, 3/99; goldish at base, OK 4/99; totally buried, almost spineless, green, OK 2 & 5/00; popping out, a few spines, green, OK 2/01; buried in juniper litter, almost spineless, orangish-green, poor 5/01; plant and tag mia 2 & 5/02; tag relocated, plant mia 2 & 5/03
323.10	8	7.53	230							3.50	0	0	2.46	0	0	mia			mia			mia						discovered 3/98, almost buried, shaded, OK 3/98, 5/98, 3/99 & 4/99; mia 2 & 5/00, 2 & 5/01, 2 & 5/02
324.00	8	7.22	238	3.20	1	1	3.10	0	0	3.20	0	0	3.18	0	0	3.52	1	1	3.31	0	0	2.83	0	0	dead			OK 3/96; almost buried, shaded, OK 3 & 5/98, 3/99 & 4/99, above green, green, good 2 & 5/00, olive, OK 2 & 5/01, almost buried in juniper litter, olive, poor 2/02; hard, dry, maybe dead, firmly rooted 5/02; hard, dry, solid, COD unknown 2/03
324.10	8	7.30	234										3.80	0	0	2.96	0	0	3.01	0	0	2.73	0	0	2.15	0	dead	discovered 3/99, dull green, OK 3/99, 4/99, 2/00; green, good 5/00, olive, OK 2 & 5/01, getting buried in juniper litter, orangish tubercles at base, otherwise green, OK 2 & 5/02; buried in juniper litter, maybe dead 2/03; solid, hard, dry, COD unknown 5/03
325.00	8	7.67	243	2.70	0	0	2.90	1	1	3.30	1	1	2.97	0	0	3.20	2	2	3.07	0	0	2.64	0	0	dead			good 3/96 & 3/97, 3/98, OK 5/98 & 3/99, green, good 4/99, 2 & 5/00, 2/01; green, OK 5/01; green with some reddish tubercles, OK 2 & 5/02, collected for weevil study 2/03; COD unknown 3/03

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
125.10	8	6.97	250													3.42	1	1	3.65	0	0	3.18	0	0	2.35	0	0	discovered 2/00; green, good 2/00; getting buried in juniper needles, green, good 5/00; tag mia, replaced 2/01; plant green, good 2 & 5/01; half buried in ant mound, green, OK 2 & 5/02; almost buried in juniper litter, top tubercles eaten, plant green, OK 5/03; buried, spineless, green, poor 5/03
126.00	8	7.91	239	3.50	0	0	3.30	0	0	3.50	0	0	3.29	0	0	3.22	0	0	3.11	0	0	3.29	0	0	3.35	0	0	good 3/96; shaded, OK 3/97, 3/98, 5/98 & 3/99; OK, dull green 4/99, 2 & 5/00; green, good 2 & 5/01, 2 & 5/02; green, OK 2/03; green, good 5/03
127.00	8	8.09	239	2.20	0	0	2.50	0	0	2.60	0	0	1.92	0	0	2.28	0	0	2.46	0	0	2.37	0	0	2.28	0	0	good 3/96; shaded, good 3/97; OK 3/98, 5/98 & 3/99; green, good 4/99; slightly reddish, OK 2/00; green, OK 5/00; green, good 2 & 5/01; reddish green, OK 2 & 5/02, 2 & 5/03
128.00	8	4.26	238	3.60	1	1	3.70	1	1	3.90	1	1	3.74	0	0	4.19	3	2+1A	4.57	2	0	4.42	0	0	4.35	0	0	good 3/96 & 3/97, 3/98; OK 5/98; green, good 3/99, 4/99, 2 & 5/00, 2 & 5/01, 2 & 5/02, 2 & 5/03
128.10	8	4.87	245				3.30	1+1A	0	3.40	1	0	2.74	1	0	3.16	1	1	3.78	0	0	3.73	0	0	3.87	0	0	stepped on 3/97; dirt from nearby hole slightly covering plant, OK 5/97; reddish, OK 3/98; yellowish OK 5/98; dull green, OK 3/99 & 4/99; reddish green, OK 2/00; slightly reddish green, good 5/00; green with some reddish tubercle tips, OK 2/01; green, good 5/01, 2 & 5/02; green, OK 2 & 5/03
128.20	8	4.82	243				2.40	2	0	2.20	0	0	2.11	0	0	2.35	1	1	2.71	0	0	2.56	0	0	2.29	0	0	stepped on 3/97; OK 5/97, 3/98, 5/98 & 3/99; dull green, misshapen 4/99; green, good 2 & 5/00; green with some red and purple tubercle tips, OK 2 & 5/01; green, OK 2 & 5/02, 2 & 5/03
128.30	8	8.40	257							3.80	0	0	4.20	0	0	3.56	0	0	3.69	0	0	3.11	0	0	mia			discovered 3/98; some tan tubercle tips, OK 3/98 & 5/98; very poor, all gray 3/99; dull green, OK 4/99 & 2/00; green with a few tan tubercles, good 5/00, 2/01; some tubercle damage, green, OK 5/01; chunk eaten out of side, green, OK 2/02; eaten to ground level, poor 5/02; plant mia 2 & 5/03
128.40	8	8.71	255							4.00	2	2	Dead															discovered 3/98; some purplish tubercle tips, OK 3/98 & 5/98; large hollow in center, COD Moneilema 3/99
128.50	8	9.63	258							1.40	0	0	1.42	0	0	0.95	0	0	dead									discovered 3/98; in little bluestem clump, good 3/98; almost buried, OK 5/98, 3/99, 4/99, 2/00; olive, OK 5/00; body solid, COD unknown 2/01
128.60	8	9.35	260							4.00	2	2	3.20	0	0	4.61	2	3	4.23	0	0	4.95	0	0	3.90	0	0	discovered 3/98; sort of misshapen, OK 3/98 & 5/98; hunkered, almost buried 3/99; popped up, dull green OK 4/99; green, good 2 & 5/00, 2 & 5/01, 2 & 5/02, 2 & 5/03
128.90	8	8.99	261																3.24	1	0	3.21	0	0	dead			discovered 2/01; green, good 2/01; green, OK 5/01, 2/02; green, good 5/02; just spines left, COD unknown 2/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
329.00	8	3.23	226	2.50	0	0	2.80	0	0	3.10	1	1	3.01	3	2	2.97	0	0	3.29	0	0	3.39	0	0	2.99	0	0	poor, reddish 3/96; greener, OK 5/97, 3/98; grayish, shrinking, poor 5/98; dull green, OK 3/99; purplish, OK 4/99 & 2/00; purplish, green, OK 5/00; some tubercle damage, green with some purplish tubercle tips 2 & 5/01; green, good 2 & 5/02, 2 & 5/03
330.00	8	2.98	226	3.20	2	2	3.60	1+2fr	3	3.80	2	2	3.07	3	3	3.81	1	1	3.78	0	0	3.57	0	0	3.50	0	0	OK 3/96, 3/97, 5/97, 3/98, 5/98 & 3/99; OK, maroonish 4/99, 2 & 5/00; some tubercle damage, plant green with some orange tubercle tips, OK 2/01 purplish-green, OK 5/01; reddish at base, otherwise green, OK 2 & 5/02; green, OK 2 & 5/03
331.00	8	3.02	218	5.60	4+1fr	5	5.70	2+3fr	5	6.20	4	5	5.69	3+1fr	4	5.95	5	5	6.73	2	2+1A	6.75	4	7	7.15	1	3	OK 3/96; good 3/97, 3/98; OK 5/98; green, good 3/99, 4/99, 2 & 5/00, 2/01; dark green, good 5/01, 2 & 5/02, 2 & 5/03
332.00	8	2.75	202	2.70	1	1	3.10	2fr	2	3.20	1	1	2.85	1	1	3.15	2	2	4.06	3	3A	4.31	2	2	4.41	2	0	good 3/96; getting maroonish, OK 5/97, 3/98 & 5/98; dull green, OK 3/99 & 4/99; green, good 2 & 5/00, 2/01; dark green, good 5/01, 2 & 5/02; flowers eaten plant green, good 2 & 5/03
333.00	8	3.55	192	4.60	3+2fr	5	4.90	1+3fr	2+3A	5.60	4	5	5.17	4	2+1A	4.97	3	3	5.23	0	0	5.05	1	0	dead			good 3/96, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 5/02, collected for weevil study 2/03
334.00	8	3.63	191	2.30	1	1	3.10	3fr	3	3.20	1	1	2.84	1	1	3.38	2	2	3.14	0	0	2.98	1	0	2.76	0	0	OK 3/96; good 3/98, 5/98 & 3/99; green, good 4/99; reddish, OK 2 & 5/00, 2 & 5/01; purplish, OK 2 & 5/02; olive, OK 2/03; looks dead, but firmly rooted 5/03
335.00	8	4.92	188	4.20	3	4	4.50	2+1fr	3	4.30	2	2	3.62	2	2	4.02	0	0	4.60	3	1+1A	4.77	1	2	4.47	0	0	one flower slightly eaten 3/96; good 5/96 & 3/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 5/02, 2 & 5/03
336.00	8	5.79	187	3.00	2	0	3.40	2+1fr	3	3.50	2	2	3.38	1	0	3.56	1	1	3.69	0	1	3.32	1	1	3.63	0	0	good 3/96 & 3/97, 5/98; getting buried, OK 3/99; popping out, green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 5/02, 2 & 5/03
337.00	8	6.58	187	2.80	0	0	3.40	2	1+1A	3.30	1	1	4.28	1	1	3.91	0	0	4.31	0	1	4.12	1	1A	4.60	0	0	good 3/96 & 3/97, 3/98, 5/98 & 3/99; good, green, fruit mostly eaten 4/99; green, good 2 & 5/00, 2/01; green with orange-red spots, OK 5/01; green, good 2/02; green with orange red spots, OK 5/02, 2 & 5/0
337.10	8	7.52	191				3.20	0	0	3.00	0	0	3.10	0	0	3.04	0	0	3.21	0	0	2.82	0	0	2.76	0	0	in shade; in sunlight at 3 PM CST, OK 3/98, 5/98 & 3/99; green, good 4/99; purplish, OK 2/00; goldish and damaged basally, green, good above 5/00; maroonish-green, OK 2/01; green with red-orange tubercle tips, poor 5/01; green with red-orange tubercle tips, OK 2 & 5/02; several tubercles eaten, plant green, OK 2/03; epidermis practically gone, red, poor 5/03
337.20	8	7.28	187				1.10	0	0	1.40	0	0	1.16	0	0	mia			mia			mia						in grass clump & shade 3/97, OK 3/98 & 5/98; poor 3/99 & 4/99, plant mia 2 & 5/00, 2 & 5/01, 2 & 5/02

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38.00	8	6.63	186	2.40	0	0	2.60	1	1	2.80	0	0	Dead															good 3/96 & 3/97, 3/98 & 5/98; COD Moneilema (collected & accidentally killed) 3/99
38.10	8	8.05	186										1.80	0	0	1.92	0	0	1.85	0	0	1.88	0	0	1.66	0	0	OK, dull green, discovered 3/99; dull green, OK 4/99 2/00; green, OK 5/00, 2/01; green with orange tubercle tips, OK 5/01; green OK 2/02; green with orange tubercle tips, OK 5/02; grayish green, poor 2 & 5/03
39.00	8	5.45	184	3.30	0	0	3.60	1+1fr	2	3.70	1	1	3.64	0	0	3.71	1	1	4.15	0	0	4.43	1	1	4.19	0	0	good 3/96 & 3/97, 3/98 & 5/98; OK 3/99; green, good 4/99, 2 & 5/00, 2 & 5/01, 2 & 5/02, 2 & 5/03
39.10	8	5.38	186				3.60		0	4.20	3	3	4.12	2+1fr	2+1disp	4.37	2	2	4.45	0	0	4.49	0	0	4.12	0	0	good, discovered 5/97, 3/98, 5/98 & 3/99; green, good 4/99, 2 & 5/00; green with maroonish and yellow tubercles, OK 2 & 5/01; slightly maroonish green, good 2 & 5/02; pale green, OK 2/03; green, OK 5/03
40.00	8	5.28	183	4.90	2	2	4.90	2fr	2	5.20	3	3	3.97	0	Dead													good 3/96, 3/98 & 5/98, dead 3/99, dead 4/99, collected by WHC 5/6/99, no evidence of weevils, COD unknown
41.00	8	5.82	181	3.50	2	2	3.60	2	2	3.40	1	1	3.12	0	1	3.08	1	1	3.25	0	0	2.82	0	0	3.23	0	0	OK 3/96; reddish 3/97, 5/97, 3/98 & 5/98; OK 3/99; goldish at base, OK 4/99; greenish-red, OK 2 & 5/00 2/01; orange with green apex, OK 5/01; green with some orange tubercle tips, OK 2 & 5/02; bottom half of stem without spines and tubercles, plant green with orange tubercle tips, OK 2 & 5/03
42.00	8	6.55	165	3.50	0	1	3.80	3	2+1A	4.00	2	2	3.67	1	0	3.91	0	0	3.61	0	0	3.49	0	0	3.22	0	0	good 3/96, 3/97, 3/98, 5/98; OK, a few orange tubercle tips 3 & 4/99, 2/00; dull green, OK 5/00; olive with some orange tubercle tips, poor 2/01; mostly orangish, OK-poor 5/01; reddish orange, OK 2 & 5/02, 2 & 5/03
Reference point 9 - 33 JMP paces west from the middle post in the west chain link fence surrounding the water treatment plant; Stake 9 = GPS9; R022121A;																												
Stake mia, relocated 2/03																												
166.00		4.34	243	1.40		0	2.00	0	0	2.40	2	2	nd	0	0	1.72	0	0	2.32	0	0	3.04	3	0	3.57	3	0	good, discovered 5/96, good 3/97, 3/98 & 5/98; eaten down below soil surface, root still alive 3/99; tubercle nub sprouting 5/99; green, good 2 & 4/00; green, OK 2/01; green, good 5/01, 2 & 5/02, 2/03; olive, OK 4/03
166.01	9	4.36	243																			0.35		0	0.44	0	mia	discovered 5/02; olive, OK 5/02; hunkered, poor 2/03; plant mia 4/03
166.02	9	4.40	243																			0.55		0	0.76	0	0	discovered 5/02; green, OK 5/02; olive, OK 2 & 4/03
166.03	9	4.83	242																						0.72	0	0	discovered 2/03; grayish green, OK 2/03; green, OK 4/03

Ancistrocactus tobuschii Data for Lost Maples State Natural Area

PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
367.00	9	4.42	248	2.70		0	3.30	4fr	4	3.50	3	3	2.85	0	0	3.61	4	4	4.73	3	3	4.95	6	5+1A	4.59	3	4	discovered 5/96, OK; dull green, OK 3/97 & 5/97; reddish, OK 3/98 & 5/98; measured in one direction only, green, OK 3/99 & 5/99; purple, OK 2 & 4/00, 2 & 5/01, 2/02; olive, OK 5/02; purple, OK 2 & 4/03
367.01	9	4.35	249																1.54		0	1.62	1	0	1.94	0	0	discovered 5/01; green, good 5/01; purple, OK 2/02; olive, OK 5/02, 2/03; green, good 4/03
367.02	9	4.42	248																						0.33	0	0	discovered 2/03; seedling of 367 at 6 o'clock; red, poor 2/03
367.03	9	4.45	248																						0.37	0	0	discovered 2/03; seedling of 367 at 7 o'clock; red, OK 2/03
368.00	9	4.55	252	1.30		0	1.40	0	0	1.40	0	0	1.20	0	0	1.47	0	0	1.81	0	0	1.64	0	0	1.74	0	0	OK, discovered 5/96; OK 3/97, 3/98, 5/98 & 3/99; green, good 5/99; pale green, OK 2/00; green, OK 4/00, 2 & 5/01; purplish green, OK 2/02; reddish, olive, OK 5/02; tag mia, replaced, reddish olive, OK 2/03; green, OK 4/03
368.10	9	4.62	252																0.93	0	0	1.27	0	0	0.98	0	0	discovered 2/01; hunkered, green, OK 2/01; green, good 5/01; green, OK 2 & 5/02; tag mia, replaced 2/03; hunkered, green, OK 4/03
368.20	9	4.60	248																			0.48		0	0.72	0	0	under small rock, discovered 5/02; green, OK 5/02, 2/03; poor 4/03
369.00	9	4.26	-258	0.50		0	0.60	0	0	0.40	0	mia	mia			mia			mia			mia						good, disoovered 5/96, good 3/97, OK 5/97, 3/98, mia 5/98, tag & plant mia 3/99, tag relocated, plant mia 5/99, 2 & 4/00, 2 & 5/01, 2 & 5/02
370.00	9	4.24	-250	0.60		0	mia			mia			mia															good, discovered 5/96, mia 3/97, 5/97, 3/98, 5/98, 3/99 & 5/99
371.00	9	4.32	-258	2.40		0	2.70	2fr	2	3.00	1	1	mia			mia			mia			mia						OK, discovered 5/96; slightly reddish green 3/97, slightly reddish green, OK 3/98 & 5/98, tag & plant mia 3/99; tag buried, relocated, plant mia 5/99, tag and plant mia 2 & 5/00, 2 & 5/01, 2 & 5/02
371.01	9	4.29	249				0.50		0	mia			mia		Removed, dead													OK, discovered 5/97, mia 3/98, 5/98 & 3/99; relocated, accidentally dug up, collected by WHC 5/6/99. COD unknown
372.00	9	4.33	249	2.30		0	2.70	3fr	3	mia			mia			mia												OK, discovered 5/96, OK 3/97, mia 3/98 & 5/98; divot left, loose spines 3/99, mia 5/99, 2 & 4/00
373.00	9	4.32	249	1.90		0	2.00	0	0	1.80	0	0	1.65	0	0	1.35	0	0	2.32	0	0	3.23	3	1	2.68	1	1A	good, discovered 5/96; totally maroon, OK 3/98 & 5/98; green, almost buried, OK 3/99; popped out, green, good 5/99, 2 & 4/00, 2 & 5/01; purple, good 2 & 5/02, 2/03; purple. OK 4/03
374.00	9	4.37	251	1.40		0	1.30	0	0	1.30	0	0	1.11	0	0	1.60	0	0	1.99	0	0	1.92	1	1	2.15	0	0	good, discovered 5/96; buried, good 3/97, 3/98, 5/98 3/99 & 5/99; green, good, tag mia, replaced 2 & 4/00 hunkered, pale green, OK 2/01; green, good 5/01; hunkered, green, OK 2 & 5/02, 2 & 4/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
75.00	9	4.34	251	1.80		0	1.60	0	0	2.20	0	0	1.68	0	0	2.34	1	1	2.95	1	1	2.68	2	2	2.76	1	0	good, discovered 5/96; partially buried, good 3/97 & 3/98; reddish, OK 5/98; almost buried, green, OK 3/99; green, good 5/99, 2 & 4/00, 2 & 5/01; purplish green, OK 2 & 5/02, 2/03; 1 flower eaten 2/03; purplish green, OK 4/03
75.01	9	4.31	251																			0.80	0	0	0.75	0	0	right upper edge of 375.00 tag, discovered 2/02; green, OK 2 & 5/02, 2 & 4/03
76.00	9	4.40	249	1.50		0	1.90	0	0	1.80	0	0	1.29	0	0	1.78	0	0	2.33	0	0	2.76	2	1	2.54	2	0	good, discovered 5/96; good 3/97; covered by rock, good 3/98, 5/98, 3/99 & 5/99; hunkered, green, good 2 & 4/00, 2 & 5/01, 2 & 5/02; maroonish green, OK 2 & 4/03
77.00	9	4.12	251	3.30		1	3.90	2fr	2	4.00	3	2+1A	nd	0	0	mia			mia			mia						OK, discovered 5/96; OK 3/97; reddish, OK 3/98 & 5/98; eaten, nub or seedling left 3/99; green, good 5/99; plant mia 2 & 4/00, 2 & 5/01, 2 & 5/02
77.10	9	3.79	254				0.80	0	0	Dead																		under rain lily 3/97; COD unknown 3/98
77.20	9	3.97	248							0.70		0	0.51	0	0	0.75	0	0	0.79	0	0	1.44	0	0	1.65	0	0	discovered 5/98; measured in one direction only, between rocks, OK 5/98; poor, totally buried, chlorotic 3/99; green, good 5/99, 2/00; totally buried in ant dirt, but green, good 4/00; out, green, good 2 & 5/01, 2 & 5/02, 2 & 4/03
78.00	9	4.67	250	2.40		0	2.60	2fr	2	3.00	2	2	2.47	0	0	3.53	4	4	4.86	6	6	4.71	5	3	4.75	4	3+1A	OK, discovered 5/96; OK 3/97, 3/98 & 5/98; dark green, OK 5/99; green, good 2 & 4/00, 2 & 5/01; purplish green, OK 2 & 5/02, 2 & 4/03
78.01	9	4.76	257																0.70		0	0.93	0	0	1.11	0	0	discovered 5/01; green, good 5/01; green, OK 2 & 5/02; very hunkered, green, OK 2/03; under rocks, green, good 4/03
78.02	9	4.70	255																0.53		0	0.42	0	0	mia			at 5 o'clock on 378; not tagged, discovered 5/01; green, good 5/01, 2/02; green, OK 5/02; plant mia 2 & 4/03
78.03	9	4.69	255																0.24		0	mia			mia			at 4 o'clock on 378, left of 378.04; not tagged, discovered 5/01; red, OK 5/01; plant mia 2 & 5/02, 2 & 4/03
78.04	9	4.69	255																0.30		0	0.34	0	0	0.20	0	mia	at 4 o'clock on 378, right of 378.03; not tagged, discovered 5/01; red, OK 5/01; green, OK 2 & 5/02, 2/03; plant mia 4/03
78.05	9	4.80	257																0.45		0	0.72	0	0	0.72	0	0	discovered 5/01; reddish-green, OK 5/01; green, OK 2 & 5/02, 2 & 4/03
78.06	9	4.77	257																0.54		0	0.57	0	0	0.84	0	0	discovered 5/01; green, good 5/01; green, OK 2 & 5/02, 2 & 4/03
78.07	9	4.69	252																0.56		0	0.57	0	0	0.67	0	0	discovered 5/01; green, OK 5/01, 2 & 5/02, 2 & 4/03
78.10	9	4.82	250							3.90	1	2	3.39	3fr	0	4.41	4	3	4.95	5	3	4.94	5	5	4.67	1A	0	a little reddish, OK, discovered 3/98; a little reddish, OK 5/98; green, good 5/99; reddish, OK 2 & 4/00; one flower eaten, plant purplish-green, good 2 & 5/01; purple, good 2/02; green, OK 5/02; purple, OK 2 & 4/03

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
378.20	9	5.13	250							1.20	0	0	1.23	0	0	1.61	0	0	2.32	0	0	2.67	2	0	2.63	2	0	good, discovered 3/98; good 5/98; OK 3/99; green, good 5/99, 2 & 4/00, 2 & 5/01, 2/02; accidentally stepped on, green, OK 5/02; green with reddish tubercles, OK 2 & 4/03
378.30	9	5.68	248																			1.61	0	0	1.64	0	0	discovered 2/02; purplish, OK 2/02; green, OK 5/02, 2 & 4/03
378.40	9	5.48	255																			1.62	1	0	1.78	0	0	discovered 2/02; green, good 2 & 5/02; green, OK 2 & 4/03
378.50	9	5.21	256																						0.96		0	discovered 4/03; green, OK 4/03
379.00	9	4.44	251	2.10		0	2.60	0	0	2.50	2	2	2.04	0	0	2.10	1	1	2.90	2	2	2.62	3	3	2.96	1	1A	good, discovered 5/96; good 3/97; almost buried, good 3/98, 5/98, 3/99, 5/99, 2 & 4/00, 2 & 5/01, 2 & 5/02, 2 & 4/03
380.00	9	4.20	252	0.90		0	1.20	0	0	1.50	0	0	0.98	0	0	mia			2.04	0	0	2.23	2	0	2.63	0	0	good, discovered 5/96; good 3/97, 3/98; OK 5/98; green, good 3/99; plant mia 2 & 4/00; green, good 2 & 5/01, 2 & 5/02, 2 & 4/03
381.00	9	4.44	252	2.70		1	3.30	2fr	2	3.10	2	2	mia			mia			mia									good, discovered 5/96, good 3/97, 3/98 & 5/98; divot left, plant gone 3/99, 2 & 4/00, 2 & 5/01
381.10	9	4.40	252													0.79	0	0	1.67	0	0	1.71	0	0	1.98	1	0	seedling or pup, green, OK 2/00; green, good 4/00, 2 & 5/01; hunkered, some tubercle damage, green, OK 2/02; green, good 5/02; flower damaged, plant green OK 2 & 4/03
382.00	9	4.28	252	1.50		0	1.80	0	0	1.90	0	0	mia			mia			mia									OK, discovered 5/96, OK 3/97, 3 & 5/98, plant mia 99, 2 & 4/00, 2 & 5/01
383.00	9	4.30	252	1.70		0	1.80	1fr	1	2.00	1	1	mia			mia			mia									OK, discovered 5/96, OK 3/97, 3 & 5/98, plant mia 99, 2 & 4/00, 2 & 5/01
384.00	9	4.33	252	0.50		0	0.30	mia	0	0.30	mia	0	mia			mia			mia									OK, discovered 5/96; rediscovered under stick, OK 5/97, mia 3/98, small seedling rediscovered, OK 5/98, plant mia 99, 2 & 4/00, 2 & 5/01
385.00	9	4.43	254	2.40		0	2.50	1fr	1	mia			mia			mia												OK, discovered 5/96; reddish green 3/97, greener 5/97, mia 3 & 5/98, 3/99, 2 & 4/00
385.10	9	4.98	254				1.00	0	0	Dead																		closet to reference point, body solid, COD unknown, may have been tubercle of buried plant 3/98
385.20	9	4.99	254				1.10	0	0	Dead																		to right of 385.3, body solid, COD unknown, may have been tubercle of buried plant 3/98
385.30	9	5.00	254				1.40	0	0	Dead																		to left of 385.2, body solid, COD unknown, may have been tubercle of buried plant 3/98
385.40	9	5.01	254				0.40	0	0	0.60	0	Dead																below 385.1-3 & 385.5, OK 3/98, just spines & tubercles left 5/98
385.50	9	4.97	254				0.80	0	0	Dead																		above 385.1-4, just spines left, COD unknown 5/98
386.00	9	4.39	255	2.30		0	2.30	1fr	1	2.60	1	1	mia			mia			mia									good, discovered 5/96, reddish 3/97 & 5/97, OK 3/98 & 5/98, divot left, plant gone 3/99, 2 & 4/00, 2 & 5/01

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PL#	STAKE	DIST	ANG	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
86.10	9	4.77	261				1.40		0	1.60	0	0	1.43	0	0	1.95	1	1	2.28	1	1	2.00	1	0	1.92	0	0	OK, discovered 5/97; OK 3/98 & 5/98; green, good 3/99 & 5/99; green, good, hunkered 2/00; coming out, green, good 4/00, 2 & 5/01; hunkered, olive, OK 2/02; green, good 5/02; hunkered, green, OK 2/03; green, good 4/03
87.00	9	3.58	~258	2.10		0	2.10	1fr	1	2.20	1	1A	1.65	0	0	2.63	3	3	2.81	3	3	3.01	3	3	2.84	0	0	OK, discovered 5/96; OK 3/97, 3/98, 5/98 & 3/99; green, good 5/99; green, good, hunkered 2/00; coming OK, green, OK 4/00, 2/01; green, good 5/01; maroonish, OK 2/02; olive, OK 5/02; green, good 2 & 4/03
87.01	9	3.60	~256				0.50	0	0	0.60	0	0	0.60	0	0	0.69	0	0	0.82	0	0	0.86	0	0	0.94	0	0	under rock; OK 3/98, 5/98 & 3/99; green, good 5/99; OK, green 2 & 4/00, 2/01; hunkered, OK 5/01; purple, OK 2/02; olive, OK 5/02; green, OK 2/03; green, good 4/03
87.10	9	3.26	252																2.42	1	1	2.69	2	2	2.77	0	0	discovered 2/01; green, good 2 & 5/01, 2 & 5/02, 2 & 4/03
87.20	9	3.84	256																						2.11		0	discovered 4/03; under rock; green, good 4/03
88.00	9	3.81	~270	1.90		0	2.30	1A	0	mia			mia			mia												good; discovered 5/96; reddish green, OK 3/97 & 5/97; mia 3/98, 5/98, 3/99, 5/99, 2 & 4/00
89.00	9	4.52	~270	3.60		2	4.20	5fr	5	4.10	1	0	nd	0	mia	mia			mia			mia						OK, discovered 5/96; very reddish, squishy 3 & 5/97 maroon, lopsided, very shaded, OK 3/98 & 5/98; eaten below soil surface, root alive 3/99, seedling at 4.48m, main plant gone 5/99, seedling and plant mia 2 & 4/00, 2/01, tag and plant mia 5/01, 2 & 5/02
89.10	9	4.28	268							1.10	0	0	0.58	0	0	0.94	0	0	1.26	0	0	1.84	0	0	1.46	0	0	in rock crevice, good, discovered 3/98; good 5/98; measured in one direction only 3/99 & 2/00; poor 3/99; green, good 5/99, 2 & 4/00; tag mia, replaced, plant green, good 2/01; tag loose, plant green, good 5/01; tag mia, replaced, plant grayish green, OK 2/02; pale green, OK 5/02, 2/03; green, good 4/03
89.20	9	4.25	266							1.20	0	0	1.37	0	0	1.91	0	0	2.54	0	0	2.74	1	0	2.42	0	0	discovered 3/98; good 3/98, 5/98; good, under rock 3/99; good, green 5/99, 2 & 4/00, 2 & 5/01; termites under rock, plant green, good 2 & 5/02, 2 & 4/03
89.30	9	4.23	264																1.14	0	0	1.36	0	0	1.47	0	0	discovered 2/01; green, good 2 & 5/01, 2 & 5/02, 2/03
89.40	9	4.31	264																1.86	0	0	2.16	1	1	1.56	0	0	discovered 2/01; green, good 2 & 5/01, 2 & 5/02, 2 & 4/03
90.00	9	8.26	248				1.50	0	mia	mia			mia															to left of 391; animal rooting in area, tag & plant mia 5/97, 3/98, 5/98, 3/99 & 5/99
91.00	9	8.26	248				1.40	0	mia	mia			mia															to right of 390, animal rooting in area, tag & plant mia 5/97, 3/98, 5/98, 3/99 & 5/99
92.00	9	7.39	232				3.20	3	3	3.30	3	2+1A	2.63	0	0	Dead												reddish 3/97; reddish, OK 3/98 & 5/98; bad, totally gray, hard, may be dead 3/99; green, OK 5/99; hard dry, solid, COD unknown 2/00

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392.01	9	7.41	232				1.20	0	0	1.40	0	0	mia			mia			mia			mia						seedling of 392.00; OK 3/98 & 5/98; mia 3/99 & 5/99, 2 & 4/00, 2 & 5/01, 2 & 5/02
393.00	9	7.45	230				3.40	3fr	3	3.30	2	2	2.69	0	0	3.18	3	3	3.28	2	2	3.38	2	1A	3.45	2	1	a little reddish, OK 3/98 & 5/98; only spines sticking out of ant mound 3/99; still partially buried, green, good 5/99; mound gone, green, good 2 & 4/00; purplish-green, good 2 & 5/01, 2 & 5/02; 1 flower eaten, plant green, good 2/03; olive, OK 4/03
394.00	9	7.48	230				3.10	3fr	3	3.10	3	3	2.71	0	0	3.28	4	3	4.49	6	7	4.33	3	1+2A	4.38	5	0	one fruit partially eaten, remainder on ground 5/97; a little reddish, OK 3/98 & 5/98; only spines sticking out of ant mound 3/99; plant out, green, good 5/99, 2 & 4/00, 2 & 5/01; green with some reddish tubercle tips, good 2 & 5/02; 2 flowers eaten, plant green, good 2 & 4/03
395.00	9	7.85	235				2.90		1	3.10	3	disp	3.11	3fr	disp?	4.33	2+2fr	4	6.07	6	7	5.24	6	5	5.82	10	8+2A	good, discovered 5/97; tag mia, retagged, good 3/98 fruits dispersed, seeds on and below plant, plant good 5/98; good 3/99; green, good 5/99, 2 & 4/00, 2 & 5/01; purplish green, OK 2/02; green, good 5/02; a few tubercle tips eaten, scarred over, plant purplish green, good 2/03; green, good 4/03
395.01	9	7.87	235																						1.45	0	0	discovered 2/03; green, good 2 & 4/03
395.10	9	6.63	242																						2.24	1	0	discovered 2/03; green, good 2 & 4/03
396.00	9	3.49	261							1.70		0	mia			mia												discovered 5/98; OK 5/98; mia 99, 2 & 4/00, 2 & 5/01
397.00	9	3.52	281							2.30		0	mia			mia												discovered 5/98; good 5/98; mia 99, 2 & 4/00, 2 & 5/01
398.00	9	3.44	243													1.68	1	1	2.18	0	0	2.37	2	0	2.85	2	1	discovered 2/00; olive, OK 2 & 4/00; purplish, OK 2 & 5/01; purple, good 2/02; orangish olive, OK 5/02; purple, OK 2 & 4/03
398.10	9	3.94	238																			1.21		0	1.49	0	0	discovered 5/02; green, OK 5/02; green, good 2 & 4/03
399.00	9	2.55	193													4.74	4	4	5.42	3	3	5.25	5	6	5.51	3	1	discovered 2/00; green, good 2 & 4/00, 2 & 5/01, 2 & 5/02, 2 & 4/03
399.01	9	2.53	193																			0.57		0	0.44	0	0	leftmost of 399.01-.04; at 12 o'clock on 399.00; discovered 5/02; green, good 5/02, 2 & 4/03
399.02	9	2.53	193																			0.51		0	0.68	0	0	rightmost of 399.01-.04; at 12:30 o'clock on 399.00, discovered 5/02; green, good 5/02, 2 & 4/03
399.03	9	2.53	193																			0.55		0	0.54	0	0	left of 399.02 & 399.04, right of 399.01; at 12 o'clock on 399.00, discovered 5/02; green, good 5/02, 2 & 4/03

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99.04	9	2.52	193																			0.23		0	0.36	0	0	between 399.03 and 399.02, discovered 5/02; green, good 5/02 & 2/03; almost buried, green, OK 4/03
00.00	9	4.02	266													0.76		0	0.85	0	0	0.97	0	0	1.08	0	0	discovered 4/00; green, good 2 & 5/01, 2 & 5/02, 2 & 4/03
01.00	9	6.10	256																2.05	0	0	1.91	0	0	1.72	0	0	discovered 2/01; purple, OK 2 & 5/01, 2/02; green, good 5/02; lower stem exposed, gray and spineless, upper stem purple, poor 2/03; purplish green, OK 4/03
02.00	9	0.97	75																0.47		0	0.71	0	0	0.87	0	0	discovered under rocks 5/01; green, OK 5/01; gray green, poor 2/02; just spines showing, poor 5/02; grayish green, OK 2/03; green, OK 4/03
03.00	9	3.88	264																						1.00		0	discovered 4/03; olive, OK 4/03
Data taken and recorded by Jackie Poole 4/29/96, 5/1/96, 3/13/97, 3/17/97, 3/29/97, 5/8/97, 5/10/97, 3/5-6/98, 3/9/98, 5/6-8/98, 3/4/99, 5/6/99 with WHC,																												
2/21-23/00 (2/22/00 with Dana Price), 4/20-21/00, 5/2/00, 2/20-22/01, 5/3,8-10/01, 2/18-21/02, 4/29-30 & 5/2/02, 2/23,24,26,27 & 4/30,5/01/03																												
Data taken by Gena Janssen and recorded by Jackie Poole 3/26/97																												
Data taken & recorded by Jackie Poole with assistance from Paul Cottman & Lloyd Steiner 3/6-8/96																												

Ancistrocactus tobuschii Data for Pole Hollow, Junction

PL#	STAKE	DIST.	ANGLE	95 DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
Stake 1 is in an opening at the top of a hill behind some redbuds; ID #10R032422A; R031323A																														
1.00	1	3.38	55	sm-med	2	2.10	0	0	2.60	1	1	2.80	2fr	2	2.66	2fr	1+ 1disp	3.06	2fr	2	3.35	1	1A	3.22	4	2A	4.76	9	8+1A	part of plant dead, but regenerating 3/96 green, OK 3/99; green, good 5/99 & 3/00; green, hunkering, OK 5/00; popped out, red at base, dull olive above OK 3 & 5/01; dull green, OK 3 & 5/02; green, good 3 & 5/03
2.00	1	3.85	50	sm-med	2	dead																								cause of death unknown 3/96
3.00	1	4.28	42	medium	2	3.30	0	0	3.70	3fr	3	3.70	3fr	2	4.25	2fr	disp?	4.55	1+2fr	2+1A	dead									reddish 3/97; green 5/97, reddish, mushy, gray spines 3/98; dull maroonish green, OK 3 & 5/99; dull green, OK 3/00 orangish, OK 5/00; one large cavity, COD Monellema 3/01
4.00	1	7.29	75	small	0	1.80	0	0	2.60	2fr	2	3.10	2fr	2	3.09	1A+2fr	2	3.60	1fr	1	4.10	0	0	3.98	4	3	5.36	7	6	army green - red 3/98; maroon, OK 3/99 orangish, OK 5/99; maroonish, OK 3/00; orangish, OK 5/00; reddish-green, OK 3/01; maroonish-green, good 5/01; purplish green, OK 3/02; maroonish, OK 5/02, 3/03; green, OK 5/03
5.00	1	7.29	75	small	0	1.80	0	0	2.20	1fr	1	2.40	2fr	3	2.54	1fr	1	3.09	0	0	3.52	1	1	3.55	5	3	4.76	5	5	measured in one direction only 3/98; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01, 3/02; green, OK 5/02; green, good 3 & 5/03
5.10	1	5.95	77						1.80	1fr	1	2.20	1fr	1	2.36	2fr	2	2.93	0	0	3.61	1	1	3.27	3	2+1A	4.76	4	1+2A	measured in one direction only 3/98; green, good 5/99, 3 & 5/00, 3 & 5/01; purplish olive, OK 3 & 5/02, 3/03; green, good 5/03
5.20	1	6.15	75						2.40	2fr	2	2.90	2	2	2.88	2A+1fr	1	3.45	0	0	dead									green, good 5/99, 3 & 5/00; just spines left, COD unknown 3/01
5.30	1	6.41	75						1.70	1fr	0	2.10	2fr	2	2.20	1A+1fr	1	2.92	1fr	1	3.85	3	3	3.17	0	0	3.12	0	0	measured in one direction only 3/98; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; green, OK 3/02; olive, OK 5/02; slightly purplish green, good 3/03; olive, OK 5/03
5.31	1	6.45	77																								0.64		0	upper right of 5.30 tag, discovered 5/03; green, good 5/03
5.32	1	6.34	79																								0.63		0	discovered 5/03; green, good 5/03
5.33	1	6.54	76																								0.55		0	discovered 5/03; reddish green, OK 5/03
5.40	1	6.42	75						1.50	0	0	1.90	0	0	2.50	1fr	1	2.45	1fr	1	3.44	1	1	3.67	3	1+1A	4.53	3	2+1A	measured in one direction only 3/98; green, good 3 & 5/99, 3 & 5/00, 3/01; maroonish-green, good 5/01; green, good 3/02; olive, OK 5/02; purplish green, OK 3 & 5/03
5.50	1	6.48	73						2.40	3fr	2+1A	3.10	2fr	2	3.51	2A+3fr	2+1A	3.51	1+2fr	1	4.07	3	2	3.73	5	4	4.44	3	3	green, good 3 & 5/99, 3 & 5/00, 3/01; misshapen, green, OK 5/01; green, OK 3/02; olive, OK 5/02, 3 & 5/03

PL#	STAKE	DIST.	ANGLE	95 DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
6.00	1	7.32	75	small	0	1.20	0	0	1.20	0	0	1.80	0	0	1.68	0	0	2.38	0	0	3.32	1	1	3.66	3	2	4.75	6	2+1A	measured in one direction only 3/98; green, good 3 & 5/99, 3 & 5/00; green with some red tubercle tips, OK 3/01; green, good 5/01; blue green, OK 3/02; green, OK 5/02; purplish green, good 3 & 5/03
7.00	1	7.58	72	large	4	4.60	2+3 fr	2	6.20	2+7fr	9	6.70	1+7fr	8	6.60	3A+5fr	6	6.11	4fr	3+1disp	5.95	1	1	5.13	4	4	5.36	4	2+2A	reddish green 3/98; maroonish, OK 3/99 orangish, OK 5/99; maroonish, OK 3/00; orangish, OK 5/00; misshapen tubercles spines gray, plant reddish-green, OK 3/01; pale green with tan tubercle tips, OK 5/01; reddish-purple, OK 3/02; green with red & orange tubercle tips, OK 5/02, 3 & 5/03
.01	1	7.34	77												1.26		0	1.18	0	0	1.15	0	dead						discovered 5/99; olive, OK 5/99; green, good 3 & 5/00; damaged, orange, poor 3/01; COD root rot 5/01
.00	1	1.14	105	small	1	2.40	1 fr	0	3.00	0	0	3.60	1fr	1	3.38	3A	0	4.39	4fr	4	5.04	2	1	4.99	6	2+4A	5.95	9	7+2A	green, good 3 & 5/99, 3/00; green with a few tan tubercles, otherwise green, hunkering, OK 5/00; purplish-green, good 3 & 5/01; purplish-green, OK 3/02; green with some yellow tubercle tips, OK 5/02; green, OK 3 & 5/03
10	1	0.74	117									2.00	0	0	2.15	1A	0	2.66	1+1fr	1+1A	dead									discovered 3/98; green, good 3 & 5/99, & 5/00; dry and fluffy inside, COD unknown 3/01
00	1	5.07	62	nd	nd	3.60	2	0	3.70	1+3fr	3	4.20	2fr	2+1A	4.74	4fr	4	4.72	3fr	3	4.53	0	0	dead						partially buried in grass clump 3 & 5/98 & 3/99; maroonish-green, OK 3 & 5/99; yellowish 3/00; orangish, OK 5/00; reddish-purplish-orangish; poor 3/01; orangish, OK 5/01; hard, dry, solid; COD unknown 3/02
10	1	4.54	70						2.00	0	0	2.40	1fr	1	2.50	2fr	1disp	Dead												dull green, OK 3 & 5/99; dry; solid; COD unknown 3/00
20	1	4.77	67												2.12	0	0	2.77	1	1	3.24	0	0	3.15	2	2	3.51	1A	0	edge of grass clump; green, good, 3 & 5/99, 3/00; green with some reddish tubercles, ants swarming fruit, OK 5/00; olive with some reddish tubercles, OK 3 & 5/01; purplish OK 3/02; hunkered, orange, OK 5/02; green with some red tubercle tips, OK 3/03; partly covered in ant dirt, purplish, poor 5/03
00	1	5.20	72	nd	nd	1.60	0	0	1.70	0	0	2.20	0	0	2.70	2fr	1	3.29	2fr	2	dead									maroonish, OK 3/99;retagged 5/99, maroonish, OK 5/99, 3/00; olive, OK 5/00; just spines left; COD unknown 3/01

Ancistrocactus tobuschii Data for
Pole Hollow, Junction

PL#	STAKE	DIST.	ANGLE	95 DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
10.01	1	5.15	73												1.40	0	0	2.06	0	0	2.87	0	0	2.89	4	2+1A	4.29	7	3+3A	green, good, hunkered 3 & 5/99, 3 & 5/00; misshapen, blue-green, OK 3/01; green, good 5/01; slightly purplish-green, OK 3/02; olive, OK 5/02, 3/03; green, good 5/03
11.00	1	7.13	74			1.60	0	0	2.30	1fr	1	2.30	0	0	2.57	0	0	3.04	0	0	3.86	0	1	4.19	5	5	5.16	6	6	discovered 3/96; being covered by rock 3/97; green, good 3 & 5/99, 3 & 5/00, 3 & 5/01; purplish green, OK 3/02; green, OK 5/02, 3 & 5/03
11.10	1	7.34	67									1.70	0	0	2.44	2fr	2	1.72	0	0	1.66	0								discovered 3/98; dull green, OK 3 & 5/99; mostly red, poor 3 & 5/00, 3/01; collected for weevil study 5/01
12.00	1	8.32	48			4.50	3+2fr	4	5.60	1+8fr	9	5.80	1+5fr	6	5.31	3fr	3	5.18	2fr	2	5.61	5	4+1A	4.88	5	4+1A	5.59	6	5+1A	discovered 3/96; army green and red, gray spines 3/98; most tubercles orange spines dull gray, poor 3 & 5/99; mostly reddish, OK 3 & 5/00, 3/01; pale green with reddish tubercles, OK 5/01; reddish-purple, OK 3 & 5/02; reddish green, OK 3/03; olive, OK 5/03
13.00	1	6.82	54			4.00	1+2fr	2	5.00	3fr	3	5.70	1+4fr	5	5.26	4fr	4	Dead												discovered 3/96, 1 flower partially eaten, tag mia 3/98, now 2 tags, a few reddish tubercle tips, OK 3 & 5/99, dead, collected for weevil study 3/00, cod unknown
14.00	1	7.80	46			3.30		1	Dead																					discovered 5/96, COD unknown, just spines left 3/97
15.00	1	3.88	87						3.60	3fr	3	2.30	2fr	2	3.27	2fr	5	3.77	1fr	1	4.46	4	3+1A	4.02	6	1A	3.49	3	1+2A	new growth on top of old stem 3/98; green, good 3 & 5/99; olive, OK 3 & 5/00, 3 & 5/01; yellowish-olive, OK 3 & 5/02; squishy, yellowish olive, poor 3 & 5/03
16.00	1	3.79	79						0.90	0	0	1.30	0	0	1.00	0	0	1.98	0	0	2.61	1	1	3.02	2	1	mia			measured in one direction only 3/98; green, good, hunkered 3 & 5/99; green, good 3 & 5/00; green with some red tubercles, OK 3/01; green, good 5/01; green with a few reddish tubercle tips, OK 3 & 5/02; a few loose spine clusters, plant mia 3 & 5/03
17.00	1	8.79	72						2.80	2fr	2	3.20	1+1fr	2	3.59	1A+2fr	1A	4.19	1+2fr	2+1disp	4.94	3	2+1A	4.45	5	4	5.06	4	4	army green and red, spines gray 3/98; maroonish 3 & 5/99, 3/00; dull green, OK 5/00; purple, OK 3 & 5/01; purplish, OK 3/02; yellowish at base, olive above, OK 5/02; purplish green, good 3 & 5/03

PL#	STAKE	DIST.	ANGLE	95 DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
7.01	1	9.51	71												3.30		1fr	3.35	0	0	3.54	0	0	3.51	3	3	3.93	2	2	discovered 5/99; olive, OK 5/99 & 3/00; green, good 5/00; pale green, OK 3/01; green, good 5/01; olive green, tag loosened 3/02; green, good 5/02; green, OK 3/03; green, good 5/03
8.00	1	9.69	77						2.70	1fr	1	3.00	2	1+1A	3.24	2fr	2	3.48	2+1fr	3	4.15	1	1	3.44	4	3+1A	3.38	2	2	green, good 5/99, 3/00; slightly purplish-green, good 5/00; purple, OK 3 & 5/01; purplish, OK 3/02; green, OK 5/02; green, good 3/03; purplish green, OK 5/03
8.10	1	1.95	62						2.80	2fr	2	2.80	1A+ 1fr	1	2.62	3fr	1	3.79	1fr	1disp	3.44	0	0	3.08	3	3A	3.08	2	1	probably stepped on 3/98; green, good 5/99, 3 & 5/00; spines gray, plant green, OK 3/01; olive, OK 5/01; dull green, OK 3 & 5/02, 3 & 5/03
8.20	1	2.23	62																								2.06	1	1	discovered 3/03; green, good 3 & 5/03
8.30	1	10.00	76																								1.05		0	discovered 5/03; green, good 5/03
9.00	1	9.85	78						2.90	1+1fr	2	3.20	2	1+1A	3.06	3fr	2+1A	3.95	2	1+1A	4.31	2	2A	4.41	4	4	5.35	6	6	green, good, hunkered 3 & 5/99; green, good 3 & 5/00, 3 & 5/01; purplish, OK 3/02; green, OK 5/02; green, good 3 & 5/03
9.10	1	10.54	75																								2.85	2	2	discovered 3/03; green, good 3 & 5/03
0.00	1	5.21	34															3.60	1fr	1	3.84	0	0	dead						discovered 3/00; green, good 3 & 5/00; dull green with some red tubercle tips, OK 3 & 5/01; hard, solid, dry, COD unknown 3/02
1.00	1	5.10	88															1.74		0	1.59	0	0	1.64	0	0	1.42	0	0	discovered 5/00; under rock; green, good 5/00; purple, OK 3/01; olive, OK 5/01, 3 & 5/02; dry, may be dead 3/03; hunkered, poor 5/03
2.00	1	2.92	21																		3.75	1	0	3.10	2	1A	5.37	4	4	discovered 3/01; green, with maroonish tubercle tips, OK 3 & 5/01; green, OK 3 & 5/02; green, good 3 & 5/03
take 1a is ~30m west of Stake 1; R032120A																														
1.00	1a	14.47	98																								5.25	6	5+1A	discovered 3/03; green, good 3 & 5/03
2.00	1a	15.35	96																								5.33	6	6	discovered 3/03; pale green, OK 3 & 5/03
3.00	1a	5.12	278																								7.24	13	9+1A	discovered 3/03; olive, OK 3/03; green, good 5/03
4.00	1a	27.06	342																								6.24	8	8	discovered 3/03; green, good 3 & 5/03
2.00	1a	3.56	356																								5.72	9	7+2A	discovered 3/03; green, good 3 & 5/03
3.00	1a	5.33	2																		4.83	4	1+1A	4.97	6	3+3A	7.17	12	11	measured around juniper, discovered 3/01; green, good 3 & 5/01, 3 & 5/02, 3/03; tiny ants swarming fruits, plant green, good 5/03

Ancistrocactus tobuschii Data for
Pole Hollow, Junction

PL#	STAKE	DIST.	ANGLE	95 DM	95 FL/FR	96DM	96FL	96FR	97DM	97FL	97FR	98DM	98FL	98FR	99DM	99FL	99FR	00DM	00FL	00FR	01DM	01FL	01FR	02DM	02FL	02FR	03DM	03FL	03FR	NOTES
24.00	1a	5.45	27																					3.20	3	0	4.78	9	4+4A	discovered 3/02; purplish-green, OK; reddish OK 5/02; purplish, OK 3/03; green, OK 5/03
25.00	1a	4.87	23																					2.46	2	1A	3.97	3	1	discovered 3/02; purplish-green, OK 3 & 5/02; olive, OK 3/03; partly covered with litter, green, good 5/03
26.00	1a	4.80	21																					1.31	0	0	2.32	0	0	discovered 3/02; green, OK 3 & 5/02, 3/03; green, good 5/03
27.00	1a	4.82	21																					1.23	0	0	1.89	0	0	discovered 3/02; green, OK 3 & 5/02; green, good 3 & 5/03
28.00	1a	2.73	96																					5.24		4+1A	7.38	15	11+4A	discovered 5/02; olive, OK 5/02; green, good 3 & 5/03
29.00	1a	2.85	135																								5.54	8	5+3A	discovered 3/03; green, good 3 & 5/03
30.00	1a	3.25	39																								8.61	17	5+6A	discovered 3/03; green, good 3 & 5/03
31.00	1a	5.40	18																								1.59	0	0	discovered 3/03; green, good 3 & 5/03
32.00	1a	3.38	57																								1.88		0	discovered 5/03; green, good 5/03
33.00	1a	3.34	57																								2.06		0	discovered 5/03; green, good 5/03
Stake 2 is in an opening reached from I-10 W; look for flagging before "Caution Crosswinds" sign																														
1.00	2	9.10	31	med-large	4	2.40	0	0	Dead																					looks dead 3/96, bad but not dead 5/96; COD unknown, just spines left 3/97
2.00	2	9.05	92	medium	3	nd	0	Dead																						too buried to measure diameter, looks dead 3/96, cause of death unknown 5/96
3.00	2	9.03	190			1.20		0	mia			mia			mia															discovered 5/96, possible seedling 19 cm west of tag nail (mia 3/97), plant & tag mia 3 & 5/97, 3 & 5/98, tag relocated, plant mia 3 & 5/99
4.00	2	8.71	190			0.50		0	Dead																					discovered 5/96, COD unknown 3/97
Data taken and recorded by Jackie Poole 3/12/96, 5/7/96; 3/29/97, 5/9/97; 5/9/98; 3/24/99, 5/6/99 with WHC,																														
3/16/00, 5/3/00, 3/15/01, 5/11/01, 3/13/02 with Celeste Brancel-Brown, 5/3/02, 3/21/03, 5/6/03																														
Data taken by Gena Janssen and recorded by Jackie Poole 3/26/98																														

Attachment B:

The impact of the Tobusch Fishhook Cactus Weevil *Gerstaeckeria* sp. nov. on the endangered Tobusch Fishhook Cactus *Ancistrocactus tobuschii*

Report of research activities during the period June 1999 - November 2003

Prepared by

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November 1, 2003

Summary

Results obtained in this study and a review of the literature of cactus feeding Curculionidae suggests the following life history scenario for the Tobusch Fishhook Cactus Weevil. Adult weevils emerge from pupal chambers within the cactus beginning in April and peaking during the first two weeks of May. They feed, mate and oviposit. The larvae feed and mature within the cacti. At some point probably during the winter, they stop feeding and form pupa chambers within the body of the cacti. They metamorphose into adults and remain in the pupa chambers until emerging in April.

During the 3.25-year study, the Tobusch Fishhook Cactus Weevil killed approximately 45% of the diseased Tobusch Fishhook Cactus collected. Thirty five percent of the dead cactus showed no signs of insect or other damage. It is presumed that these died of some type of rot, the agent of which is unknown. *Moneilema crassum*, a cerambycid cactus specialist, killed another 7.5%. Approximately 35% showed no evidence of insect or other damage and were presumed killed by some kind of root rot.

"Information relating to the demographic status of populations, and of the relationship of the species with its environment is almost always crucial to the development and implementation of successful species protection and management strategies" (Primack, 1993).

Herbivory of the Tobusch Fishhook Cactus Weevil, (*Gerstaeckeria* sp. nov.), has been recognized as a threat to the Tobusch Fishhook Cactus at least since 1995 (Lockwood 1995, Emmett 1995). Serious threats to rare cactus species are not without precedent. Herbivory by the moth, *Yosemitia graciella,* suddenly decimated a previously healthy population of the rare barrel cactus, *Sclerocactus polyancistrus,* (Donnell 1986). The moth attacked and over a five-year period killed 90% of the plants at the site. Other colonies of the cactus as close as ten miles away showed no sign of infestation. Studies of this nature and a growing realization of the potential threat to the Tobusch Fishhook Cactus poised by weevil herbivory prompted research about the weevil.

The plant: how rare is it?

Between May 1950 and May 1995, 47 populations of Tobusch Fishhook Cacti were discovered. The current estimation of the total population is less than 3000 individuals (J. Poole pers. comm). The limited distribution of the cactus is something of a mystery (R. Emmett 1995). It is present in two habitat types on the western Edwards Plateau. The first type is gravely soils in flood prone areas associated with rivers and streams. This was where the cactus was originally discovered and was thought to the type habitat, but has turned out to be the least typical. The second type of full sun to moderate shade on rocky hilltops or mesa tops in shallow limestone derived soils is where most of the Tobusch Fishhook Cacti are found. Both of these habitat types as well as the vegetational community associated with the cacti are plentiful, if not extremely common in the western Edwards Plateau. The majority of Tobusch Fishhook Cactus individuals occur within fairly distinct spatially distinct groups of several to many individuals - a colony. (Emmett, 1995).

Rarity in a species is usually related to very specialized habitat requirements or to a lack of species adaptability. As stated above, there doesn't seem to be much that is peculiar about the habitat of the Tobusch Fishhook Cactus. The microclimatic and edaptic requirements are found all over the Edward's Plateau. The usual cause of lack of species adaptability is lack of genetic variability. But the Tobusch Fishhook Cactus is an obligate outbreeder and presumably is not susceptible to problems associated with inbreeding (Emmett 1995). The simple explanation for the lack of success of this cactus species may be habitat alteration.

So why the patchiness and limited distribution? The answer may be simply a habitat alteration brought about by ranching and the introduction of exotic species such as the feral pig. Whatever its cause, the limited distribution of the Tobusch Fishhook Cactus may had have a direct and profound evolutionary impact on the flightless Tobusch Fishhook Cactus weevil.

The weevil: what is it?

In a telephone interview, Charles O'Brien, the expert on the genus *Gerstaeckeria* stated that there are many undescribed weevil species, especially from Texas. Based on a preliminary examination of specimens supplied to him, O'Brien said that the Tobusch Fishhook Cactus feeding weevil is an undescribed species (letter to David Bowles dated 25 September 1996). Nothing is know about the distribution of the *Gerstaeckeria* weevil that feeds on Tobusch

Fishhook Cacti, however, there are several species of *Gerstaeckeria* in the region (H. Burke pers. comm; O'Brien 1970). The description of this weevil may be helpful in determining its similarities to other weevil species. In this report it is referred to as the Tobusch Fishhook Cactus weevil.

This 3.25 year research project sought answers to questions about the impact of the Tobusch fishhook cactus weevil, *Gerstaeckeria* sp. on its host, the endangered Tobusch Fishhook Cactus, *Ancistrocactus tobuschii*. Additional questions were asked about the life history and host preference of this insect that were thought useful in determining the its impact on it hosts and would suggest ways of controlling it. Host range in particular is very important in establishing the life history of the weevil. A species specific to the Tobusch Fishhook Cactus would require a very different management regime than one that could cross host species easily. One of the focal points of the research was the elucidation of the host range of the Tobusch Fishhook Cactus Weevil. Several other cactus species present in the Tobusch Fishhook Cactus habitat were monitored for weevil and other herbivore activity.

Methods

Populations of the Tobusch fishhook cactus were observed for the weevil activity at different sites during the springs and summers of 2000 through 2003. Weevil behavior and activity was also monitored in specially prepared observation boxes in a small laboratory located at 503 East Mary Street, Austin, Texas beginning with the summer of 1999. Jackie Poole made collections of diseased or dead Tobusch Fishhook Cactus during the springs of these years at the sites listed below. Unless specified, any reference to cactus in the text refers to the Tobusch Fishhook Cactus, *Ancistrocactus tobuschii*. The weevil which is the subject of this study is undescribed and is referred to here as the Tobusch Fishhook Cactus Weevil.

Devils River SNA, Val Verde County
Devil's Sinkhole SNA, Edwards County
Dobb's Run, Edwards Co.
Frank Robert's Place, Real County
Hwy 674 right-of-way, Kinney Co.
Junction, Kimble County
Kickapoo Caverns SP, Kinney/Edwards Counties.
Kerr WMA, Kerr County
Lost Maples SNA, Bandera/Real Counties.
Los Rincones Preserve, Kerr County
Pole Hollow, Kimble County

Weevil monitoring in observation boxes

Two methods were used to monitor adult weevil behavior as a function of season (phenology) and to determine the presence of weevils in diseased-looking cacti:

1) Tobusch Fishhook Cacti and other cacti in the habitat were observed at the sites listed above during days and evenings.
2) Dead and dying cacti were removed from the sites and taken to Austin, Texas for observation of weevil emergence and/or weevil damage.

Unhealthy-looking or dead Tobusch Fishhook Cacti were collected from the locations listed above and placed in ventilated plastic boxes approximately 30 x 17 cm. at the Austin

location. A combination of two strategies was used to determine whether or not weevils were present inside the cacti. A portion of the dead cacti were dissected either at the collection site or at the Austin location and examined for the presence of weevils. To determine emergence phenology, dead and disease-looking cacti were allowed to remain in the boxes and periodically checked for the presence of weevils. Cacti in the boxes were misted once a week. Later in the season (July or August) all remaining cacti were dissected and examined for weevils, weevil damage (galleries, puparia or any evidence of weevil feeding) and other insects. The cause of death was assigned accordingly. See Table 1& Fig. 1.

Tobusch Fishhook Cactus Weevil behavior

In addition to the smaller rearing chambers, a large terrarium consisting of a ventilated 60 cm x 30 cm plastic box was established to view adult behavior and to determine whether or not the weevils would eat cacti in the genera *Ancistrocactus ,Opuntia, Echinocerus*, and *Coryphantha*. The chamber was filled with sand to a depth of approximately 10 cm. Potted cacti were partly buried in the sand so the weevils could have free access to them. Weevils reared on Tobusch Fishhook Cacti and other cacti were coded with combinations of three Testers™ paint colors so that they could be distinguished according to rearing plant and origin and placed in the terrarium.

The first two season's objective was to watch adult behavior on and around their hosts and is typical of the procedure for the following years. A living Tobusch Fishhook Cactus was placed along with several Tobusch Fishhook Cactus spine masses and pieces of Tobusch Fishhook Cactus that contained pupa chambers along with Tobusch Fishhook Cactus Weevil that were allowed free access. (The live cactus was procured from Desert Botanical Garden, Phoenix, Arizona). Observations were made day and night, approximately once every 3 hours for the first 2 weeks, less regularly thereafter. The terrarium was maintained until the cacti were dissected on 1 November 2000. In subsequent years, different species of cacti were added to the terrarium to provide a choice to feeding and ovipositing weevils. In the beginning a red incandescent light was tried to facilitate observations at night. This was abandoned after several days because this light source did not cast enough light to allow clear observation and it appeared to make little difference in the behavior of the weevils.

The terrarium was filmed during eight nights for a total of 84 hours with a PicoCam video camera, focal length 10 inches with infra red capability. This film was analyzed for mating and ovipositional behaviors.

Shroud experiments

To check for weevils activity at Kickapoo Caverns SNA during periods when observers could not be present, selected Tobusch Fishhook Cactus were shrouded with conical shrouds constructed of aluminum screen. Each shroud was approximately 30 cm high and 15 cm diameter at the base. Forty nine cacti were shrouded for a three month period during the summer of 1999. Shrouds were placed on July 7th and removed on September 8th. The shrouds were left in place for two month and then removed because of the possibility of a long-term deleterious affect on the cacti.

Host plant feeding preference

An attempt was made to quantify the amount of plant material eaten. Pieces of each cactus species were weighed and placed in feeding chambers with a number of weevils. The

following day they were weighed again. To control for water loss nearly identical pieces, which had had no weevil herbivory, were weighed at the beginning and end of the feeding period. After the expected water loss was subtracted the final weights were subtracted from the starting weights. The difference was the amount of food consumed.

Results

During the 3.25 year study, a total of 256 unhealthy looking Tobusch Fishhook Cacti were placed in ventilated plastic boxes and observed for the presence of weevils. The numbers and kinds of herbivores that emerged from the cacti and that had killed them are presented in Table 1.

The major agent of cactus deaths was the Tobusch Fishhook Cactus weevil (44.8%; Table 2). The second most important cause of death is listed in the category, dead without apparent cause (34.7%). In all cases a death due to weevils was determined by the presence of weevils or the presence of galleries approximately 3-4 mm diameter and/ or the presence of puparial chambers or exit holes from these chambers. If the cerambycid *Moneilema crassum* was not present, mortality due to this beetle was easily distinguished from *Gerstaeckeria* weevil mortality by the larger size of the feeding galleries, which were 8-10 mm diameter. The cerambycid cactus specialist, *Moneilema crassum*, accounted for 7.5% of the deaths.

In most instances, cacti that were dead without apparent cause (DWAC) were not green, and instead had a distinctly grayish color. Their interior consisted of a hard corky material. Sometimes a sandy texture was evident. Presumably these cacti died of some form of root rot. In DWAC cases, galleries or any evidence of feeding was never present. A soupy wet interior generally indicated that Copestylum flies had invaded the cacti. This fly may have been the cause of 15% of the deaths in 2001, a relatively wet spring. In a telephone conversation, F. Christian Thompson described these flies as secondary invaders, so another agent may have weaken or even killed the cacti before the flies arrived.

Host fidelity: the search for weevils on other species in the Tobusch Fishhook Cactus habitat

At various times at Kickapoo Caverns State Natural Area or on private property located at 9301 FM 462 North in Medina County, other species of cacti were dissected and examined for weevils. These species included the prickly pears, *Opuntia lindheimeri* and *O. phaeacantha*, the strawberry cactus, *Echinocereus enneacanthus*, the claret cup cactus, *Echinocereus triglochidiatus*, the lace cactus, *Echinocereus reichenbachii*, and the sulcate cory cactus, *Coryphantha sulcada*. Most of these dissections yielded no results. However, *Gerstaeckeria* weevils were found in *Opuntia* and in *Coryphantha*.

Portions of a number of *Opuntia* cacti were collected at Kickapoo Caverns and brought to Austin for observation. Also collected were *Coryphantha sulcada*. Four of these yielded weevils or other insect.

Opuntia one: One obviously damaged *Opuntia* was collected near (within 10 cm) of Tobusch fishhook Cactus #7 at the Ray Emmett site at Kickapoo Caverns State Natural Area. Two weevils, yet to be identified (in the possession of Charles O'Brien), came out of this cactus. As of early June 2001, # 7 Tobusch fishhook Cactus appears to be healthy. If the weevils that came out of the *Opuntia* are Tobusch Fishhook Cactus Weevils, this would be good evidence that they can cross over to a different host. If they are not, it would support the hypothesis that the Tobusch Fishhook Cactus Weevil is host specific.

Opuntia two: A long chamber was found in the lower portion of this plant near the beginning of its root. Within the chamber there was a colorful moth larva, most likely a *Melitara* moth. Presumably because its growth chamber was disturbed in the process of discovery, the moth larva did not metamorphize and precise identification was not possible. This is the first observation of a larva of this kind in the Tobusch Fishhook Cactus habitat. No larvae of this type have been found on the Tobusch Fishhook Cactus.

Opuntia three: The cactus was collected near the bunkhouse at Kickapoo Caverns State Natural Area. The collection consisted of numerous pads taken from an *Opuntia* that had a distinctly grayish cast. During the course of the summer, at least eight weevils emerged from the *Opuntia*. At lease six exit holes were counted and several grubs were found. The weevils were taken to the Entomology Laboratory at Texas A&M where they were identified as *Gerstaeckeria doddi* by Horace Burke. Three of the live weevils were placed on a Tobusch Fishhook Cactus. No feeding was evident suggesting that *Gerstaeckeria doddi* cannot feed on the Tobusch Fishhook Cacti.

Weevils also emerged from *Coryphantha sulcada* (collected from the Amistad reservoir by Jackie Poole) and were subsequently identified as *Gerstaeckeria bifasciata* (Gerstaecker) by Horace Burke at Texas AM University.

Behavior in a large terrarium

During the 1999 and 2000 seasons much effort was devoted to observations of adult weevil behavior. Adult weevils (up to 19) were color coded and placed in a large terrarium which included a live Tobusch Fishhook Cactus (eventually replace with second Tobusch Fishhook Cactus) and pieces of cactus debris including spine mats and pupal chambers. The weevils were most active during the evening crepuscular period, but a few could be incited to move almost any part of the day or night. Most associated themselves with the living cacti. Others were found under various pieces of the cactus debris, spine mats or pieces with pupa chambers. They often were found within the pupal chambers and under the spine mats. There was clear evidence of feeding on the surface of the cactus as the walls were scoured and fresh green interior flesh was visible. One possible mating was observed; but no ovipositions were witnessed.

Later the two now dead Tobusch Fishhook Cactus cacti were dissected. The cacti were rotten, crumbly, but not liquid inside. No weevils were found in the cacti. There was some evidence of pupa or feeding galleries in the large one, none in the small one.

The results of continuous filming of large terrarium were disappointing. In spite of the near focal length of the camera, its resolution was not sufficient to discern precise behaviors between individual weevils. when viewed under infra red to discern either copulatory or ovipositional behaviors. The precise timing of mating and oviposition in this species remains to be determined.

Hostplant specificity within the large terrarium

Gerstaeckeria weevils showed a large preference for Tobusch Fishhook Cacti. This preference was manifested in two ways - the number of weevils congregated on each cactus species and the amount of cactus tissue of each species consumed.

Experiment one: Terrarium with these plants or pieces of plants: Tobusch Fishhook Cactus, small Tobusch Fishhook Cactus piece with puparia, *Opuntia* mass, large Tobusch Fishhook Cactus piece with puparia, spine masses and a plant carcass.
Twelve out of 13 weevils were congregated on the Tobusch Fishhook Cactus. The Tobusch Fishhook Cactus showed much feeding damage (eight areas evacuated) whereas the other living plant, *Opuntia*, did not.

To determine whether or not *Gerstaeckeria* was host specific, food choice tests were conducted. Food choices present to *Gerstaeckeria* weevils in a feeding chamber were *Opuntia* (probably *Lindheimeri*), *Echinocereus enneacanthus* (strawberry cactus), Tobusch fishhook cactus, and *Echinocactus texensis* (horse crippler). In the first choice tests no attempt was made to quantify the material eaten. The number of weevils on each species was tallied (Table 3).

The horse crippler cactus was hardly touched; no weevils congregated on it. The *Opuntia* showed some feeding damage and two weevils total congregated on it. The Tobusch Fishhook Cactus showed much feeding damage; five weevils congregated on it.

An attempt was made to quantify the amount of food material consumed from a number of species in the habitat. Similar tests where a choice is given among sections of leaves of different species yield results that are often dramatic. In the case of choices among cactus species, the food had to be greatly modified to equalize the amount presented. Cutting the cacti, of course, exposed different amount of tissue to desiccation. Weight loses due to desiccation proved to be more significant that loses due to the consumption of food. It is possible that manipulations of food material could be refined, but the different shapes of the cacti will always present a problem.

Life history of the *Gerstaeckeria*

No weevil activity was visible during daylight or after dark at any Tobusch Fishhook Cactus site. Subsequent examination of dead or sick-looking cacti revealed that weevils were indeed present, but confined to the interior of the cacti.

A combination of two methods was used to determine whether weevils were present inside a cactus. Sick and dead cacti were collected in the field and placed in ventilated plastic boxes. A portion of these was dissected and examined for presence of weevils. The remainder of the dead and diseased cacti were kept in the boxes, misted once a week, and periodically checked for weevil emergence. Later in the season - July or August - all cacti were dissected to look for weevils or weevil damage.

Records were kept of the emergence of the weevils and presence of grubs during the Spring (Fig. 1). Emergence began at the end of April, peaked during the first two weeks of May, tapered off into June and was over by mid July. The data suggest that the Tobusch Fishhook Cactus Weevils spends the bulk of the fall and winter months as larvae inside the cacti. They emerge mainly during May, mate and oviposit. The larvae develop slowly as is typical of root eating insects (see discussion) spending both the hot summer and cold winter months inside the cacti protected from the extremes of heat and cold.
Observations of weevil behavior in the terrarium over the winters of 2001 - 2 and 2002 - 3 showed that a high percentage (ca. 85% both winters) survived the winter and were healthy the following springs. They survived even after they had consumed their food supplies.

The emergence phenology of *Moneilema crassum* was slightly different form the Tobusch Fishhook Cactus Weevil (Fig. 2). Emergence peaked during the first two weeks of April

and was finished by the end of May. *Moneilema crassum* appears to be about one month ahead of the Tobusch Fishhook Cactus Weevil.

Shroud experiments

To check for weevil activity during periods when observers could not be present, selected Tobusch fishhook cacti were shrouded with conical shrouds constructed of aluminum screen. The purpose of the shrouds was to catch and retain any adult weevils that might emerge during times when the investigators could not be present. No weevils were sighted within the shrouds during any part of the two month period from July 7th to September 8th 2000.

Mating and oviposition

The only successful breeding occurred when a gravid female Tobusch Fishhook Cactus Weevil was placed on a Tobusch Fishhook Cactus. The weevil's gravid status was noted by an egg attached to her ovipositor. This weevil producing 4-5 grubs. No oviposition and only one copulation were witnessed during the course of the study.

Will the Tobusch Fishhook Cactus weevil accept other hosts?

The restrictiveness of the weevil with respect to host range is unknown. A large terrarium was established on 12 May 01 to view adult behavior and to establish whether or not the weevils would eat cacti in the genera *Opuntia* and *Echinocerus*. Eight adults reared on Tobusch Fishhook Cacti were coded with combinations of two Testers model paint colors so that they could be distinguished and placed in the terrarium.

In the terrarium, a living Tobusch fishhook cactus was placed along with an *Opuntia* (probably *atrospina*) and an *Echinocerus triglochidiatus*. The weevils were allow free access to all three plants. The terrarium was established on 12 May 01. As of 4 December, 2001 one weevil remain alive.

Observations were conducted periodically over the course of the 2001 spring, summer and fall. The experiment was terminated on 4 December 2001. The Tobusch Fishhook Cactus had been killed by weevils by 15 August 2001, so the experiment became a starvation experiment to see if the weevils would accept the two other species as hosts. They did not. Although the *Opuntia* died during the summer, a close examination and dissection showed no feeding damage. The same was true of the *Echinocerus*, which remained alive through out the experiment. Observation conducted during the spring and summer of 2003 showed that Tobusch Fishhook Cactus Weevils will feed lightly on *Opuntia*, but when given a choice between Tobusch Fishhook Cactus and *Opuntia* they greatly prefer Tobusch Fishhook Cactus.

Discussion

Life history

Since the Tobusch Fishhook Cactus Weevil is undescribed, there is no information available on its biology. However, the general biology of root feeding weevils is known. The information below, while not specifically pertaining to the *Gerstaeckeria*, has been extracted from the literature on the Coleoptera (Evans 1975) because it likely has direct bearing on the life history of the *Gerstaeckeria* cactus weevils.

It is mostly the larval stages of beetles that have specialized in root feeding. The hidden portion of roots in the soil is an ideal location for evading predators while getting on with the business of eating. The above ground parts of the cactus are also extremely well defended,

denying access by potential predators of the root feeding herbivores. Most of these larval root feeders are wire worms, Elyteridae, chafer grubs, Carabeidae or weevils, Curculionidae.

Because of poor nutrient quality, some beetles are slow growing and have long life cycles. Root feeding chafer larvae usually live from two to three years and root feeding wire worm larvae for about five years. Timber and furniture beetles may live even longer, especially if the food is dry and is of low value. There is a record of an American cerambycid larva that lived over 40 years in dry wood.

Beetles are famous for withstanding food shortages or adverse climatic conditions. The commonest way is for the beetle to lapse into a dormant condition (diapause). Weevils and chafers are mentioned as organisms that practice diapause (Evans 1975). All of the examples are likely shared by the cactus feeding *Gerstaeckeria.*

All species of *Gerstaeckeria* weevils are specialists on cactus. They lay eggs in cactus The larvae feed and pupate inside the cactus body. Pupal cells are formed in chambers within and larvae or newly metamorphosed adults may spend a portion of the season in diapause within the pupal cells. Adults are primarily nocturnal and are especially active immediately after dark. The elytra are fused, and consequently, the insects are flightless (O'Brien 1970). It is interesting to note that the only Tobusch Fishhook Cactus population that is thriving, e.g. recruitment is matching or exceeding mortality, is at Lost Maples SNA where *Gerstaeckeria* weevil herbivory has not been verified (J. Poole pers comm). If Tobusch Fishhook Cactus Weevils are not present at Lost Maples, it is unlikely to be able to exploit the Tobusch Fishhook Cactus population there due to the flightless state of the weevil..

The Tobusch Fishhook Cactus Weevil is a stem feeders and stems are know to be less nutritious than leaves or fruits. Development occurs slowly. Because of this it is likely that the weevil is univoltine or possibly it take more than a year to develop. The single observation of the gravid weevil producing viable grubs suggests that it is univoltine. The emergence records of the Tobusch Fishhook Cactus Weevil support this scenario: Metamorphosed adult weevils emerge from their host in mid to late spring. They feed, mate and oviposit. The new generation of grubs feeds within the cactus body all summer, fall and winter. The larvae develop slowly as is typical of root eating insects spending both the hot summer and cold winter months inside the cacti protected from the extremes of heat and cold. After sometime, likely in the winter, immature growth is complete and the larva forms a pupal cell (puparia). Within this cell it metamorphoses. It emerges in late spring and initiates a new generation. Observation of weevils in the large terrarium suggest that some portion of the adult weevils survive the summer and live on until the next spring when they may again participate in mating and ovipositing. Although not observed, mating and ovipositing at time other than spring cannot be ruled out, but the poor quality of the food source suggest slow growth and a univoltine regime.

Oviposition in this species was not witnessed. Another species, *Ryssematus lineaticollis* Say, the milkweed weevil that uses the milkweed, *Asclepias syriaca*, as a host in northern states exhibited mating and ovipositional behaviors that were easily observed. As is typical of weevils, after mating, the female bores a hole in the host with her rostum. She then turns about and inserts an egg in the hole. The larvae develop within the stem of the milkweed. It is likely that this same process occurs in the Tobusch Fishhook Cactus Weevil.

Determination of the host range of the Tobusch Fishhook Cactus Weevil has been frustrating. Host choice experiments have shown that the Tobusch Fishhook Cactus Weevil will aggregate on and can feed on other species of cacti, especially *Opuntia* sp., but consumption of Tobusch Fishhook Cacti far exceeded other species. Moreover, feeding on a cactus species is no

assurance that it may be used for breeding. In two instances *Gerstaeckeria* weevils that looked identical to the Tobusch Fishhook Cactus Weevil were taken from other cactus species. These were described by experts as species other than the Tobusch Fishhook Cactus Weevil. The identification of the weevil found in *Opuntia* growing quite near a Tobusch Fishhook Cactus is still pending. If it is the Tobusch Fishhook Cactus Weevil, it will be the first confirmed case of the weevil's use of two host species. As of this time the range of species that the Tobusch Fishhook Cactus Weevil can use to breed is not confirmed, but it is clear that adults will feed on other species such as *Opuntia*.

If *Gerstaeckeria* is restricted to the Tobusch Fishhook Cactus, then it must have extremely specific host finding mechanisms. Its flightless character would make it dependent on the patchy distribution of its host. If the Tobusch Fishhook Cactus disappears from a particular location, it would also necessarily perish. If not so restricted, it could use other cacti in the habitat and crossover when necessary.

Limitation of study opportunities due to the endangered status of the cactus

An ideal objective of this study would be to know when Tobusch Fishhook Cactus weevils oviposit, how long they remain in the larval stage, when they emerge as adults and when they mate. In spite of many hours of diurnal observations and lengthy nocturnal filming of a terrarium full of weevils, no ovipositional events were witnessed. Assessments of larval stages could only be determined by destructive sampling. That is, the only means of determining the presence of larva was to break the cactus apart. Not only was this a catastrophic event for the cactus, it was the same for the larva destroying the moist environment in which they fed. Consequently only a few cacti were opened during the study. The majority was left intact and whatever was inside them was allowed to develop to maturity.

The weevil's importance as a factor causing the demise of the Tobusch Fishhook Cactus

One of the goals of this study was to monitor Tobusch Fishhook Cactus populations in several state parks and on other state and private property to determine the effects herbivory of Tobusch Fishhook Cactus Weevil. Of the cacti brought in for observation, the weevil killed an estimated 45% and Moneilema killed another 7.5%. These percentages were based on the Tobusch Fishhook Cacti brought to Austin for observation because they were suspected of insect herbivory. J. Poole (2003) made determinations of mortality in the field on additional plants that showed obvious damage (Table 1 in J. Poole 2003). Her estimates of mortality of the Tobusch Fishhook Cactus and the percentage killed by various agents will be the most accurate.

Acknowledgements

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Tables

Table 1 Causes of mortality of the Tobusch Fishhook Cactus for the research period 1999 - 2003

	Year				
	1999	2000	2001	2002	2003
Moneilema crassum [1]	0	2	3	8	7
Gerstaeckeria sp.	12	20	13	44	29
Copestylum flies	0	1	5	0	0
DWAC [2]	23	11	11	32	13
Crushed [3]	0	0	1	0	0
Other insects	0	0	0	1	0
Problem Determinations [4]	6	4	0	1	0
Healthy	4	5	0	0	0
Total	45	43	33	86	49

[1] Emmett 1995 identifies this *Moneilema* as *M. armata* LeConte on p. 138 and as *M. crassum* on p. 161. On page 161 he cited an authority (Ed Riley of Texas A&M University. I have decided to use the referenced identification.
[2] Dead without apparent cause. Tobusch Fishhook Cactus is dead, but has no evidence of insect feeding, e.g. no weevils or galleries.
[3] Presumed to have been crushed by a large herbivore
[4] During the later years of the study, identifying the causes of death became easier.

Table 2 Percentage of Tobusch Fishhook Cacti killed by various agents 1999 - 2003

	1999	2000	2001	2002	2003	Ave %
Moneilema crassum	0	4.7	9.1	9.3	14.3	7.5
Gerstaeckeria sp.	26.7	46.5	39.4	52.2	59.2	44.8
Copestylum flies	0	2.3	15.2	0	0	3.5

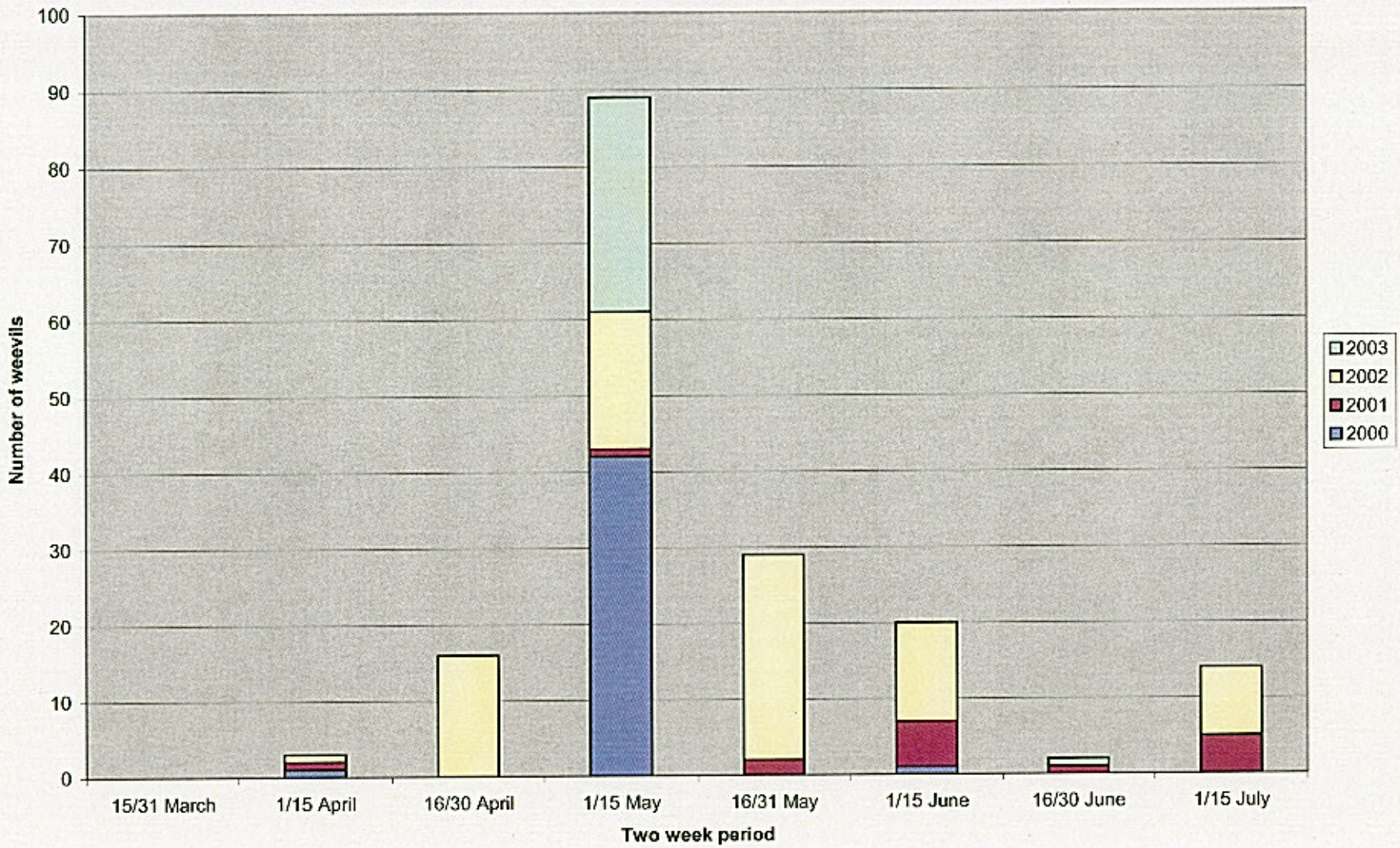
DWAC [1]	51.1	25.6	33.3	37.2	26.5	34.7
Crushed [2]	0	0	3.0	0	0	0.6
Other insects	0	0	0	1.1	0	0.2
Problem determinations	13.3	9.3	0	1.1	0	4.7
Healthy plant	8.9	11.6	0	0	0	4.1

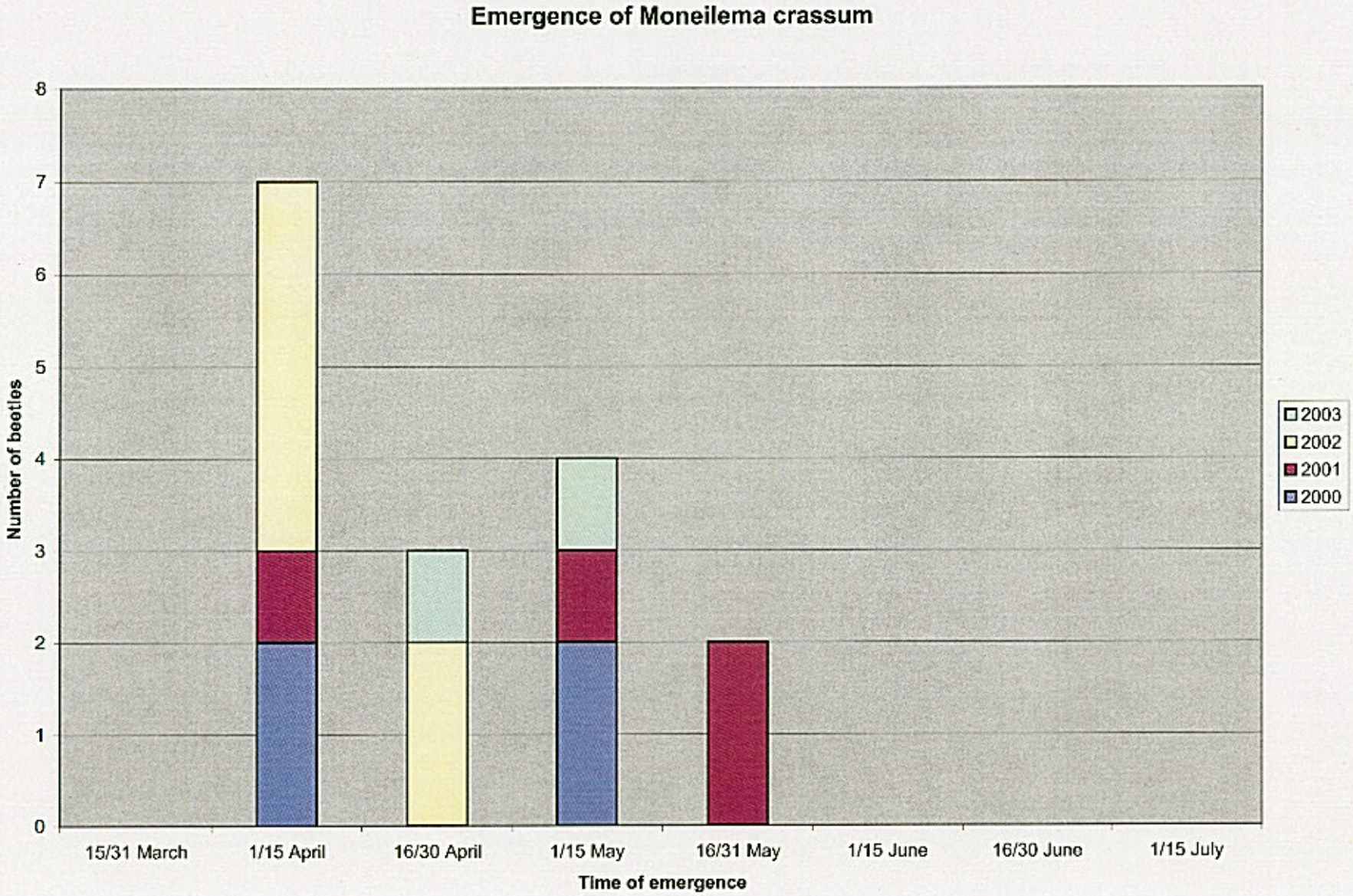
Table 3 Preference of Tobusch Fishhook Cactus Weevil for different species of cacti within the habitat. Numbers are numbers of weevils found at the particular location.

Date	*A.tobuschii*	*Opuntia*	*E. texensis*	E. enneacanthus	Other[2]
7 June 2000	5	2	0	1	1
14 June Rep 1	1	1	0	NA[1]	3
14 June Rep 2	3	0	0	NA[1]	2
16 June Rep 1	3	1	1	NA[1]	0
16 June Rep 2	12	0	NA[1]	NA[1]	1
Total	13	6	1	NA	7

1 The cactus was in too poor of condition to use in the test.
2 Not on a cactus, elsewhere in chamber

Emergence of the Tobusch Fishhook Cactus Weevil from its host




Emergence of Moneilema crassum
Number of beetles
0
1
2
3
4
5
6
7
8
15/31 March
1/15 April
16/30 April
1/15 May
16/31 May
1/15 June
16/30 June
1/15 July
Time of emergence
2003
2002
2001
2000