

FINAL REPORT

As Required by

THE ENDANGERED SPECIES ACT, SECTION 6

TEXAS
Project No: E-1-4

ENDANGERED AND THREATENED SPECIES CONSERVATION

Job No. 1.0

Endangered Plant Education

Project Coordinator: Gena K. Corlies

*Principal Investigator: Jackie M. Poole
Gena K. Corlies*



Larry D. McKinney, Ph.D.
Director
Resource Protection Division

Andrew Sansom
Executive Director
TX Parks and Wildlife Department

November 30, 1992

FINAL REPORT

STATE: TEXAS PROJECT NO.: E-1-4

PROJECT TITLE: Endangered and Threatened Species Conservation.

PERIOD COVERED: September 1, 1991 through August 31, 1992

JOB NUMBER: 1.0

JOB TITLE: Endangered Plant Education

JOB OBJECTIVE: Develop an education program concerning the endangered, threatened, or rare plants of Texas to teach identification of such species, and increase the appreciation and awareness of rare plants and their plight.

SEGMENT OBJECTIVE: Compile slides of all endangered, threatened, and category 1 and 2 plants of Texas for development of slide shows. Texas Natural Heritage Program staff members will photograph endangered, threatened, and category 1 and 2 plants. This work will be done on a continuing basis according to flowering and fruiting seasons. A minimum of 3 sets of slides, which will be available for education purposes, will be produced.

ACCOMPLISHMENTS

Three educational products were produced as a part of this project: 1) Endangered, Threatened and Native Plants identification notebook; 2) Video Production entitled "Endangered Plants: Our Choice"; and, 3) Slide compilation of all Listed and Category plant species in the state of Texas.

The rare plant identification notebook (Endangered, Threatened and Native Plants of Texas) was originally intended as a Game Warden's guide book, but it has now become one of the most requested identification reference materials distributed by TPWD. A total of 33 pages have been mass-produced for the notebook, however, only 20 have actually been distributed (all state listed endangered and threatened species). According to the Law Enforcement Division, distributing pages of species that were not state listed endangered or threatened would only cause confusion. In the past year, 4 plant species have been federally listed as endangered: 1) Terlingua Creek cat's eye (*Cryptantha crassipes*); 2) Walker's manihot (*Manihot walkerae*); 3) Texas trailing phlox (*Phlox nivalis* ssp. *texensis*); and, 4) Little Aguja pondweed (*Potamogeton clystocarpus*). Once these species have been state listed, their identification sheets will be distributed. A list of all identification sheets distributed and not distributed (and a copy of each) are included in Appendix A.

The video production, "Endangered Plants: Our Choice", was completed and available for distribution in 1990. This video can also be purchased from TPWD for \$21.60.

The compilation of slides for all listed and category species of plants in Texas is an overwhelming project. To date, 113 species photographs are a part of this collection, and 61 species are still needed to complete this project. These final 61 species should be completed within the next year. A list of all plant species (and type of photograph) included in the collection thus far, and a list of all those species still needed, are included in Appendix B.

SIGNIFICANT DEVIATIONS

The slide collection for all listed and category plant species in Texas has yet to be completed. This project, however, should be completed within the next fiscal year. At the time of completion, this collection will be presented to USFWS. Additionally, the original plan of having three copies of each slide became too expensive. The project now consists of two sets of slides, one for TPWD and one for USFWS.

PREPARED BY:

Gena K. Corlies

Gena K. Corlies
Endangered Species Botanist

Nov. 24, 1992

Date

APPROVED BY:

Larry D. McKinney
Larry D. McKinney, Ph.D.
Director, Resource Protection Division

11-24-92

Date

APPENDIX A
IDENTIFICATION SHEETS PRODUCED FOR THE ENDANGERED, THREATENED
AND NATIVE PLANTS NOTEBOOK

DISTRIBUTED

<p>Quercus macrocarpa Albionia macrocarpa Saxifraga Lobelia spicata Thymus sp. Fragaria virginiana Limonium carolinianum var. albiflorum Cypripedium pubescens Lithospermum sp. Saxifraga Lobelia sp. Asclepias tuberosa Limonium carolinianum var. albiflorum Cypripedium pubescens var. succulentum Cypripedium pubescens Lithospermum sp. Cypripedium pubescens Cypripedium pubescens Lithospermum sp. Lithospermum sp. Lithospermum sp. Lithospermum sp. Lithospermum sp.</p>	<p>Hickory oak Large leaved sand verbena Texas sandwells Lloyd's hedgehog cactus Aster bogweed Johnston's Penstemon Black lace cactus Mistletoe cactus Shrimp tree Texas wild rice White bladderpod Tobacco root cactus Davis green pine Snead cholla cactus Texas poppy mallow Mistletoe pennywort Bunched cory cactus Lloyd's Mariposa cactus White daisy Lavender lace cress</p>
---	---

APPENDIX A

MASS PRODUCED BUT NOT DISTRIBUTED

<p>Cypripedium pubescens Cypripedium pubescens Cypripedium pubescens var. dasycarpum Ancistrum hirsutum Castilleja elongata Limonium carolinianum var. chrysanthum Mentzelia laevis Lithospermum sp. Aster bogweed Black mallow sp. Lithospermum sp. Ancistrum hirsutum Lithospermum sp.</p>	<p>Texas creek cat's eye Brush pea Silver lace cactus Texas blue star Tall penstemon Chisos hedgehog cactus White's manroot Purple sunflower Star cactus Texas trailing piper Little Agave yucca South Texas ragweed Fringy willow-wort</p>
--	---

APPENDIX A

IDENTIFICATION SHEETS PRODUCED FOR THE ENDANGERED, THREATENED AND NATIVE PLANTS NOTEBOOK

DISTRIBUTED

1)	Hickley oak	<i>Quercus hinckeyi</i>
2)	Large-fruited sand verbena	<i>Abronia macrocarpa</i>
3)	Texas snowbells	<i>Styrax texana</i>
4)	Lloyd's hedgehog cactus	<i>Echinocereus lloydii</i>
5)	Ashy dogweed	<i>Thymophylla tephroleuca</i>
6)	Johnston's Frankenia	<i>Frankenia johnstonii</i>
7)	Black lace cactus	<i>Echinocereus rechenbachii</i> var. <i>albertii</i>
8)	Nellie cory cactus	<i>Coryphantha minima</i>
9)	Slender rush pea	<i>Hoffmannseggia tenella</i>
10)	Texas wild rice	<i>Zizania texana</i>
11)	White bladderpod	<i>Lesquerella padilla</i>
12)	Tobusch fishhook cactus	<i>Ancistrocactus tobuschii</i>
13)	Davis' green pitaya	<i>Echinocereus viridiflorus</i> var. <i>davisii</i>
14)	Sneed pincushion cactus	<i>Coryphantha sneedii</i> var. <i>sneedii</i>
15)	Texas poppy mallow	<i>Callirhoe scabriuscula</i>
16)	McKittrick pennyroyal	<i>Hedeoma apiculatum</i>
17)	Bunched cory cactus	<i>Coryphantha ramillosa</i>
18)	Lloyd's Mariposa cactus	<i>Neolloydia mariposensis</i>
19)	Prairie dawn	<i>Hymenoxys texana</i>
20)	Navasota ladies' tresses	<i>Spiranthes parksii</i>

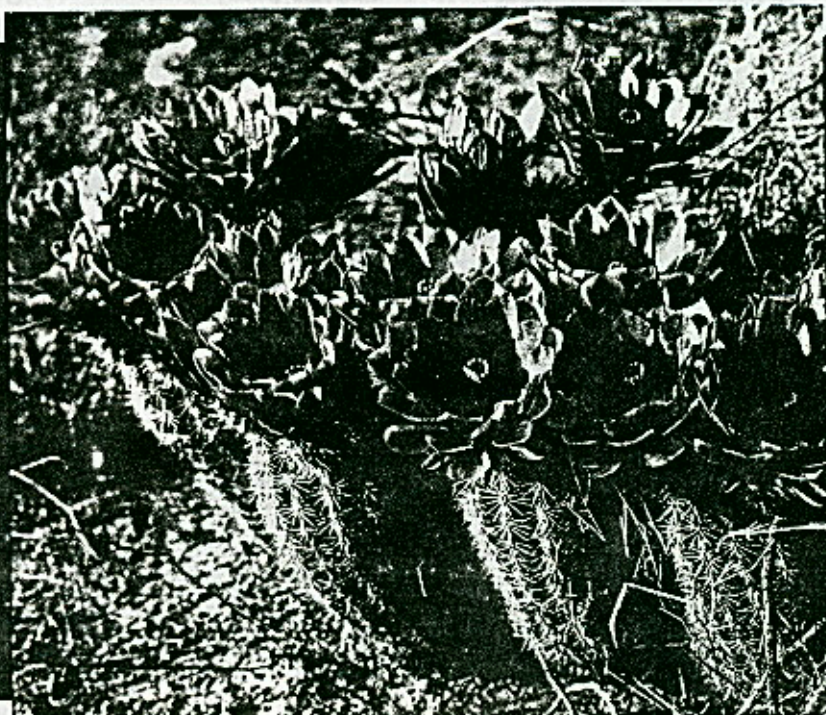
MASS-PRODUCED BUT NOT DISTRIBUTED

21)	Terlingua creek cat's eye	<i>Cryptantha crassipes</i>
22)	Brush pea	<i>Genistidium dumosum</i>
23)	Silver lace cactus	<i>Coryphanth strobiliformis</i> var. <i>durispina</i>
24)	Tharp's blue-star	<i>Amsonia tharpii</i>
25)	Tall paintbrush	<i>Castilleja elongata</i>
26)	Chisos hedgehog cactus	<i>Echinocereus chisoensis</i> var. <i>chisoensis</i>
27)	Walker's manihot	<i>Manihot walkerae</i>
28)	Puzzle sunflower	<i>Helianthus paradoxus</i>
29)	Star cactus	<i>Astrophytum asterias</i>
30)	Texas trailing phlox	<i>Phlox nivalis</i> ssp. <i>texensis</i>
31)	Little Aguja pondweed	<i>Potamogeton clystocarpus</i>
32)	South Texas ragweed	<i>Ambrosia cheiranthefolia</i>
33)	Brushy whitlow-wort	<i>Paronychia congesta</i>

Common Name:
Chisos hedgehog cactus
Chisos Mountain hedgehog
Chisos cholla

Common Name:

Lloyd's hedgehog cactus



Allan Zimmerman



Scientific Name: *Echinocereus lloydii* Britt. and Rose

Other Scientific Names: *Echinocereus roetteri* (Engelm.) Engelm. ex Rumpel var. *lloydii* Backeberg; *Echinocereus viridiflorus* Engelm. var. *intermedius* Backeberg; *Echinocereus roetteri* (Engelm.) Engelm. ex Rumpel; *Echinocereus pectinatus* Scheidw. "var. *rectispinus*"

Federal Status: Listed as Endangered, October 26, 1979

State Status: Listed as Endangered, April 29, 1983

Photographs and Drawings: Warnock, 1974, p.94; Weniger, 1970, plate 11; Weniger, 1984, p.51.

Description:

Habit: Stems one or several in a clump, 6-12 in. long, 3 - 4½ in. thick, cylinder-shaped, green, with 11-13 ribs, tuberculate; areoles circular, ¼ - ⅓ in. apart.

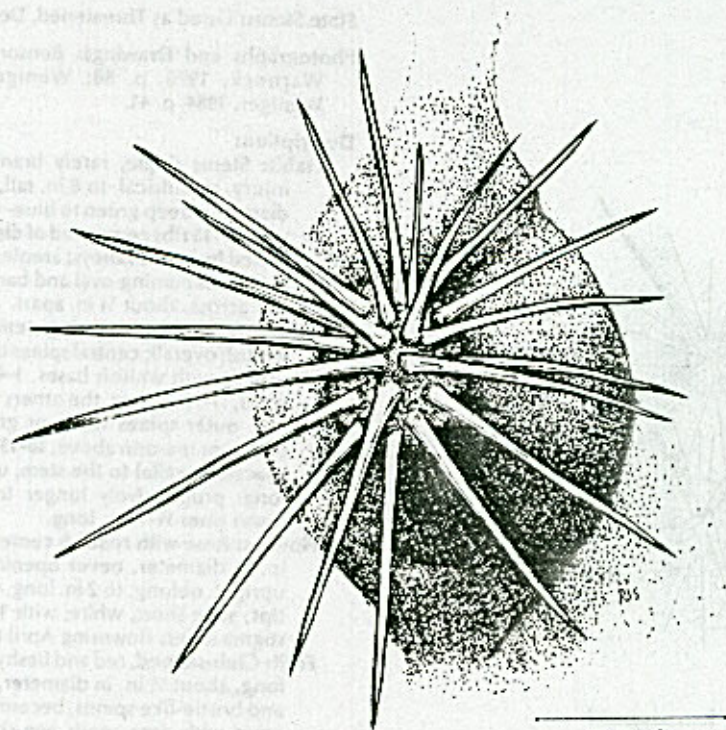
Spines: Partially hiding stem, red with gray coating, straight, spreading, needlike; central spines 2-8, to ½ in. long; outer spines 8-17, to ⅓ in. long.

Flowers: Various shades of red, extremely variable in color, 2¼ - 3 in. long, 2 - 3½ in. in diameter; outer "petals" with purplish centers and lavender margins, narrowly oblong, blunt at tip and wavy, 1½ in. long, ¼ in. wide; inner "petals" lavender or magenta to orangish-red, lance-shaped but broader at tip, rounded, 1½ in. long, ½ in. wide; anthers yellow to pink; stigma green; flowering April to May.

Fruit: Green tinged with pink or orange, 1 - 1¼ in. long, ½ - ¾ in. in diameter, egg-shaped, with white spines about ⅓ in. long; maturing mid-summer; seeds black, warty, about ⅛ in. long and broad.

Habitat: On various sites within the Chihuahuan Desert, with lechuguilla, mesquite, creosote bush, tarbush, skeleton-leaf goldeneye, and various cacti.

Ownership: Guadalupe Mountains National Park and private.

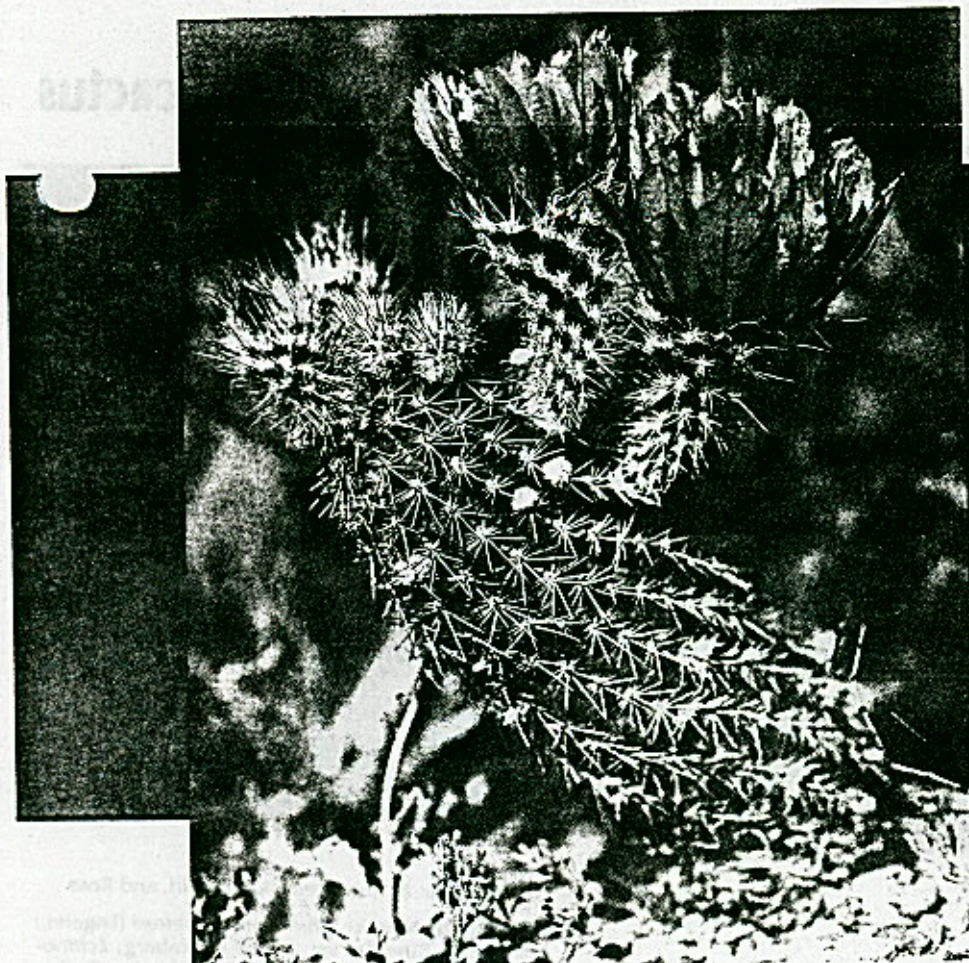


¼ inch

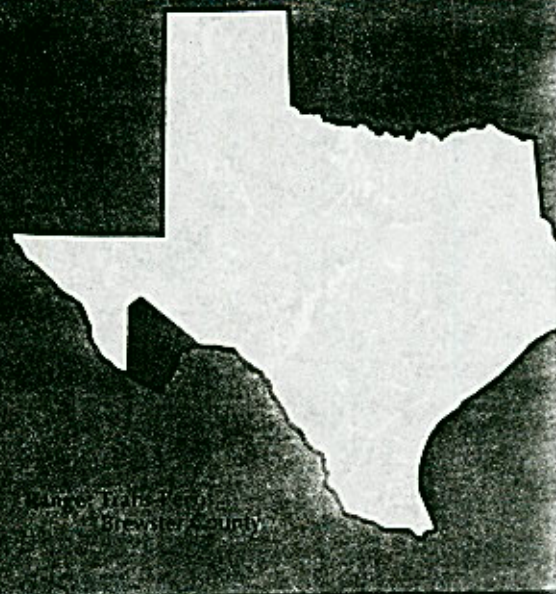
Typical spine cluster of
Lloyd's hedgehog cactus

(continued on back)

Common Name:
Chisos hedgehog cactus
 Chisos Mountain hedgehog,
 Chisos pitaya, Chisos hedgehog



Paul Montgomery



Scientific Name: *Echinocereus chisoensis* W.T. Marshall
 var. *chisoensis*

Other Scientific Names: *Echinocereus reichenbachii* (Terscheck) Haage f. ex Britt. & Rose var. *chisoensis* (W.T. Marshall) L. Benson; *Echinocereus chisosensis*, a misspelling.

Federal Status: Listed as Threatened, September 30, 1988

State Status: Listed as Threatened, December 30, 1988

Photographs and Drawings: Benson, 1982, plate 113; Warnock, 1970, p. 88; Weniger, 1970, plate 7; Weniger, 1984, p. 41.

Description:

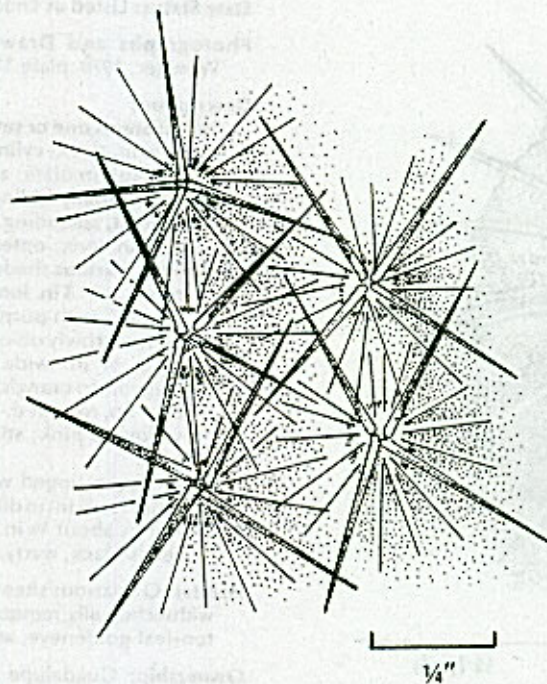
Habit: Stems single, rarely branching with age or injury, cylindrical, to 8 in. tall, slender, to 2 in. in diameter, deep green to blue- to yellowish-green with 13-16 ribs composed of distinct tubercles separated by broad valleys; areoles circular and woolly at first, becoming oval and bare with age, $\frac{1}{8}$ in. or less across, about $\frac{1}{4}$ in. apart.

Spines: Sparse, not covering stems, slender, straight whitish overall; central spines black to dark brown usually with whitish bases, 1-4, one pointed outward, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, the others shorter and spreading; outer spines white or gray below and red brown or maroon above, 10-15, bristle-like, evenly spaced, parallel to the stem, upper ones $\frac{1}{4}$ - $\frac{3}{8}$ in. long, progressively longer toward the bottom, lower ones $\frac{1}{4}$ - $\frac{3}{8}$ in. long.

Flowers: Rose with reddish centers, to $2\frac{1}{2}$ in. long, 1 in. in diameter, never opening widely; petals upright, oblong, to 2 in. long, with entire, pointed tips; style short, white, with 10 small, dark green stigma lobes; flowering April to July.

Fruit: Club-shaped, red and fleshy when ripe, 1-1 $\frac{1}{2}$ in. long, about $\frac{1}{2}$ in. in diameter, covered with woolly and bristle-like spines, becoming dry and splitting open with age; seeds egg-shaped, about $\frac{1}{8}$ in. long, black, warty.

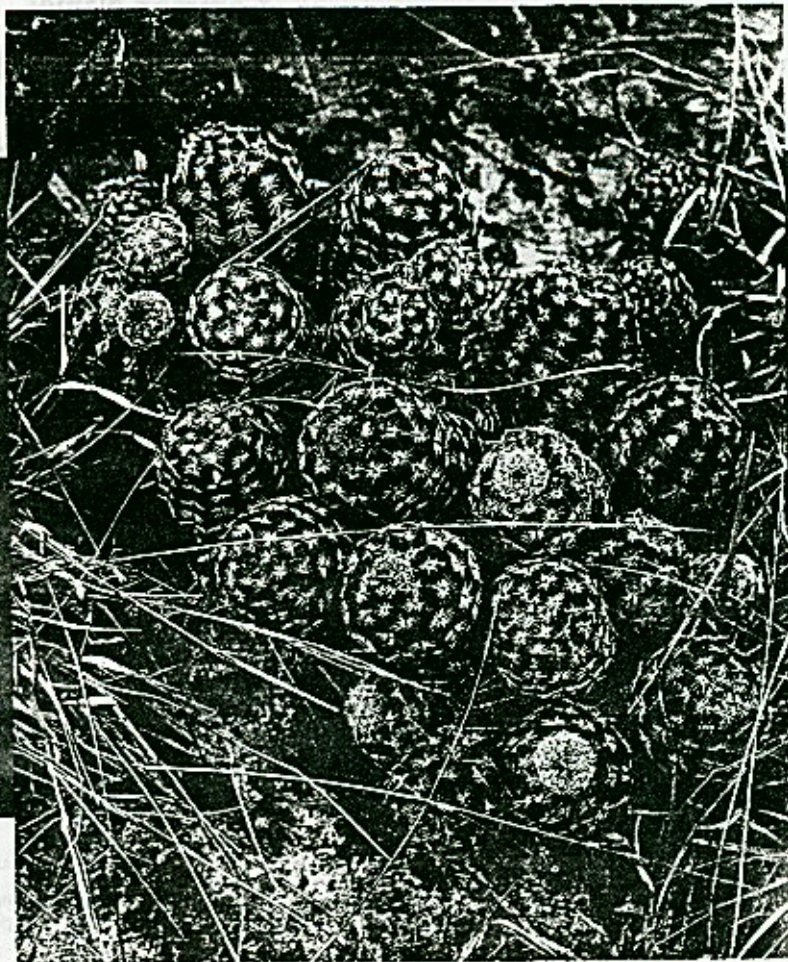
Habitat: Desert grasslands and shrublands at low elevation; with dog cholla, creosote bush, lechuguilla, ocotillo, and leatherstem.



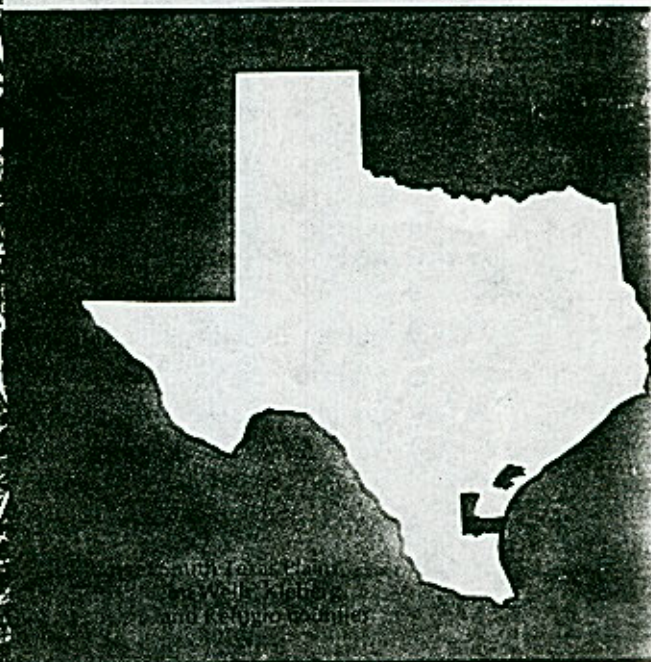
Typical spine clusters of
 Chisos hedgehog cactus

(continued on back)

Common Name:
Black lace cactus



Jackie Poole



Scientific Name: *Echinocereus reichenbachii* (Terscheck)
 Haage f. var. *albertii* L. Benson

Other Scientific Names: *Echinocereus melanocentrus*
 Lowry

Federal Status: Listed as Endangered, October 26, 1979

State Status: Listed as Endangered, April 29, 1983

Photographs and Drawings: Benson, 1982, p.671 and plate
 114; Weniger, 1970, plate 5; Weniger, 1984, p.35.

Description:

Habit: Stems single or branching with age, 1 - 6 in.
 long, 1-2 in. thick, cylinder-shaped, deep green,
 with 10-13 ribs, tuberculate; areoles elliptic, $\frac{1}{8}$ in.
 long, almost touching.

Spines: Dark, partially hiding stem; central spine none
 or 1, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, purple-black, perpendicular to
 stem, or turning slightly upward; outer spines 14
 -20, slender, resembling the teeth in a comb,
 straight, white with dark purple tips, $\frac{1}{4}$ - $\frac{1}{2}$ in. long.

Flowers: Pink to purple, 2 - 3 in. long, 2 - 3 in. wide,
 "petals" pointed at tips; stigma green, with 12 - 13
 lobes; flowering April to June.

Fruit: Green, about $\frac{3}{4}$ in. long; seeds not described.

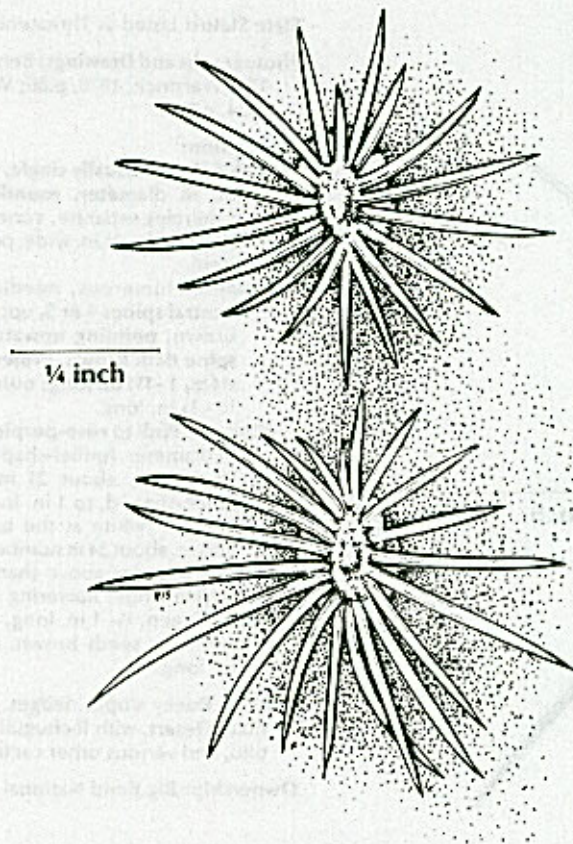
Habitat: Brushy, grassy areas where the Gulf Coastal Plain
 meets the inland mesquite shrubland, with huisache,
 mesquite, blackbrush, retama, granjeno, guayacan,
 buffalo grass, and Texas grama.

Ownership: Private.

Similar Species with Key Character Differences:

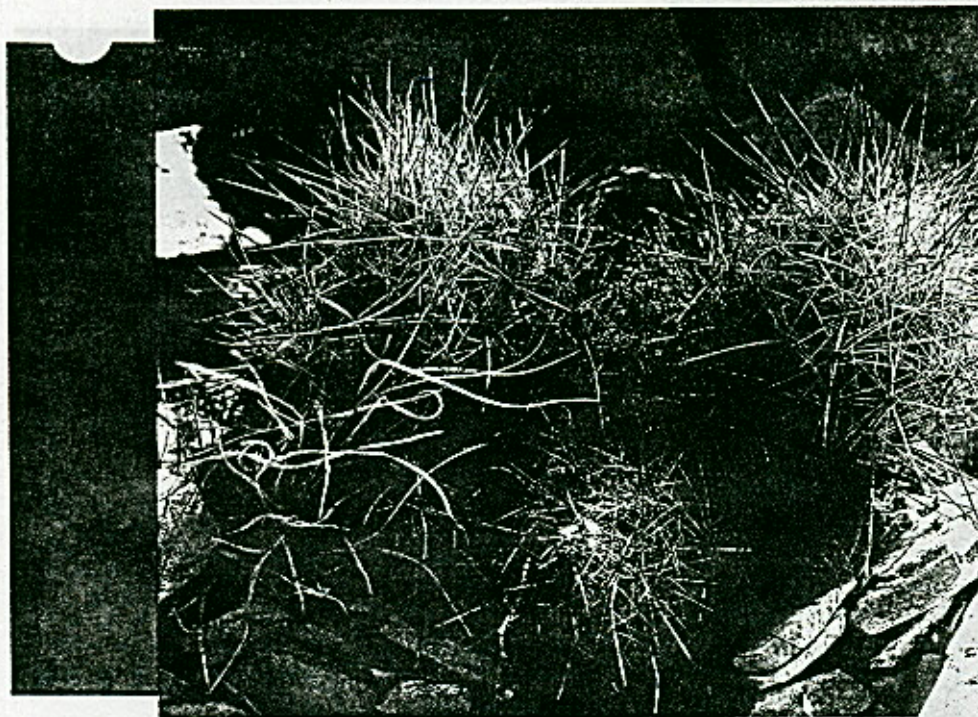
Longer areole, more outer spines, outer
 spines straw-colored to pale gray with pink
 tips *E. reichenbachii* var. *reichenbachii*

Longer areole, outer spines spreading
 irregularly, outer spines straw-colored
 to pink *E. reichenbachii* var. *perbellus*

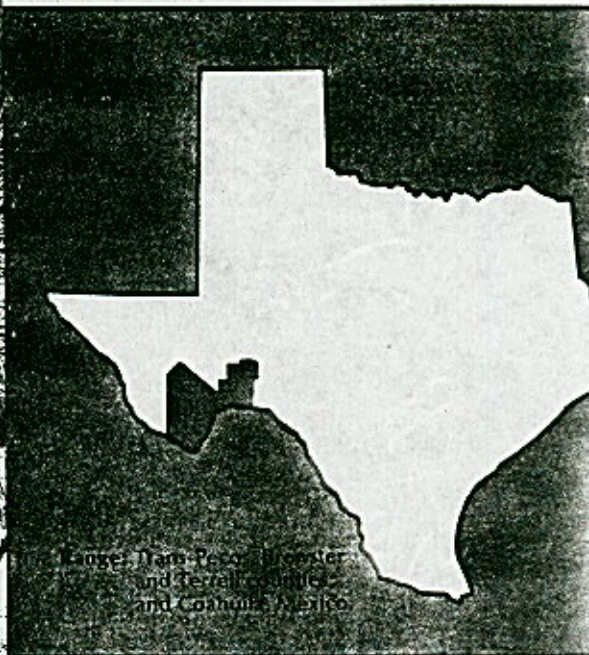


Typical spine cluster of
 Black lace cactus

Common Name:
Bunched cory cactus



Jackie Poole



Range: Big Bend National Park and Terrell Mountains and Coahuila, Mexico

Scientific Name: *Coryphantha ramillosa* Cutak

Other Scientific Names: *Mammillaria ramillosa* (Cutak) Weniger; *Coryphantha ramulosa* (misspelling in Warnock, 1970)

Federal Status: Listed as Threatened, November 6, 1979

State Status: Listed as Threatened, April 29, 1983

Photographs and Drawings: Benson, 1982, p.836 and plate 174; Warnock, 1970, p.86; Weniger, 1970, plate 29, & 1984, p.172.

Description:

Habit: Stems usually single, 2¼ - 3½ in. long, 2¼ - 3¼ in. in diameter, rounded, dark grayish-green; tubercles separate, cone-shaped and pointed, ½ in. long, ½ - ¾ in. wide, protruding ¼ - ½ in. from stem.

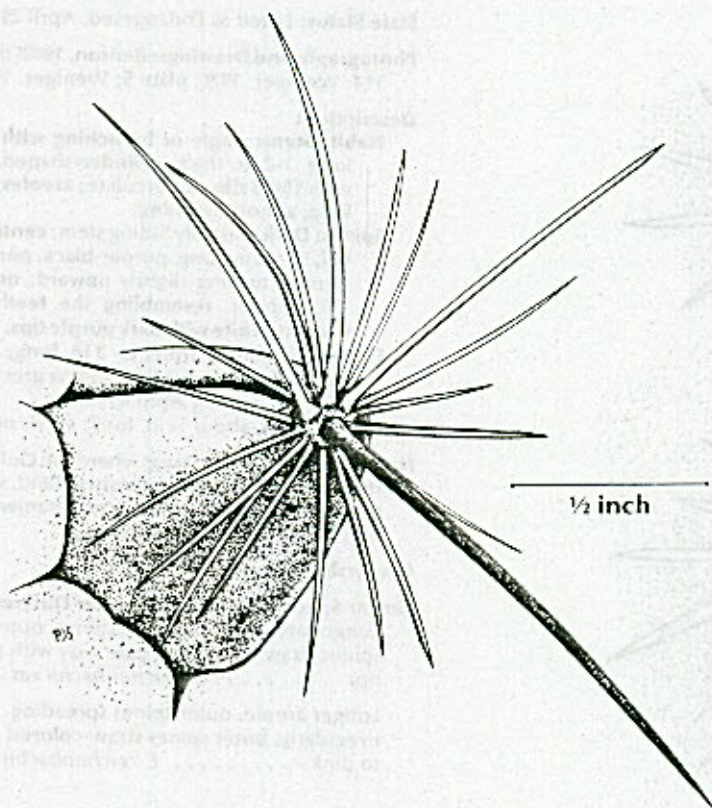
Spines: Numerous, needlelike, not hiding stem; central spines 4 or 5, upper ones white with some brown, pointing upward, ¾ - 1 in. long, lowest spine dark brown, projecting outwardly from the stem, 1 - 1½ in. long; outer spines 9-20, dull white ½ - ¾ in. long.

Flowers: Pink to rose-purple, 1-1½ in. long, 1¼ - 2 in. in diameter, funnel-shaped; outer "petals" greenish-purple, about 21 in number, more or less lance-shaped, to 1 in. long and ¼ in. wide; inner "petals" white at the base, pink to rose-purple above, about 34 in number, narrowly lance-shaped and broader above than below; anthers yellow; stigma white; flowering April to June.

Fruit: Green, ¾ - 1 in. long, egg-shaped; maturing in summer; seeds brown, kidney-shaped, about ¼ in. long.

Habitat: Rocky slopes, ledges, and flats in the Chihuahuan Desert, with lechuguilla, beargrass, yucca, ocotillo, and various other cacti.

Ownership: Big Bend National Park and private.



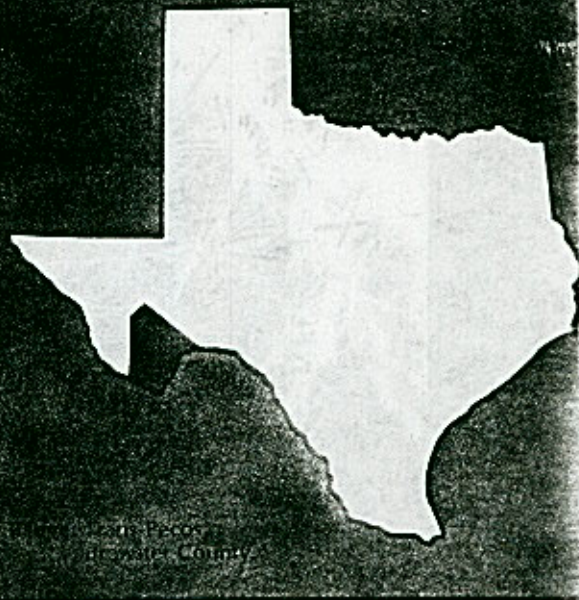
Typical spine cluster of
 Bunched cory cactus

Common Name:
Davis' green pitaya

Davis' hedge cactus, Green pitaya cactus
 Davis' hedgehog cactus, Davis' green pitaya cactus



David Riskind



Scientific Name: *Echinocereus viridiflorus* Engelm. var. *davisii* (A.D. Houghton) W.T. Marshall

Other Scientific Names: *Echinocereus davisii* A.D. Houghton

Federal Status: Listed as Endangered, November 7, 1979

State Status: Listed as Endangered, April 29, 1983

Photographs and Drawings: Weniger, 1970, plate 2; Warnock, 1977, p. 158; Weniger, 1984, p.21.

Description:

Habit: Stems usually solitary, mostly underground, often covered with spikemoss, very small, $\frac{3}{8}$ - $1\frac{1}{16}$ in. long, $\frac{3}{8}$ - $\frac{1}{4}$ in. in diameter, top-shaped, dark green, with 6-9 ribs; areoles narrowly oval, $\frac{1}{8}$ - $\frac{3}{16}$ in. long.

Spines: Partially hiding stem, straight or curving upward, reddish-purple, gray, or white, often tipped with red; central spine absent or occasionally one present with age, $\frac{3}{8}$ - $\frac{1}{2}$ in. long; outer spines 8-14, lower ones $\frac{3}{16}$ - $\frac{5}{16}$ in. long, upper ones shorter, arranged like teeth in a comb.

Flowers: Greenish-yellow, to 1 in. long, $\frac{3}{8}$ - $\frac{1}{4}$ in. in diameter; stamens pale green to yellow; stigma pale green, with 5-7 lobes; flowering February to March.

Fruit: Green, dry, egg-shaped, $\frac{1}{4}$ - $\frac{1}{8}$ in. long, $\frac{1}{16}$ - $\frac{1}{8}$ in. in diameter; maturing April to May; seeds warty, about $\frac{1}{32}$ in. long.

Habitat: Novaculite outcrops, in full sun among sparse Chihuahuan Desert scrub, usually immersed in mats of spikemoss.

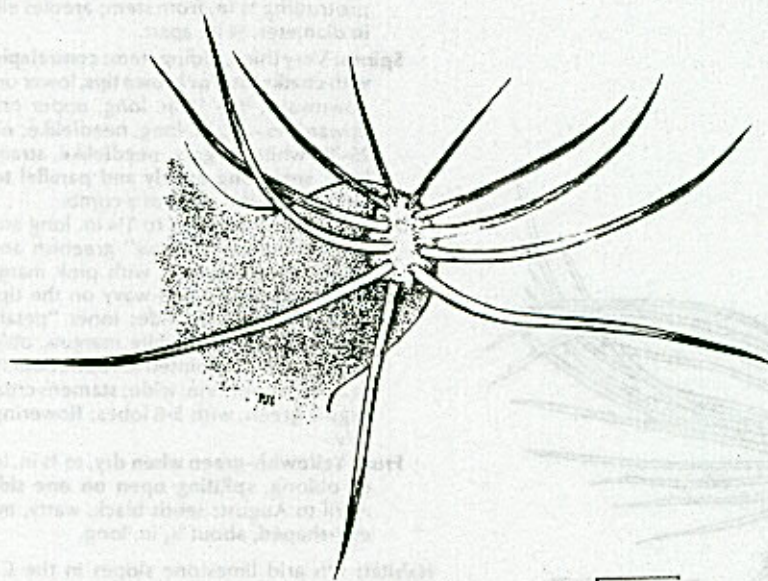
Ownership: Private and Texas Department of Highways and Public Transportation right-of-way.

Similar Species with Key Character Differences:

Stems larger, above ground, 10-14 ribbed . . . *Echinocereus viridiflorus* (other varieties)

Larger stems; larger flowers; central spines present *Echinocereus* (other species)

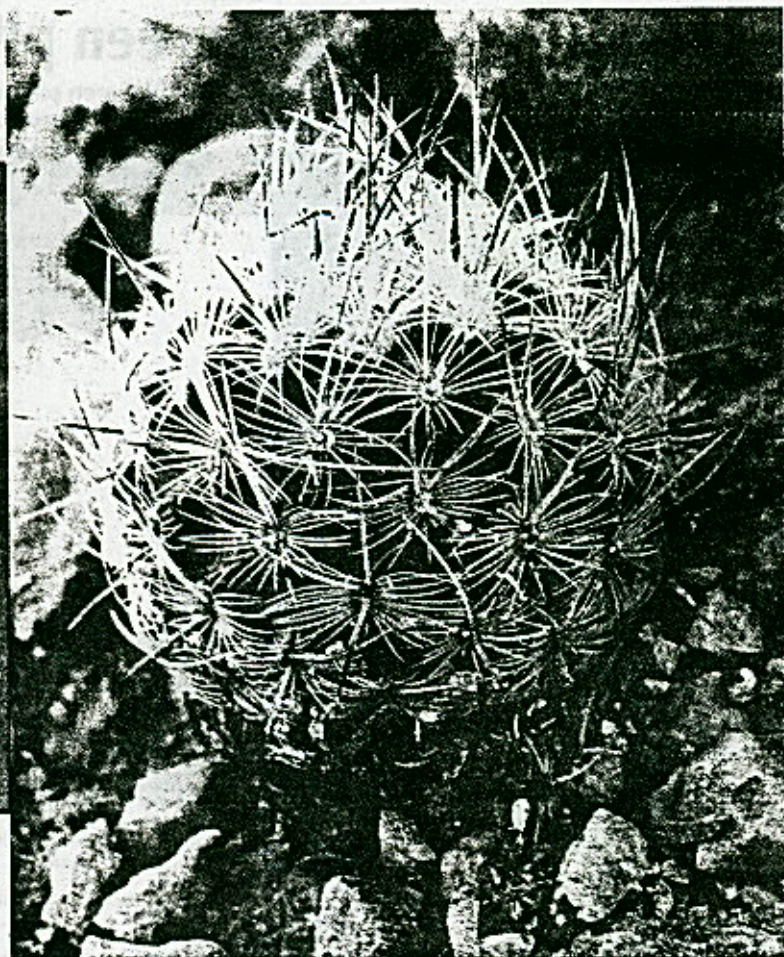
Stems not ribbed *Mammillaria*



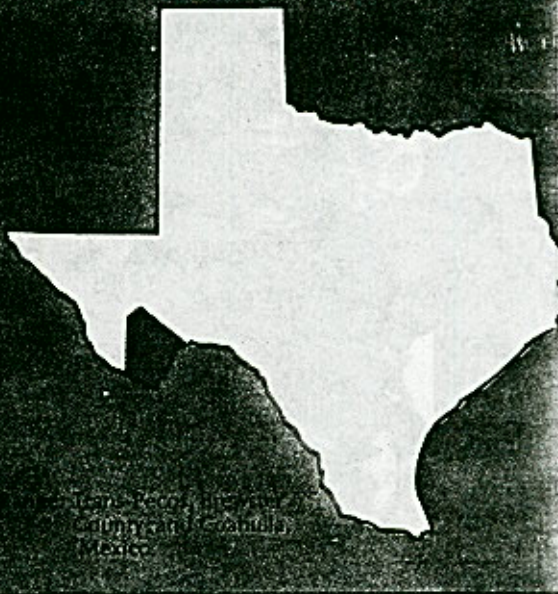
$\frac{1}{8}$ inch

Typical spine cluster of
 Davis' green pitaya

Common Name:
Lloyd's Mariposa cactus
 Golfball cactus, Mariposa cactus



Paul Montgomery



Scientific Name: *Neolloydia mariposensis*
 (Hester) L. Benson

Other Scientific Names: *Echinomastus mariposensis*
 Hester; *Echinocactus mariposensis* (Hester) Weniger

Federal Status: Listed as Threatened, November 6, 1979

State Status: Listed as Threatened, April 29, 1983

Photographs and Drawings: Benson, 1982, plates 152 and 153; Warnock, 1977, p. 164; Weniger, 1970, plate 25; Weniger, 1984, p. 133 and 135.

Description:

Habit: Stems single, 1 - 4 in. long, 1 - 2½ in. in diameter, egg- to golfball-shaped, blue-green, without ribs; tubercles ¼ in. long and broad, protruding ¼ in. from stem; areoles elliptic, ½ in. in diameter, ¼ in. apart.

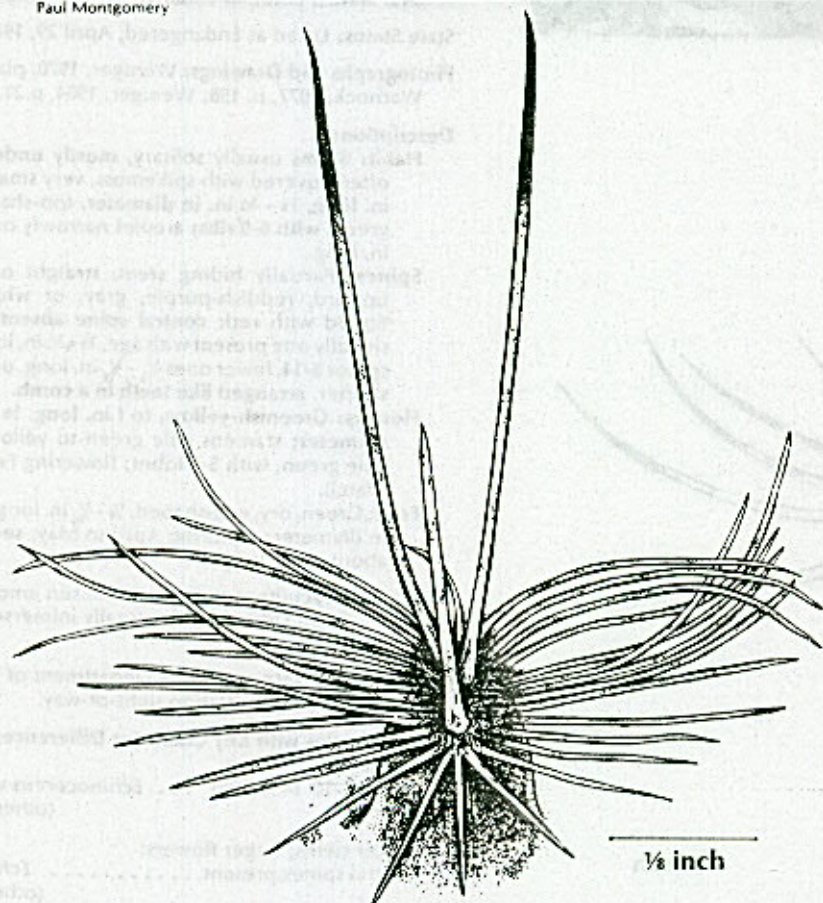
Spines: Very thick, hiding stem; central spines 2-4, tan with chalky blue or brown tips, lower ones curving downward, ¾ - 1 in. long, upper ones curving upward, ½ - 1½ in. long, needlelike; outer spines 25-35, white to gray, needlelike, straight, ¼ - ¾ in. long, spreading evenly and parallel to stem, arranged like the teeth of a comb.

Flowers: Green to pink, to 1¼ in. long and 1½ in. in diameter; outer "petals" greenish and reddish-purple in the center, with pink margins, lance-shaped, rounded and wavy on the tips, to ¾ in. long, about ¼ in. wide; inner "petals" pink or yellowish tan with white margins, oblong-lance-shaped, almost pointed to rounded at the tip, to ¾ in. long, about ¼ in. wide; stamens cream to pink; stigma green, with 5-8 lobes; flowering March to July.

Fruit: Yellowish-green when dry, to ¾ in. long, round or oblong, splitting open on one side; fruiting April to August; seeds black, warty, more or less egg-shaped, about ¼ in. long.

Habitat: On arid limestone slopes in the Chihuahuan Desert, with creosote bush, lechuguilla, ocotillo, candelilla, leatherstem, and other cacti.

Ownership: Big Bend National Park and private.

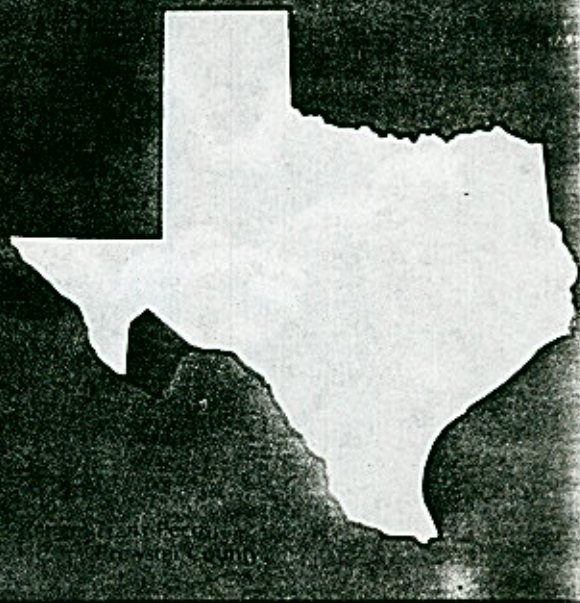


Typical spine cluster of
 Lloyd's Mariposa cactus

Common Name:
Nellie cory cactus
 Dwarf cory cactus



Dale and Marion Zimmerman



Scientific Name: *Coryphantha minima* Baird

Other Scientific Names: *Coryphantha nellieae* Croizat; *Mammillaria nellieae* (Croizat) Croizat; *Escobaria nellieae* (Croizat) Backeberg; *Escobaria minima* (Baird) D. Hunt.

Federal Status: Listed as Endangered, November 7, 1979

State Status: Listed as Endangered, April 29, 1983

Photographs and Drawings: Weniger, 1970, plate 37; Benson, 1982, pp.812-813 and plate 166; Warnock, 1977, p.156; Weniger, 1984, p.203.

Description:

Habit: Stems single, very small, $\frac{1}{2}$ - 1 in. long, $\frac{1}{4}$ - $\frac{3}{4}$ in. in diameter, round to cylindrical, dark green; tubercles $\frac{1}{16}$ - $\frac{3}{16}$ in. in diameter, protruding $\frac{1}{16}$ - $\frac{1}{8}$ in. from stem; areoles cone- or egg-shaped, wooly, less than $\frac{1}{16}$ in. in diameter, usually $\frac{1}{8}$ - $\frac{3}{16}$ in. apart.

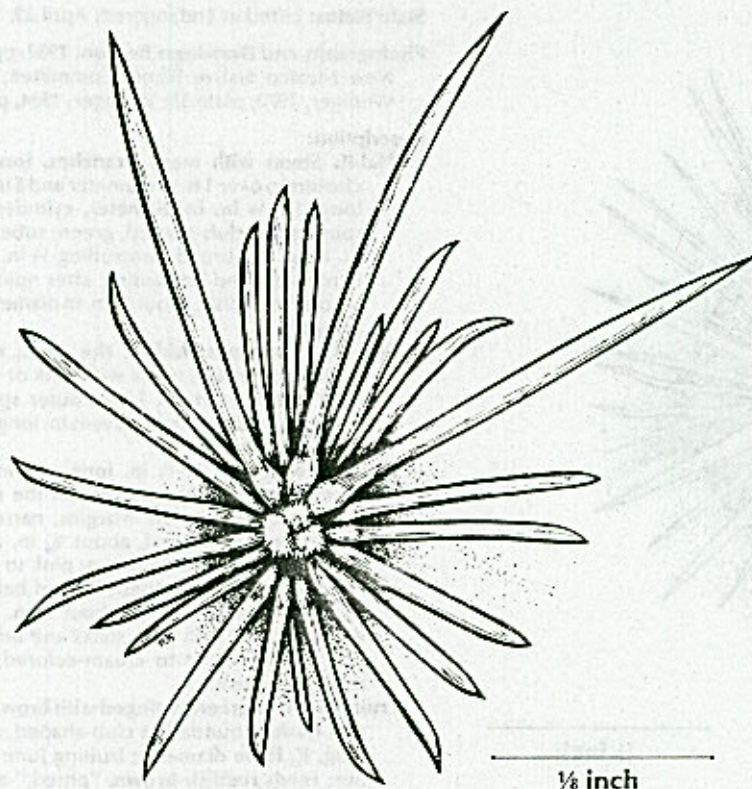
Spines: Dense, 15-27 per areole, ashy gray or pinkish, cylindrical, abruptly pointed at tip, appearing very thick for their length, spreading parallel to the stem, $\frac{1}{8}$ - $\frac{1}{4}$ in. long.

Flowers: Pale pink to reddish-purple, $\frac{1}{2}$ - $\frac{3}{8}$ in. long, $\frac{3}{4}$ - 1 in. wide; "petals" lance-shaped, margins fringe-like, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, $\frac{1}{8}$ - $\frac{3}{16}$ in. wide; stamens greenish to yellow; stigmas green, with 4-8 lobes; flowering March to June.

Fruit: Green, egg-shaped, $\frac{1}{16}$ - $\frac{1}{4}$ in. long, $\frac{1}{16}$ - $\frac{3}{16}$ in. in diameter; maturing June to October; seeds black, pitted, about $\frac{1}{32}$ in. long.

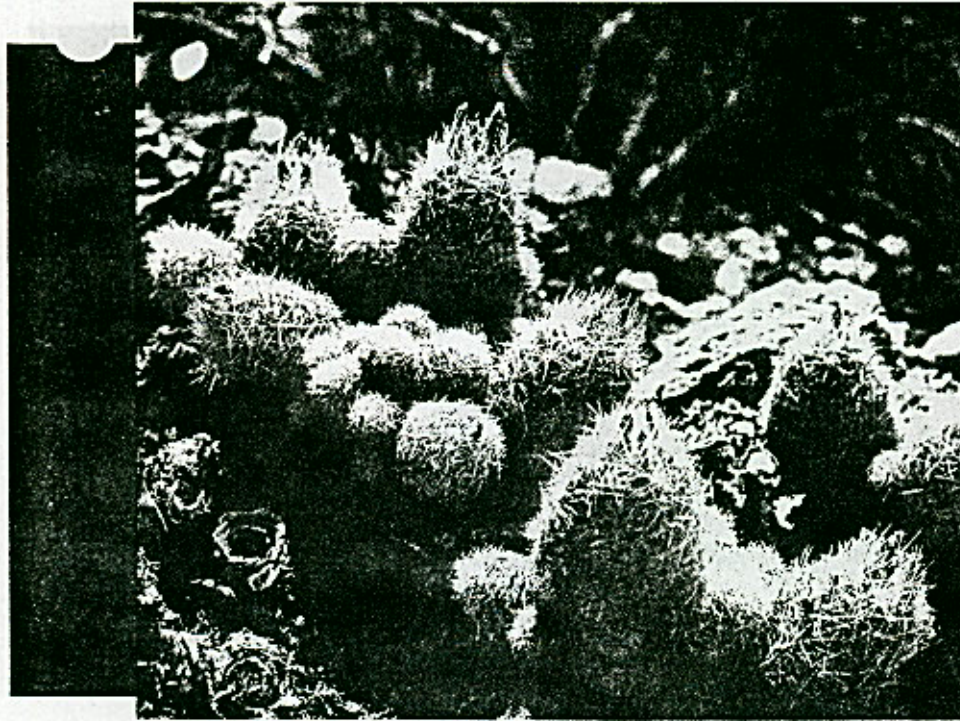
Habitat: Novaculite outcrops, in full sun among sparse Chihuahuan Desert scrub.

Ownership: Private.

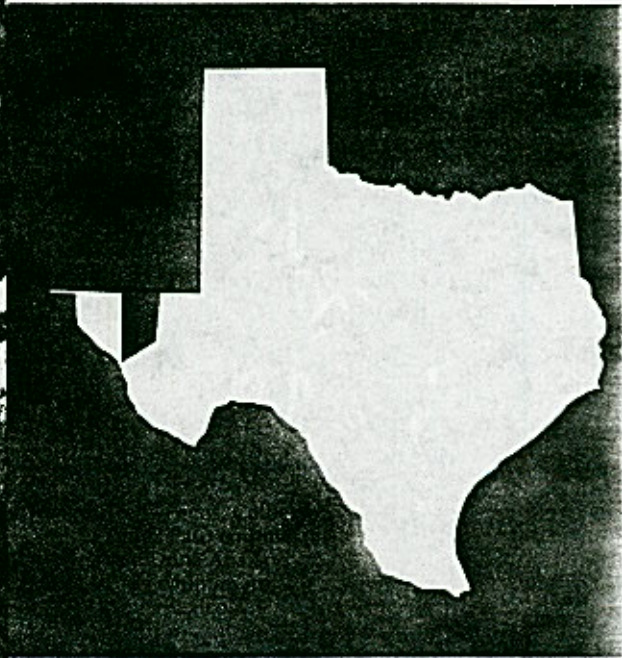


Typical spine cluster of
 Nellie cory cactus

Common Name:
Sneed pincushion cactus



Charlie McDonald



Scientific Name: *Coryphantha sneedii* (Britt. and Rose) Berger var. *sneedii*

Other Scientific Names: *Escobaria sneedii* Britton and Rose; *Mammillaria sneedii* (Britt. and Rose) Cory; *Coryphantha pygmaea* Fric; *Coryphantha sneedii* (Britt. and Rose) Fosberg

Federal Status: Listed as Endangered, November 7, 1979

State Status: Listed as Endangered, April 29, 1983

Photographs and Drawings: Benson, 1982, pp. 850-851; New Mexico Native Plants Committee, 1984, p.89; Weniger, 1970, plate 38; Weniger, 1984, p.206.

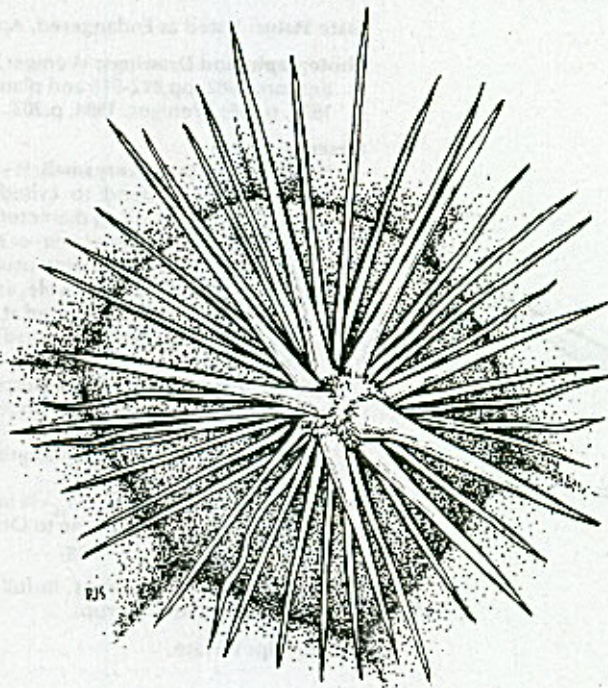
Description:

Habit: Stems with many branches, forming dense clusters to over 1 ft. in diameter and 5 in. tall, 1-3 in. long, ½-1¼ in. in diameter, cylinder-shaped or rounded to club-shaped, green; tubercles ⅙ - ⅛ in. long and broad, protruding ¼ in. from stem, hardening and remaining after spines fall off; areoles roundish, about ⅙ in. in diameter, about ⅓ in. apart.

Spines: Numerous, hiding the stem, needlelike; central spines 6-9, white with pink or lavender to brown tips, ⅓-¾ in. long; outer spines 25-90, white, spreading, straight, ⅓-½ in. long, the outermost ones shorter.

Flowers: Magenta, ½-¾ in. long and in diameter; outer "petals" rose or green in the middle and very pale pink on the margins, narrowly lance-shaped, edges fringed, about ⅙ in. long, ⅙ in. wide; inner "petals" white or pink to magenta in the middle, lance-shaped, fringed below the tip, sharp-pointed at the tip, about ¼ in. long, ⅙ in. wide; anthers with pink stalks and bright orange tips; stigma white to cream-colored; flowering April to September.

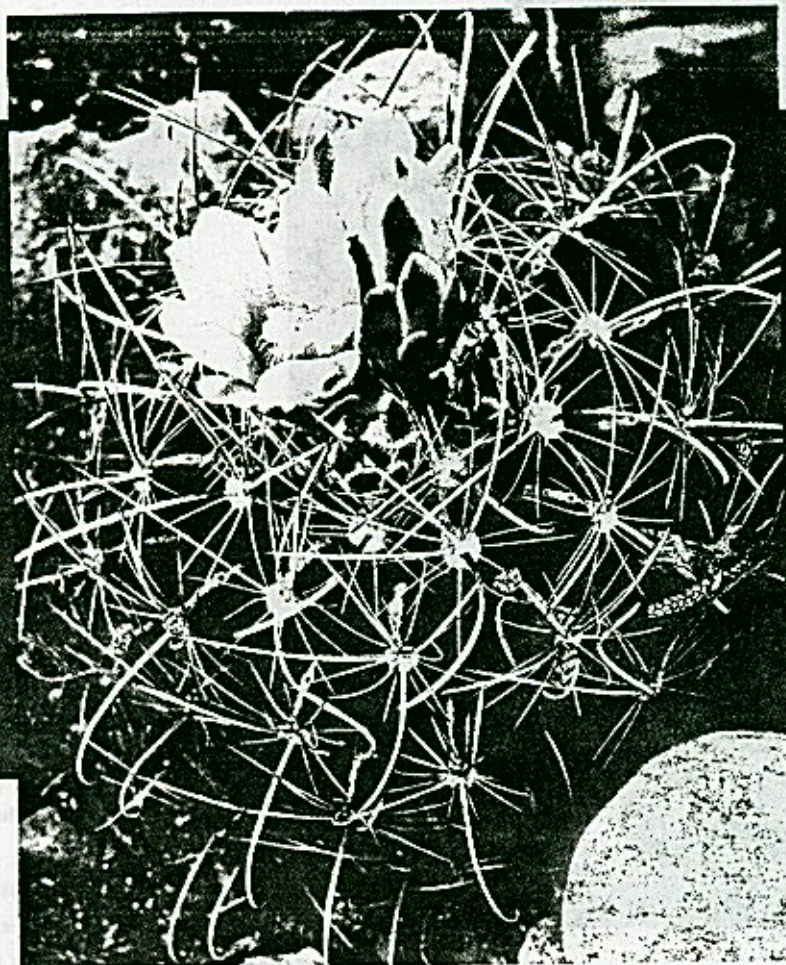
Fruit: Green or greenish tinged with brown or pink to red, fleshy, rounded to club-shaped, about ⅓ in. long, ⅙ in. in diameter; fruiting June to November; seeds reddish-brown, "pitted," about ⅙ in. broad, less than that long.



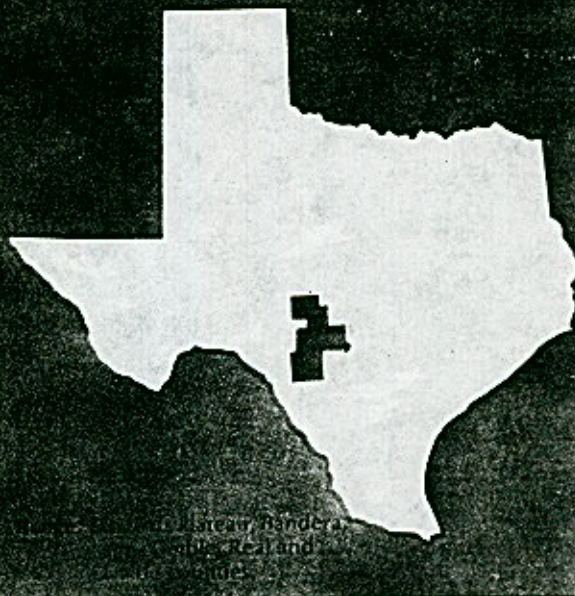
⅛ inch

Typical spine cluster of
 Sneed pincushion cactus

Common Name:
Tobusch fishhook cactus
 Tobusch's cactus



Paul Montgomery



Scientific Name: *Ancistrocactus tobuschii*
 (W.T. Marshall) W.T. Marshall ex Backeberg

Other Scientific Names: *Echinocactus tobuschii* (W.T. Marshall) Weniger; *Mammillaria (Ancistrocactus) tobuschii* W. T. Marshall

Federal Status: Listed as Endangered, November 7, 1979

State Status: Listed as Endangered, April 29, 1983

Photographs and Drawings: Weniger, 1970, plate 22; Weniger, 1984, p.113.

Description:

Habit: Stems usually one, 2-3 in. long, 1 - 3½ in. in diameter, rounded, biscuit-like, dark green; tubercles ¼ - ⅓ in. long, ¼ in. broad, protruding ¼ - ½ in.; areoles elliptical to linear, ⅓ - ½ in. apart.

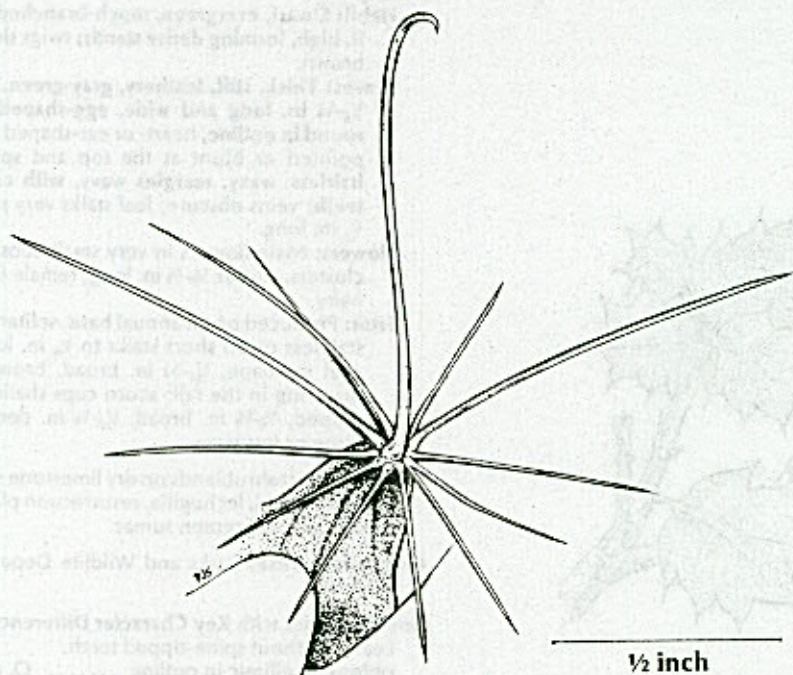
Spines: Not hiding stem surface; **central spines 3-5**, light yellow with red tips, fading to gray, **upper 2-3 straight**, erect, 1 - 1½ in. long, **lower ones hooked and spreading**; **outer spines 7-12**, straight, needle-like, ½ -¾ in. long.

Flowers: **Yellow to cream**, 1 - 1½ in. long and wide; "petals" spoon-shaped, edges sometimes toothed, about ½ in. long, ¼ in. wide; stamens yellow; stigmas green to yellow, with 5-9 lobes; flowering February to April.

Fruit: **Green**, flushing pink or pinkish-brown on ripening, 1 - 1¼ in. long, ⅓ - ½ in. wide, **fleshy**, egg-shaped; maturing late spring to early summer; seeds black, finely warty, ⅓ in. long and wide.

Habitat: Gravel terraces along drainages, limestone ledges, ridges, and rocky hills in openings of live oak-juniper woodland.

Ownership: Private and Texas Department of Highways and Public Transportation right-of-way.



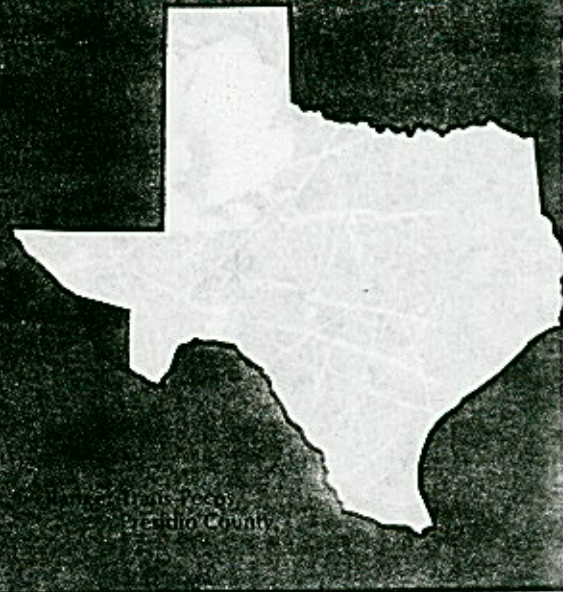
Typical spine cluster of
 Tobusch fishhook cactus

(continued on back)

Common Name:
Hinckley's oak
 Hinckley oak



Paul Montgomery



Scientific Name: *Quercus hinckleyi* C.H. Muller

Other Scientific Names: None

Federal Status: Listed as Threatened, August 26, 1988

State Status: Listed as Threatened, December 30, 1988

Photographs and Drawings: Warnock, 1970, p. 28; Vines, 1976, p. 159; Powell, 1988, p. 99.

Description:

Habit: Dwarf, evergreen, much-branched shrub to 4 ft. high, forming dense stands; twigs slender, light brown.

Leaves: Thick, stiff, leathery, gray-green, very small, $\frac{3}{16}$ - $\frac{5}{16}$ in. long and wide, egg-shaped or almost round in outline, heart- or ear-shaped at the base, pointed or blunt at the top and spine-tipped; hairless, waxy, margins wavy, with coarse spiny teeth; veins obscure; leaf stalks very short, about $\frac{1}{16}$ in. long.

Flowers: Male flowers in very small, loose, elongate clusters, cluster $\frac{1}{8}$ - $\frac{3}{8}$ in. long; female flowers very hairy.

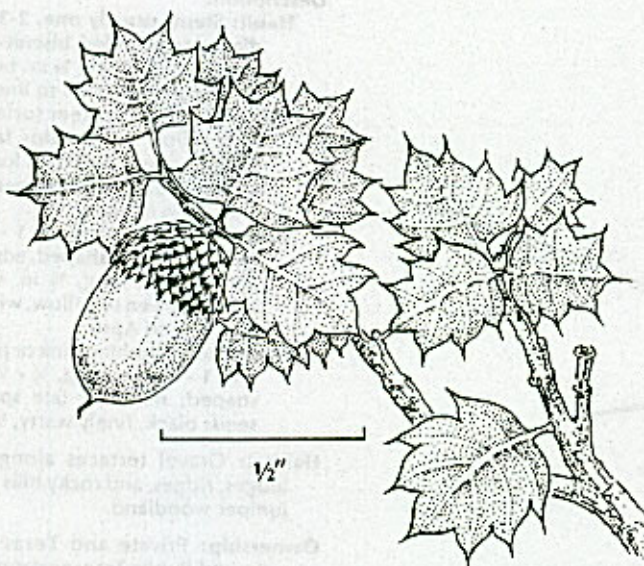
Fruit: Produced on an annual basis, solitary or paired stalkless or on short stalks to $\frac{3}{4}$ in. long; acorn: oval in shape, $\frac{3}{16}$ - $\frac{1}{2}$ in. broad, brown, hairless maturing in the fall; acorn cups shallow, saucer-shaped, $\frac{1}{2}$ - $\frac{5}{8}$ in. broad, $\frac{1}{3}$ - $\frac{1}{2}$ in. deep, margin more or less wavy.

Habitat: Desert shrublands on dry limestone slopes; with tickbush, sotol, lechugilla, resurrection plant, myrtle croton, and evergreen sumac.

Ownership: Texas Parks and Wildlife Department and private.

Similar Species with Key Character Differences:

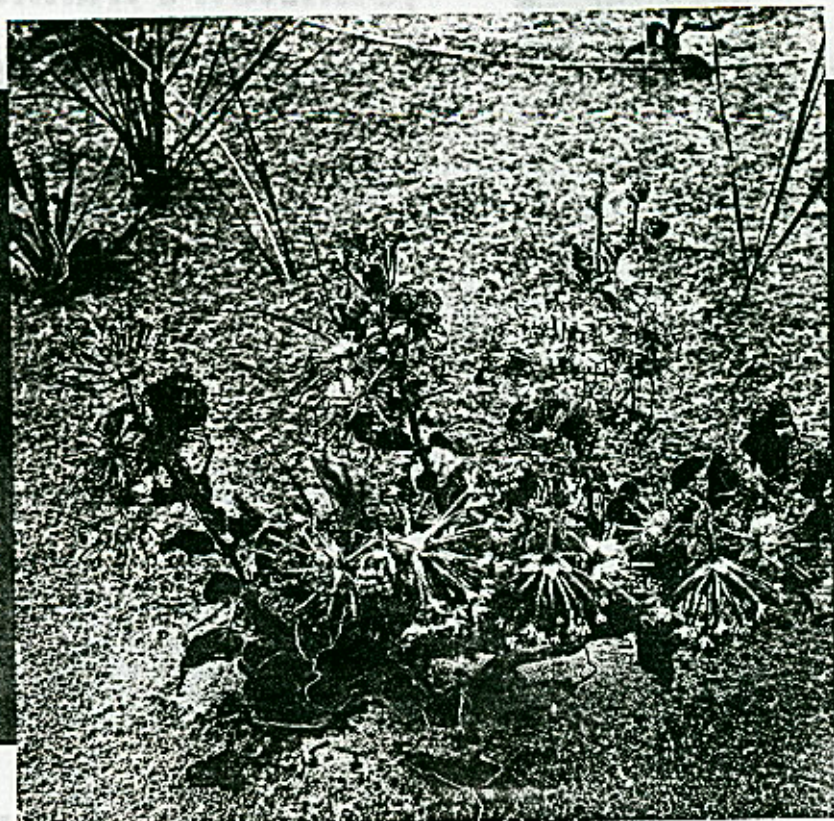
Leaves without spine-tipped teeth, oblong to elliptic in outline *O. depressa*



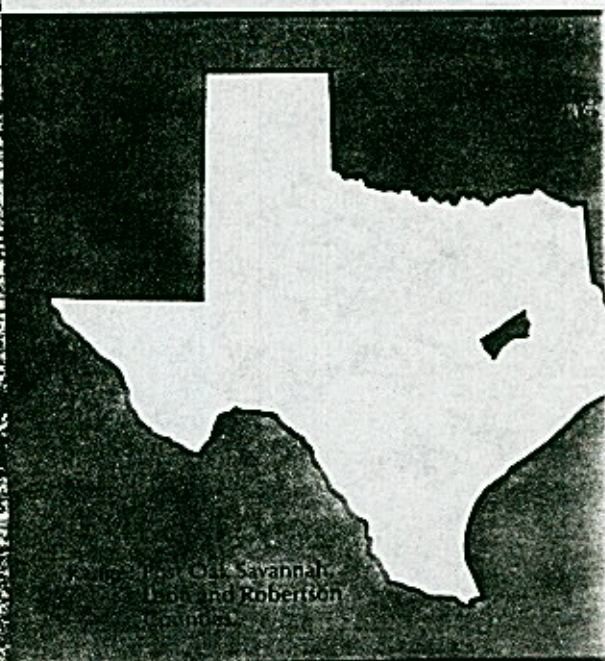
Leaves and fruit of
 Hinckley's oak

(continued on back)

Common Name:
Large-fruited sand verbena



Jackie Poole



Post Oak Savannah,
Lobo and Robertson



Leaves, buds, and fruits of
Large-fruited sand verbena

Scientific Name: *Abronia macrocarpa* L.A. Galloway

Other Scientific Names: None

Federal Status: Listed as Endangered, September 28, 1988

State Status: Listed as Endangered, December 30, 1988

Photographs and Drawings: U.S. Fish and Wildlife Service, 1987, p. 3.

Description:

Habit: Ascending to semi-erect perennial herb, from fleshy to semi-woody, long taproot; stems to 20 in. tall, covered with sticky hairs.

Leaves: Opposite, more or less egg-shaped, covered with sticky hairs, $\frac{3}{4}$ -2 in. long, $\frac{1}{2}$ -1 $\frac{1}{2}$ in. wide.

Flowers: Pink-purple, with 20 to 75 flowers arranged in a spherical nodding head up to 4 in. across; individual flowers tubular $\frac{3}{8}$ -1 $\frac{1}{4}$ in. long, with an expanded five-lobed border $\frac{1}{4}$ - $\frac{3}{8}$ in. across; flowering late March to early June.

Fruit: Turbine-shaped, with 5 wings, papery, $\frac{1}{8}$ - $\frac{1}{2}$ in. long, $\frac{1}{8}$ - $\frac{1}{2}$ in. wide; seeds brown, $\frac{1}{8}$ - $\frac{1}{2}$ in. long.

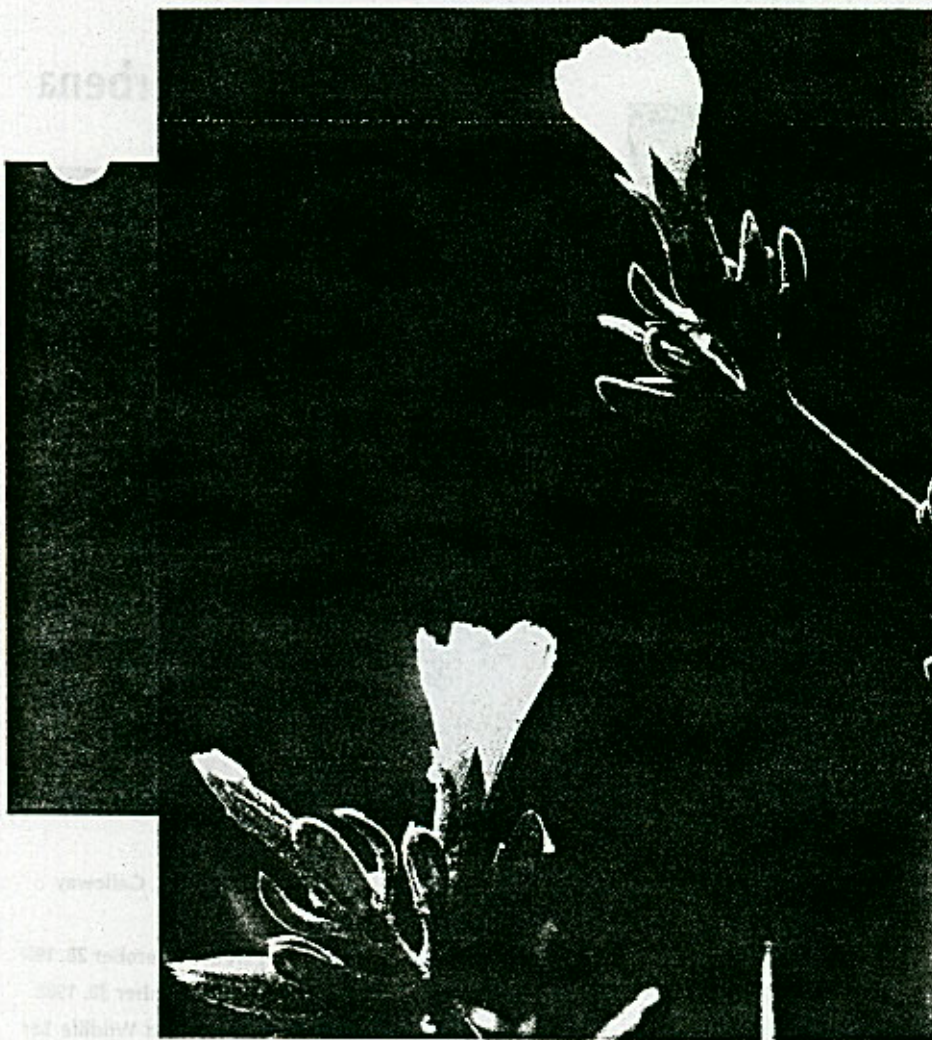
Habitat: Bare, wind-blown sand dunes surrounded by post oak woodlands; often growing with Indian blanket, goldenmane tickseed, silver croton, and ciliate rhododendron.

Ownership: Private land.

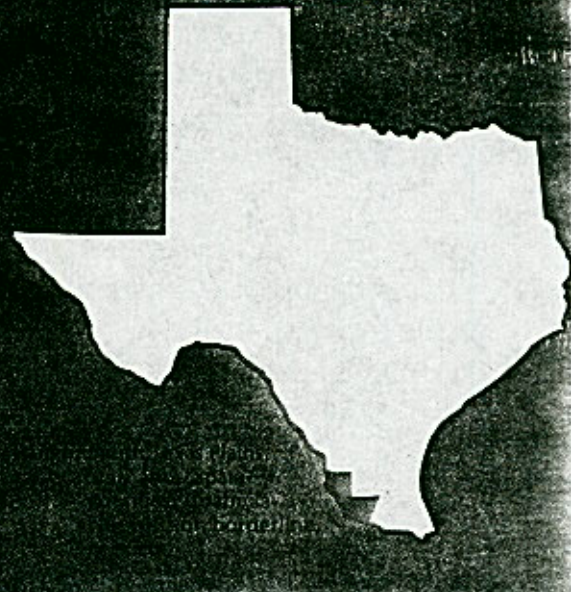
Similar Species with Key Character Differences:

No other species of *Abronia* have large, papery-thin fruits.

Common Name:
Johnston's frankenia



Paul Montgomery



Scientific name: *Frankenia johnstonii* Correll
Other Scientific Names: *Frankenia leverichii* B.L. Turner
Federal Status: Listed as Endangered, August 7, 1984
Slate Status: Listed as Endangered, January 23, 1987
Photographs and Drawings: None published.

Description:

Habit: Sprawling shrub, grayish or bluish-green, woody at base, to 2 ft. tall, with dark brown wiry roots; stems several to many, wiry, slightly woody, with scattered small white hairs.

Leaves: Opposite, gray-green, slightly hairy, oblong to lance-shaped, broader at the tip, rounded at the base and tip, leaf margins slightly inrolled, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, $\frac{1}{8}$ - $\frac{3}{16}$ in. wide; leaf stalks brownish-green, slightly winged, $\frac{1}{2}$ - $\frac{3}{4}$ in. long.

Flowers: White, usually borne singly at tips of small branches; calyx tubular, with 5 small, triangular lobes, ribbed, hard, hairy, $\frac{3}{8}$ - $\frac{1}{4}$ in. long, $\frac{1}{8}$ - $\frac{3}{16}$ in. wide; petals 5-6, spoon-shaped, edges wavy, $\frac{3}{8}$ - $\frac{1}{2}$ in. long; stamens 5-12, usually 6, extending past petals; style 3-branched, extending past petals; flowering November to April.

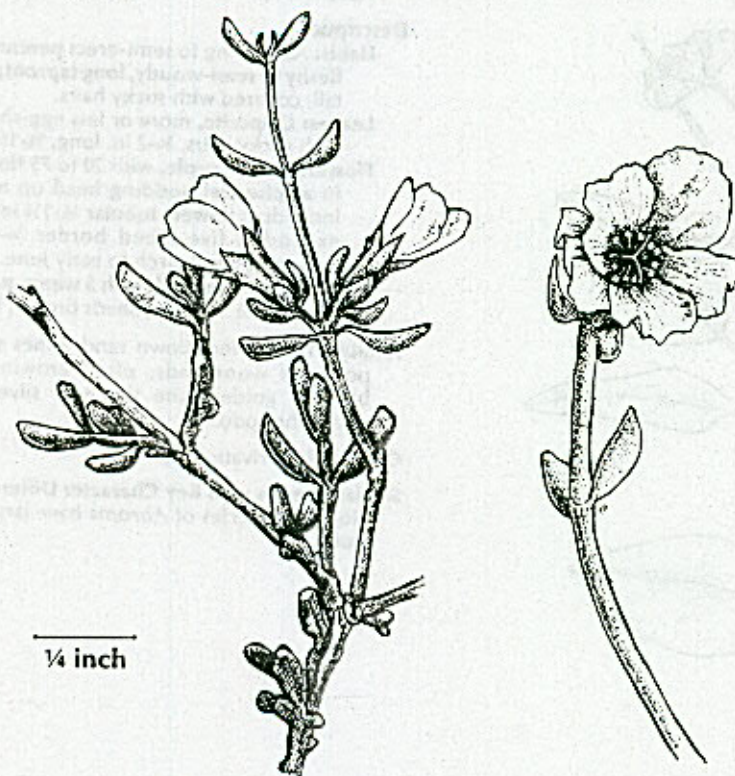
Fruit: Golden-brown, narrowly egg-shaped, single-seeded, dry, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, maturing December to May; seeds pale yellow with golden brown tip, narrowly egg-shaped, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, $\frac{1}{12}$ - $\frac{1}{8}$ in. wide.

Habitat: Rocky gypseous hillsides or saline flats in brushlands, with saladillo, seepweed, coldenia, and isocoma.

Ownership: Private.

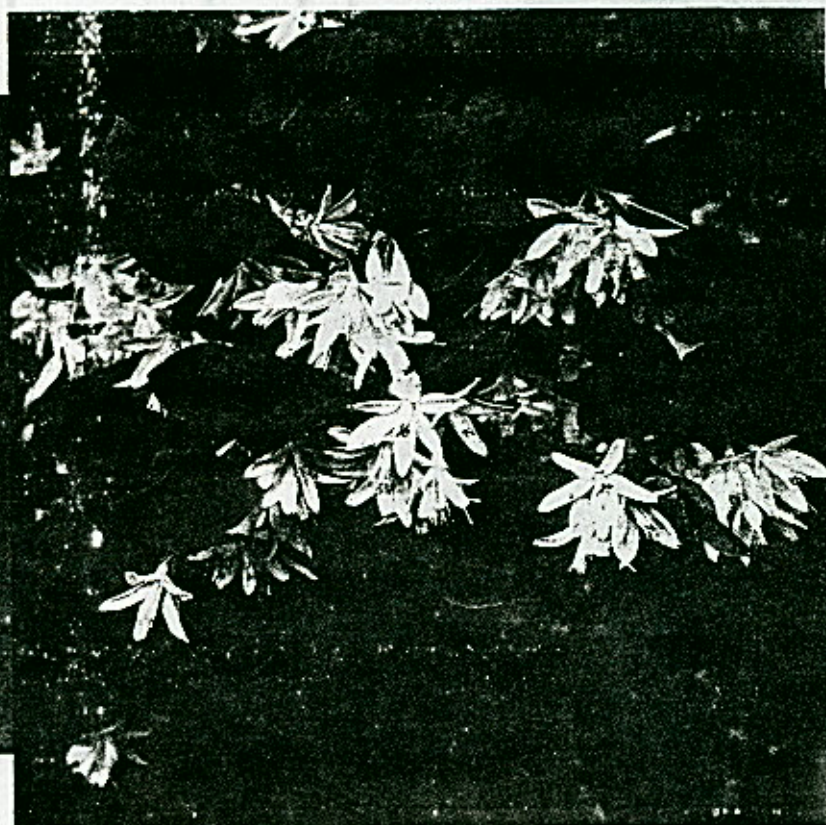
Similar Species with Key Character Differences:

- Leaves not stalked, smaller and hairless beneath *Frankenia jamesii*
- Petals joined, not separate Borage family
- Petals joined, not separate Madder family

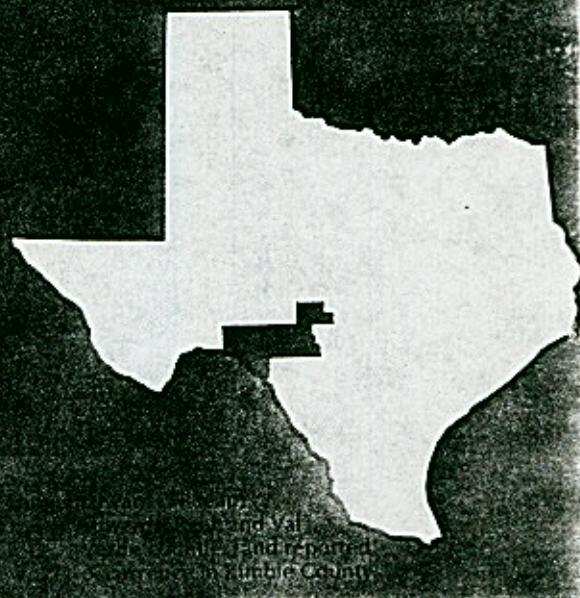


Leaves and flower of
Johnston's frankenia

Common Name:
Texas snowbells
 Texas silver bells



Paul Montgomery



Scientific Name: *Styrax texana* Cory

Other Scientific Names: None

Federal Status: Listed as Endangered, October 12, 1984

State Status: Listed as Endangered, January 23, 1987

Photographs and Drawings: Vines, 1960, p. 847.

Description:

Habit: Slender shrub to 15 ft. tall, irregularly branched, often appearing one-sided or unshapely because of its occurrence on cliffs; branches slender, reddish brown when young, gray when older; bark smooth, light gray to dark gray.

Leaves: Alternate, deciduous, bright to pale green and smooth above, silvery and hairy below, egg-shaped to almost round, smooth-margined, rounded at the base, pointed or rounded at the tip, short-stalked.

Flowers: White, borne among leaves, in clusters of 2-5, pendulant; flower stalks slightly hairy, $\frac{1}{4}$ in. long; calyx bell-shaped, with 6-7 small teeth at the top, widest at the top, hairy, $\frac{1}{4}$ in. long, $\frac{1}{8}$ in. wide; corolla white, with 5 separate more or less lance-shaped petals, $\frac{1}{2}$ - $\frac{3}{4}$ in. long; stamens 10; style 1; flowering April to May.

Fruit: Green maturing to brown, hairy, rounded, dry, short-stalked, $\frac{3}{8}$ in. in diameter, splitting into 2 or 3 parts, maturing in summer; seeds dark shiny brown, smooth, more or less rounded, 3 per fruit, about $\frac{1}{8}$ in. long.

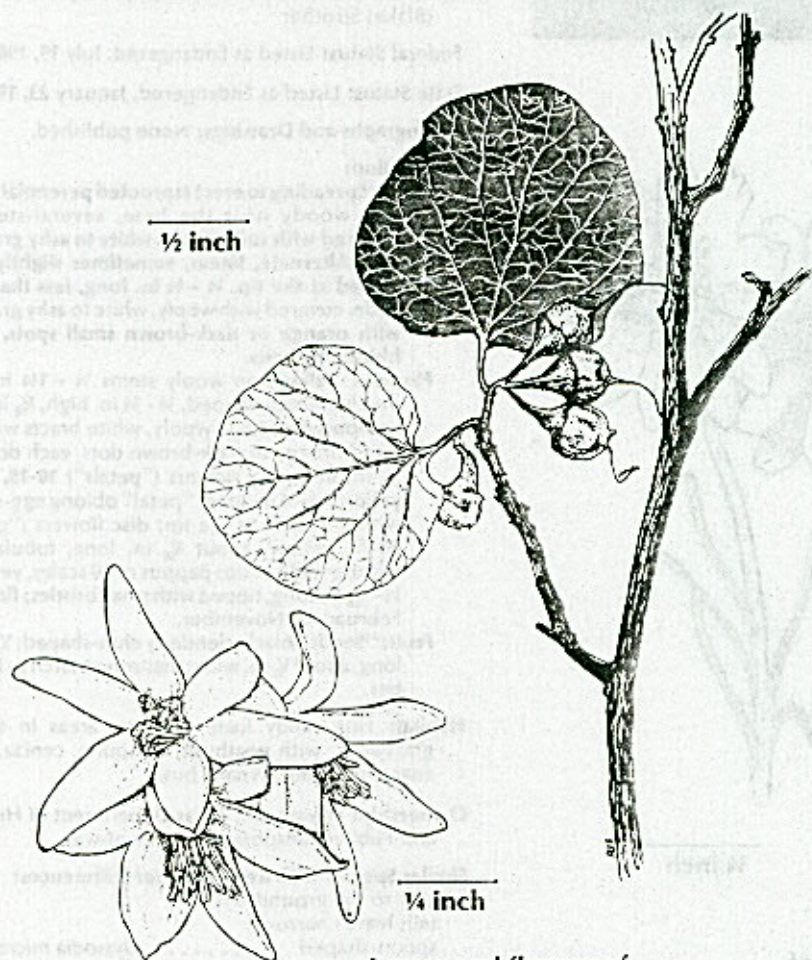
Habitat: Limestone bluffs and cliff faces, with Spanish oak, cedar, Texas ash, agarita, egg-leaf silk tassel, and woolly-bucket bumelia.

Ownership: Private and one reported locale on Texas Department of Highways and Public Transportation property.

Similar Species with Key Character Differences:

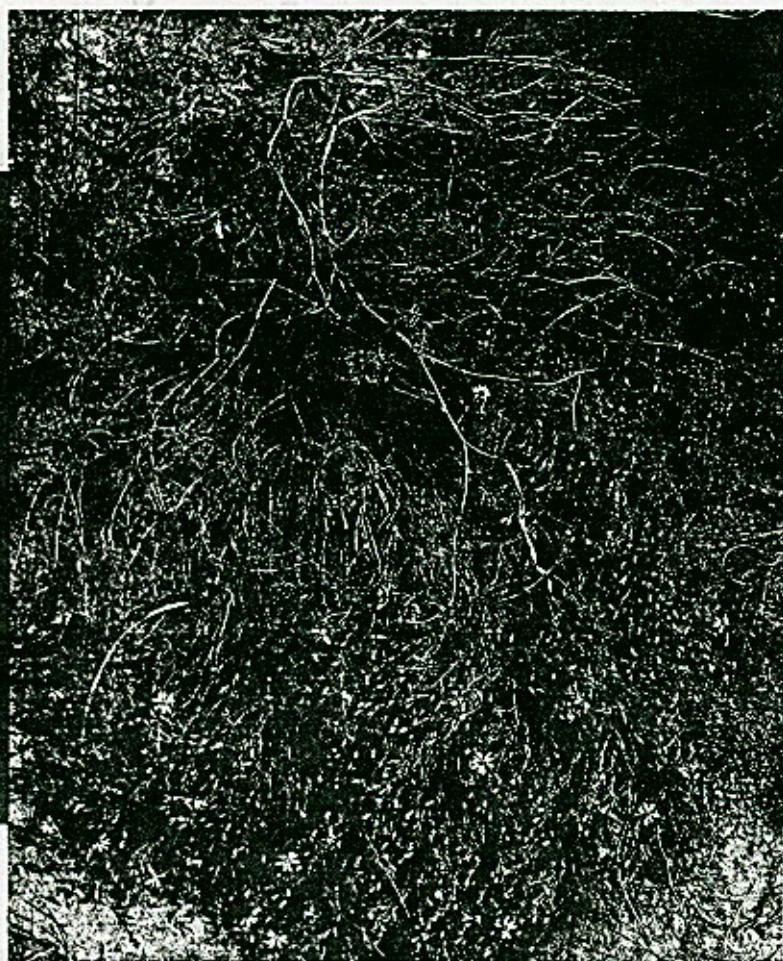
Both leaf surfaces similar,
 leaves egg- or heart-shaped,
 leaf margins somewhat lobed
 and wavy *Styrax platanifolia*

Extremely rare, perhaps extir-
 pated from West Texas; flower
 cluster stalks very hairy *Styrax youngae*

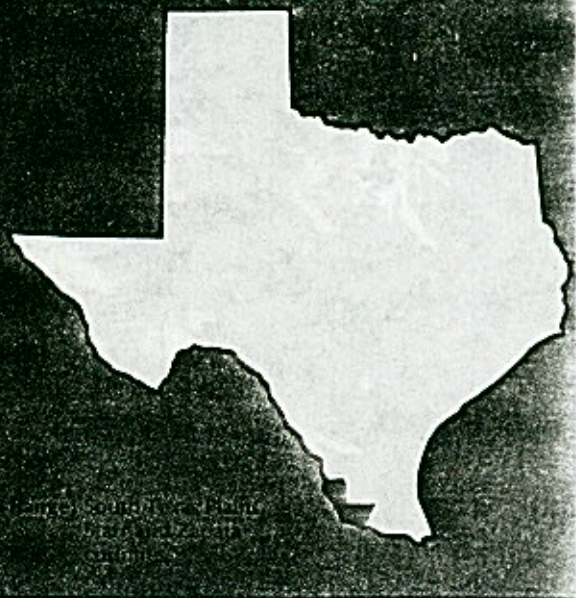


Leaves and flowers of
 Texas snowbells

Common Name:
Ashy dogweed



Jackie Poole



Scientific name: *Dyssodia tephroleuca* Blake

Other Scientific Names: *Thymophylla tephroleuca* (Blake) Strother

Federal Status: Listed as Endangered, July 19, 1984

State Status: Listed as Endangered, January 23, 1987

Photographs and Drawings: None published.

Description:

Habit: Spreading to erect taprooted perennial to 12 in. tall, woody near the base, several-stemmed, covered with soft, wooly, white to ashy gray hairs.

Leaves: Alternate, linear, sometimes slightly three-parted at the tip, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, less than $\frac{1}{8}$ in. wide, covered with wooly, white to ashy gray hairs, with orange or dark-brown small spots, usually hidden by hairs.

Flowers: Yellow, on wooly stems $\frac{1}{4}$ - $1\frac{1}{4}$ in. long; involucre bell-shaped, $\frac{1}{8}$ - $\frac{3}{8}$ in. high, $\frac{1}{8}$ in. wide, composed of 12-13 wooly, white bracts with scattered orange to dark-brown dots, each dot about $\frac{1}{8}$ in. long; ray flowers ("petals") 10-15, golden yellow, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, "petal" oblong egg-shaped, with 2-3 teeth at the tip; disc flowers ("center") 30-70, yellow, about $\frac{1}{8}$ in. long, tubular, with minute teeth at tip; pappus of 10 scales, yellowish, $\frac{1}{8}$ - $\frac{3}{8}$ in. long, tipped with small bristles; flowering February to November.

Fruit: "Seeds" black, slenderly club-shaped, $\frac{1}{4}$ - $\frac{5}{8}$ in. long, about $\frac{1}{32}$ in. wide; maturing March to December.

Habitat: Fine sandy loam in open areas in shrubby grasslands, with goatbush, mesquite, ceniza, yucca, anacahuita, and javelina bush.

Ownership: Private and Texas Department of Highways and Public Transportation right-of-way.

Similar Species with Key Character Differences:

Low to the ground, 2-4 in. tall; leaves narrowly spoon-shaped *Dyssodia micropoides*

Lower leaves 3-5 parted; West Texas *Dyssodia setifolia* var. *radiata*

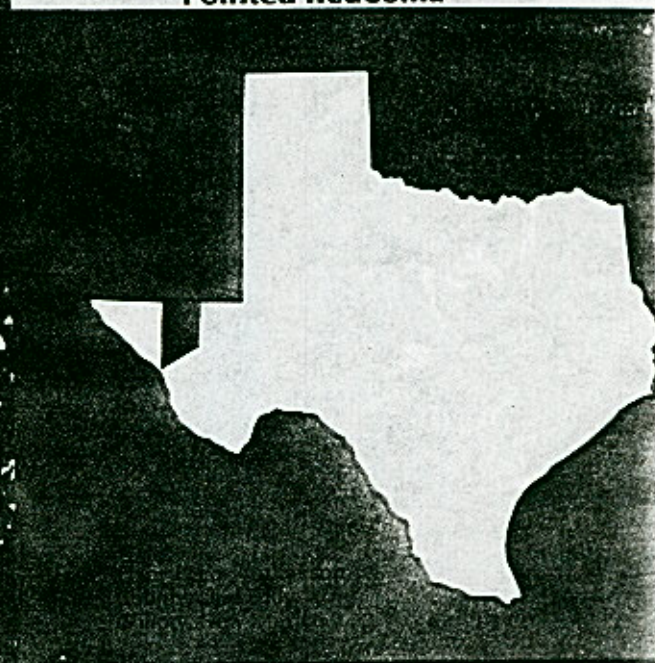


Leaves and flowers of
Ashy dogweed

Common Name:
McKittrick pennyroyal
 Pointed false pennyroyal,
 Pointed hedeoma



Jackie Poole



Scientific Name: *Hedeoma apiculatum* W.S. Stewart

Other Scientific Names: None

Federal Status: Listed as Threatened, July 13, 1982

State Status: Listed as Threatened, April 29, 1983

Photographs and Drawings: Warnock, 1977, p.190; New Mexico Native Plants Committee, 1984, p. 191.

Description:

Habit: Low-growing perennial 4-6 in. high, forming dense mats from woody roots, with strong minty smell; numerous stems thickly covered with small curled hairs.

Leaves: Alternate, crowded, leathery, not stalked, lance-shaped, with pointed tips, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, $\frac{1}{6}$ - $\frac{1}{4}$ in. wide.

Flowers: Pink, in clusters of 1-3, crowded near the tips; calyx papery, tubular to funnel-shaped, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, 2-lipped, upper lip with 2 short, pointed teeth, lower lip with 3 long, pointed teeth; corolla pink, showy, $\frac{3}{4}$ in. long, with 2 broad lips; flowering July to September.

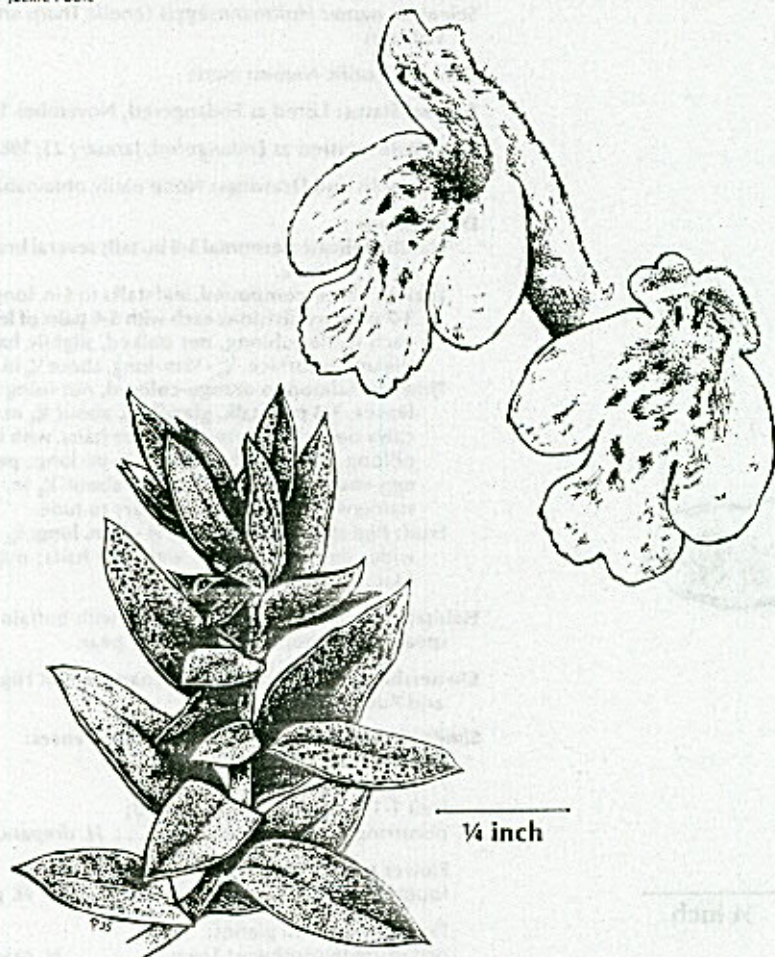
Fruit: "Seeds" 4, oblong, pointed at the tip, sticky when wet, $\frac{1}{6}$ in. long, less than $\frac{1}{32}$ in. wide.

Habitat: Limestone rock faces, on boulders, cliffs and ledges, with rock-mat, rock-lettuce, rock-daisy, and resurrection plant.

Ownership: In Texas, Guadalupe Mountains National Park.

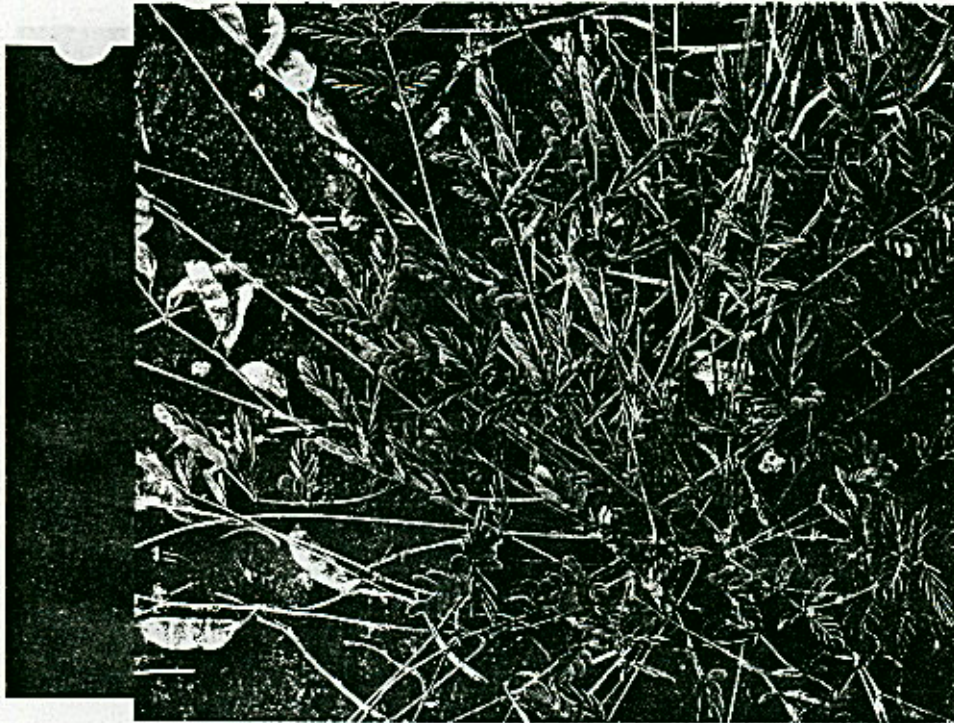
Similar Species with Key Character Differences:

No other species of mints in Texas form prostrate mats on limestone cliff faces.

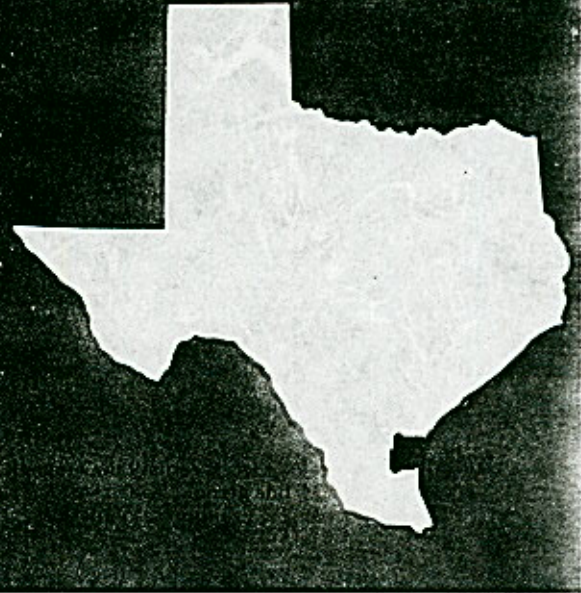


Leaves and flowers of
 McKittrick pennyroyal

Common Name:
Slender rush-pea



Paul Montgomery



Scientific name: *Hoffmannseggia tenella* Tharp and Williams

Other Scientific Names: None

Federal Status: Listed as Endangered, November 1, 1985

State Status: Listed as Endangered, January 23, 1987

Photographs and Drawings: None easily obtainable.

Description:

Habit: Delicate perennial 3-6 in. tall; several branches from the base.

Leaves: Twice-compound, leaf stalks to 5 in. long, with 3-7 primary divisions each with 5-6 pairs of leaflets; each leaflet oblong, not stalked, slightly hairy on the under surface, $\frac{1}{8}$ - $\frac{1}{4}$ in. long, about $\frac{1}{8}$ in. wide.

Flowers: Salmon to orange-colored, not rising above leaves, 3-5 per stalk, glandless, about $\frac{1}{8}$ in. long; calyx densely covered with fine hairs, with linear-oblong, obtuse lobes, about $\frac{1}{8}$ in. long; petals 5, egg-shaped, $\frac{1}{2}$ - $\frac{3}{8}$ in. long, about $\frac{1}{8}$ in. wide; stamens 10; flowering February to June.

Fruit: Pod straight, glandless, $\frac{1}{2}$ - $\frac{3}{4}$ in. long, $\frac{1}{8}$ - $\frac{1}{4}$ in. wide, densely covered with fine hairs; maturing March to July; seeds 2-4.

Habitat: On clayey soil, near creeks, with buffalo grass, speargrass, mesquite, and prickly pear.

Ownership: Private and Texas Department of Highways and Public Transportation.

Similar Species with Key Character Differences:

Pinnae (primary leaf divisions) 7-11; 5-10 flowers per stalk; fruit 1-1 $\frac{1}{2}$ in. long, sickle-shaped; occurring in west Texas *H. drepanocarpa*

Flower parts with glands; found in west Texas *H. glauca*

Flower parts with glands; occurring in southwest Texas *H. oxycarpa*
 Lower leaf surface with orange glands (black when dry) *Caesalpinia*

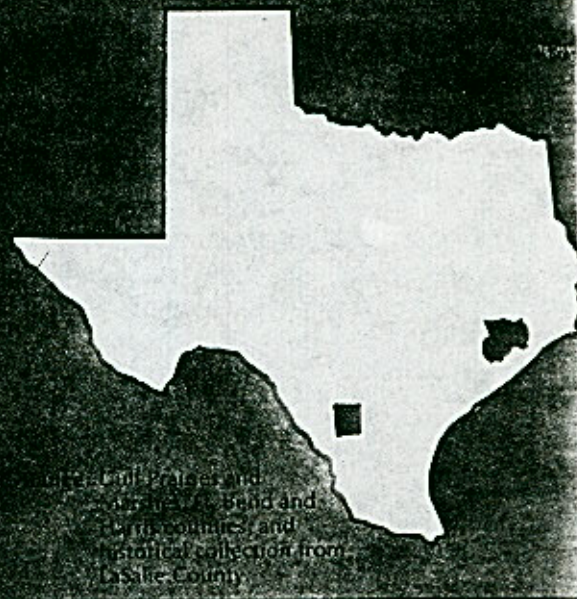


**Twice-compound leaf,
 flower and fruit of
 Slender rush-pea**

Common Name:
Texas bitterweed



Paul Montgomery



the Gulf Prairies and
adjacent sand and
clay counties, and
historical collection from
LaSalle County

Scientific name: *Hymenoxys texana* (Coulter & Rose) Cockerell

Other Scientific Names: *Actinella texana* Coulter & Rose; *Picradenia texana* (Coulter & Rose) Greene

Federal Status: Listed as Endangered, March 13, 1985

State Status: Listed as Endangered, January 23, 1987

Photographs and Drawings: None easily obtainable.

Description:

Habit: Small delicate annual to 6 in. tall; stems single or branching.

Leaves: Those clustered at the plant base, spoon-shaped, with entire or toothed margins, about $\frac{3}{16}$ in. wide; those along the stem, alternate, fewer, narrower, with parallel sides, few or no teeth along the margins.

Flowers: Yellow, small, inconspicuous on stems $\frac{3}{16}$ - $\frac{3}{8}$ in. long; phyllaries in two series, joined at the base, rigid and keeled, about $\frac{3}{16}$ in. long; ray flowers ("petals") minute, appearing to be absent; disc flowers ("center") tubular, minutely toothed at top, less than $\frac{1}{8}$ in. long; pappus of 5 scales tipped with short awns, $\frac{3}{16}$ - $\frac{1}{2}$ in. long; flowering late March to early April.

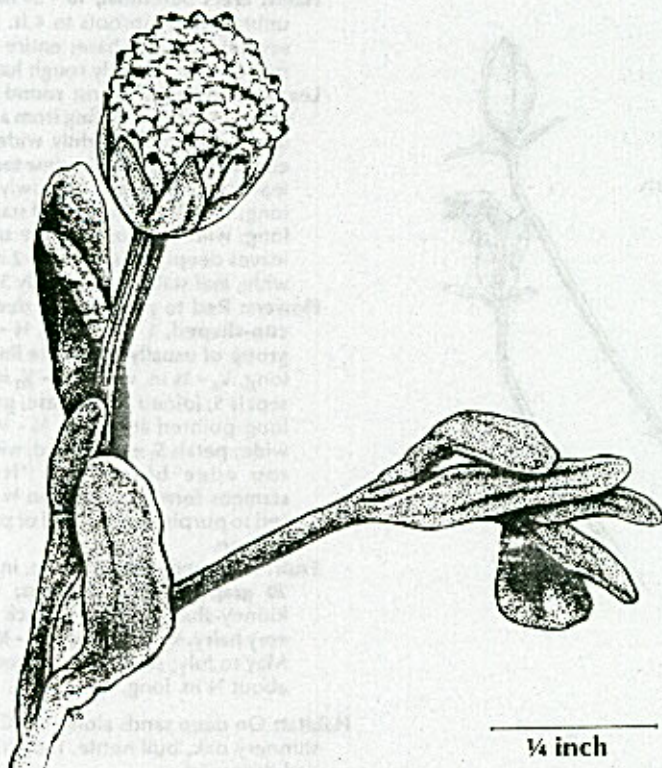
Fruit: "Seeds" cone-shaped, obscurely 4-angled; hairy, $\frac{3}{16}$ - $\frac{1}{8}$ in. long; maturing April to May.

Habitat: In poorly drained depressions or at the base of mima mounds in open grassland in almost barren areas with *Limnoscadium pumilum*, peppergrass, little barley, and *Nostoc*.

Ownership: Private and public land.

Similar Species with Key Character Differences:

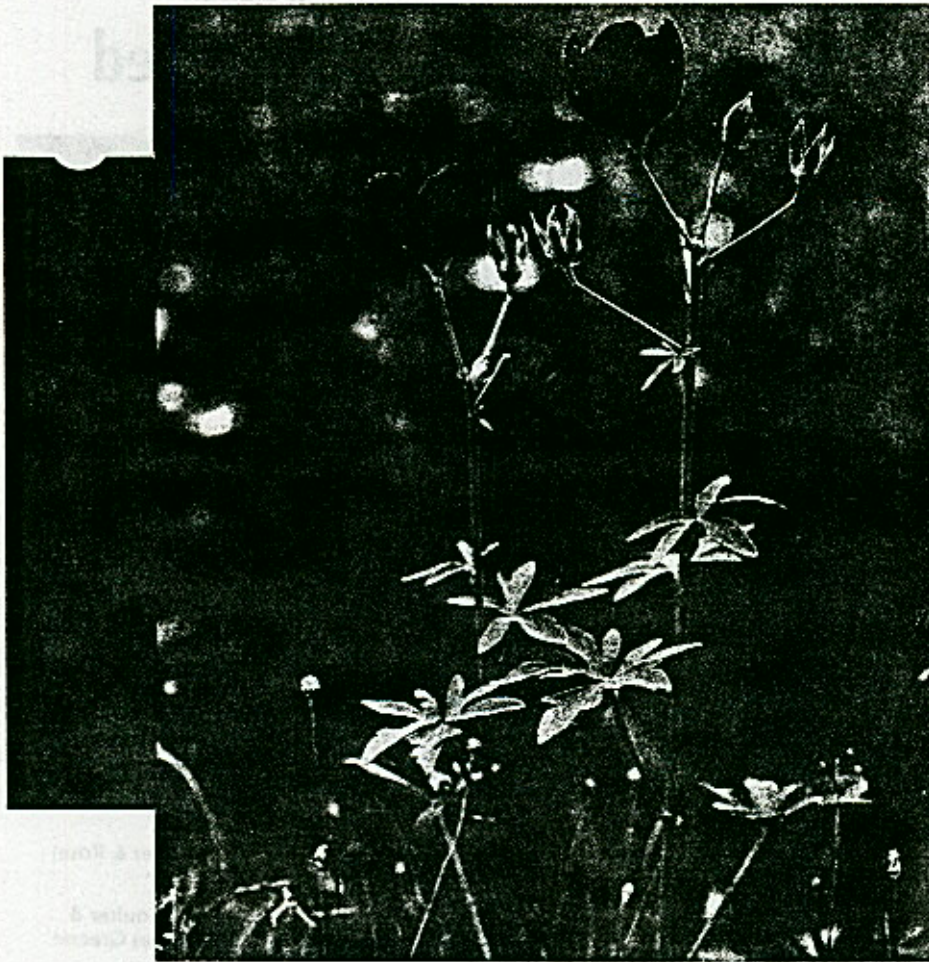
Ray flower ("petals") present *Hymenoxys*
(other Texas species), *Helenium*, *Dyssodia*



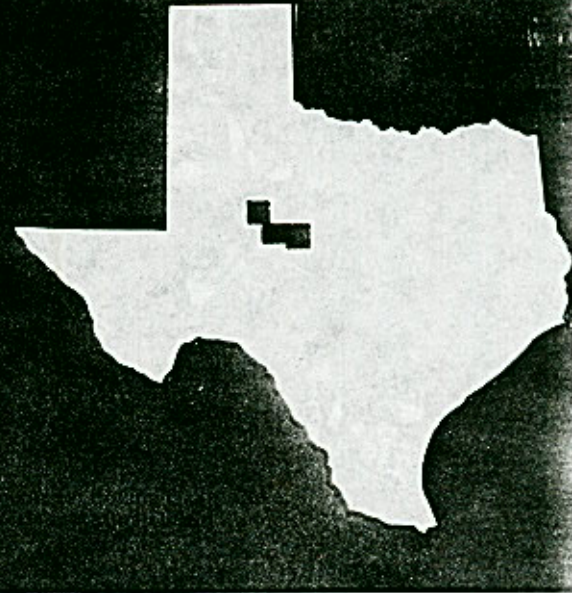
Leaves and fl.
Texas bitterweed

Common Name:

Texas poppy-mallow



Paul Montgomery



Scientific Name: *Callirhoe scabriuscula* Robins.

Other Scientific Names: None

Federal Status: Listed as Endangered, January 13, 1981

State Status: Listed as Endangered, April 29, 1983

Photographs and Drawings: None easily obtainable.

Description:

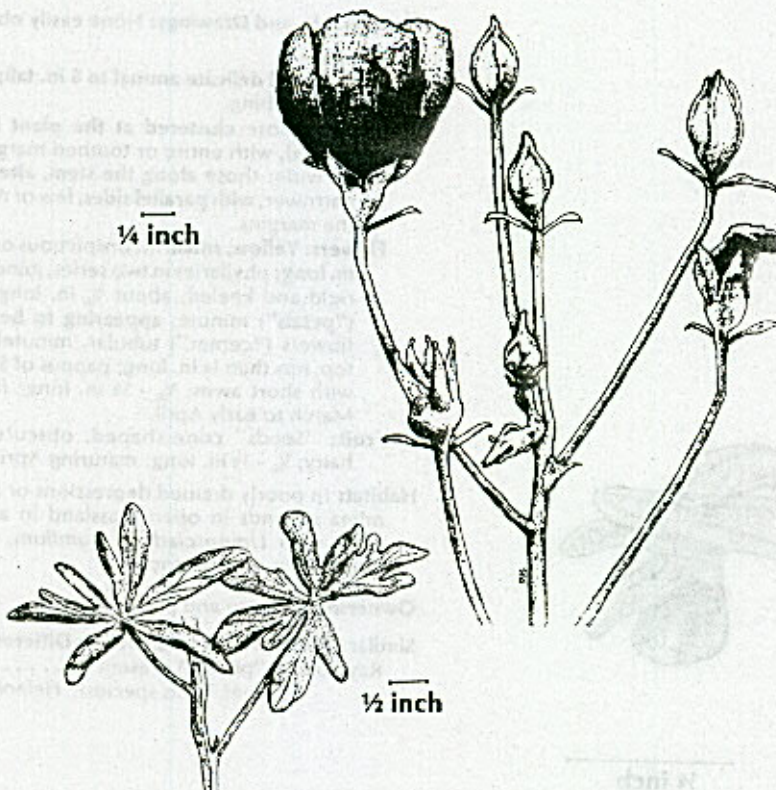
Habit: Erect perennial, 10 - 50 in. tall, with slender, unbranched taproots to 4 ft. long; stems one or several from the base; entire plant covered with microscopic, slightly rough hairs.

Leaves: Alternate, almost round in outline, divided into 3 - 5 lobes radiating from a common point, the lobes oblong to slightly wider near the tip, the edges smooth or with a few teeth, blunt at the tip; leaves at plant's base shallowly divided, 1½ - 2½ in. long, 1½ - 2¾ in. wide, leaf stalks usually 2 - 3¾ in. long, with a groove on the upper surface; stem leaves deeply divided, 1¾ - 2 in. long, 2¼ - 2½ in. wide, leaf stalks ½ - 2 (rarely 3¾) in. long.

Flowers: Red to purple, with deeper red basal spot, cup-shaped, 1 - 3 in. tall, ¾ - 7/8 in. wide, with a group of usually 3 leaf-like linear bracts ¼ - ⅓ in. long, ¼ - ⅓ in. wide, ⅓ - ⅓ in. below the sepals; sepals 5, joined at the base, green, lance-shaped, long-pointed at the tip, ⅓ - ¼ in. long, ⅓ - ¼ in. wide; petals 5, egg-shaped, with broad end at top, top edge blunt with "fringed" margins; stamens forming a column ¾ - ¾ in. tall, anthers red to purple; stigmas red or pink; flowering April to June.

Fruit: Flattened disk, ¼ - ½ in. in diameter, with 12 - 20 grapefruit-like sections; sections somewhat kidney-shaped, closed, back and exposed sides very hairy, ¼ - ¼ in. high, ⅓ - ⅓ in. wide; maturing May to July; seeds black, smooth, kidney-shaped, about ¼ in. long, ¼ in. wide.

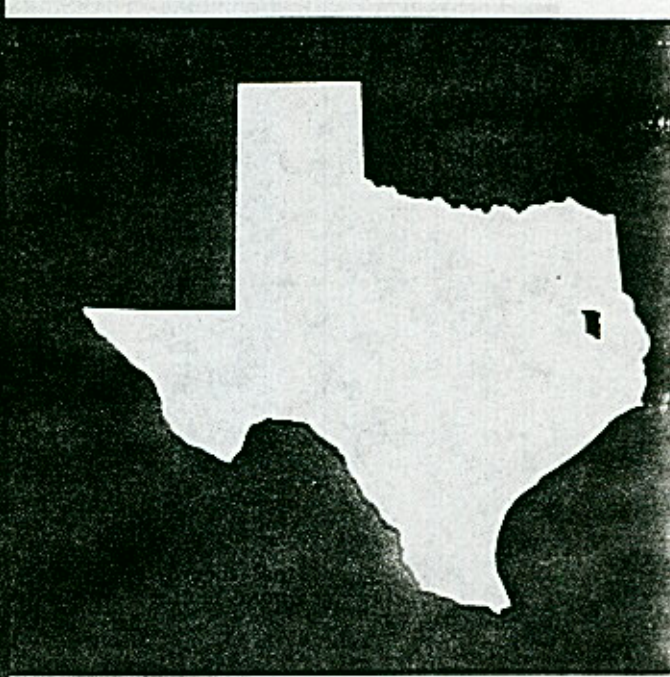
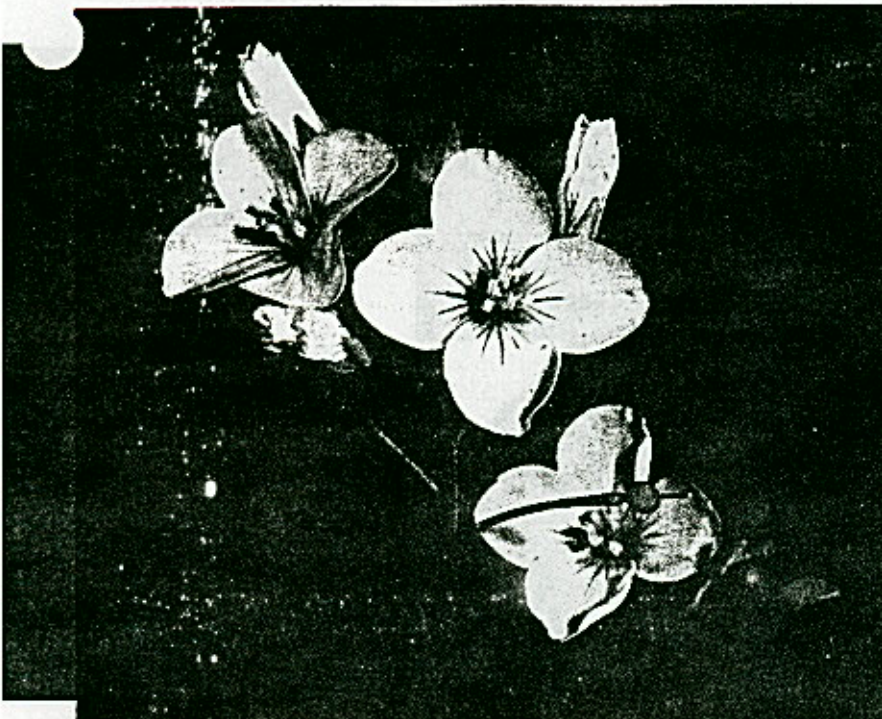
Habitat: On deep sands along the Colorado River, with shinny oak, bull nettle, Indian blanket, three-awn and dropseed.



Leaves and flowering stalk of Texas poppy-mallow

(continued on back)

Common Name:
White bladderpod



Stanley and Gretchen Jones

Scientific Name: *Lesquerella pallida* (Torrey and Gray) Watson

Other Scientific Names: *Vesicaria grandiflora* Hooker var. *pallida* Torrey and Gray; *Vesicaria pallida* (Torrey and Gray) Torrey and Gray

Federal Status: Listed as Endangered, April 10, 1987

State Status: Listed as Endangered, May 18, 1987

Photographs and Drawings: Nixon, et al., 1983.

Description:

Habit: Upright to spreading annual, branching from the base or upper stems, 2-25 in. tall.

Leaves: Alternate, yellowish green to grayish green, slightly hairy, linear to oblong in outline, with entire or toothed, sometimes wavy, margins; those near the plant base deeply lobed, to 4 in. long and ¾ in. wide, on stalks to 1½ in. long; those along the stem gradually reduced in size upward.

Flowers: White, with yellow bases, borne singly (on very small plants) or up to 24 along an elongated stem to 6 in. long, each flower with a short stalk; **sepals** 4, greenish, becoming cream colored to yellowish orange with age, with clear margins; **petals** 4, egg-shaped, tapering abruptly to a narrow base, to ½ in. long and ¾ in. wide; **stamens** 6, 4 long and 2 short; flowering April to May.

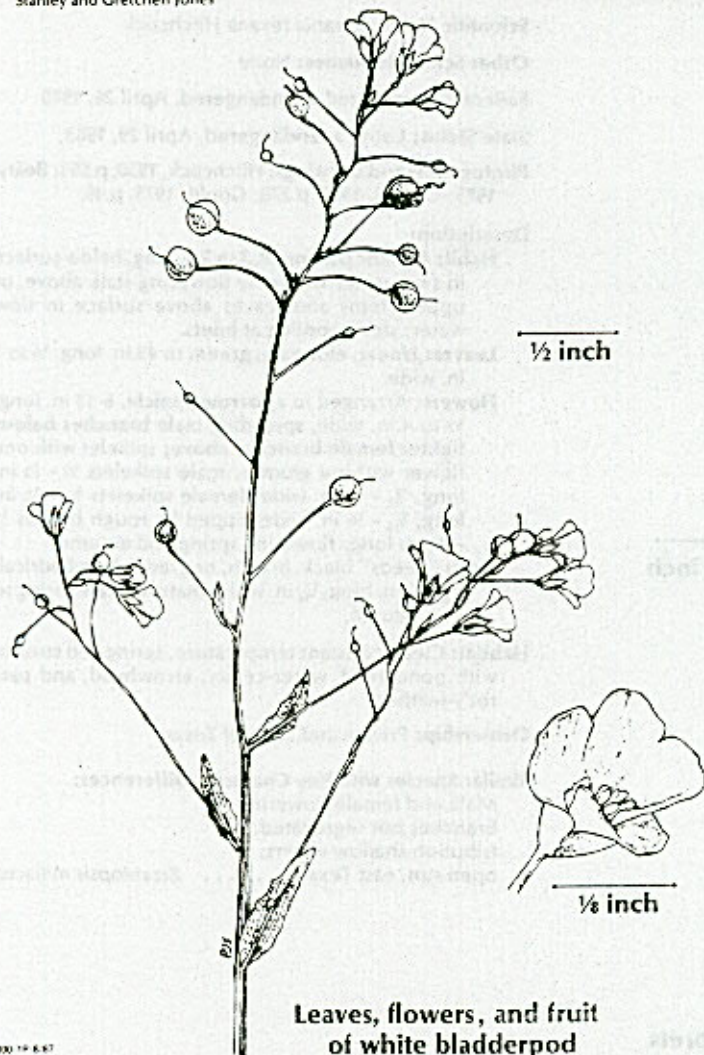
Fruit: Globe-shaped, to ¼ in. in diameter; seeds 8-12, flattened, about ¼ in. long and wide.

Habitat: On or near seeping, calcareous rock outcrops overlying clay which form natural openings in the forest, usually on hillsides with Drummond onion, Drummond sandwort, western daisy, groovestem, Indian plantain, yellow sweet-clover, canarygrass, Ozark savory, and beaked cornsalad.

Ownership: Private.

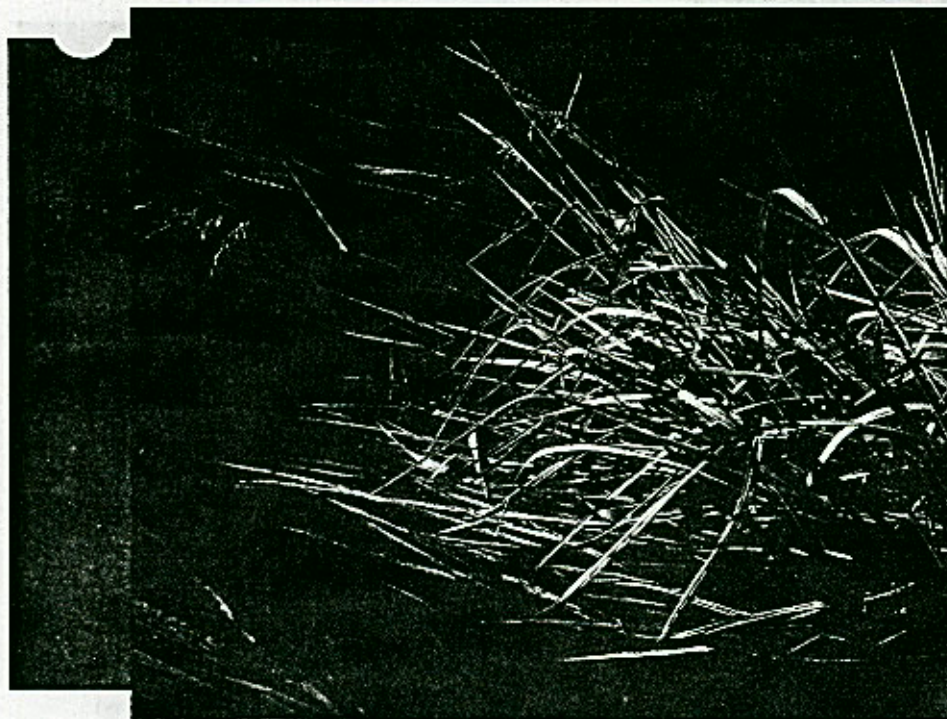
Similar Species with Key Character Differences:

- Plants perennial; occurring in west Texas *L. purpurea* and *L. mcvaughiana*
- Flowers yellow all other Texas species of *Lesquerella*

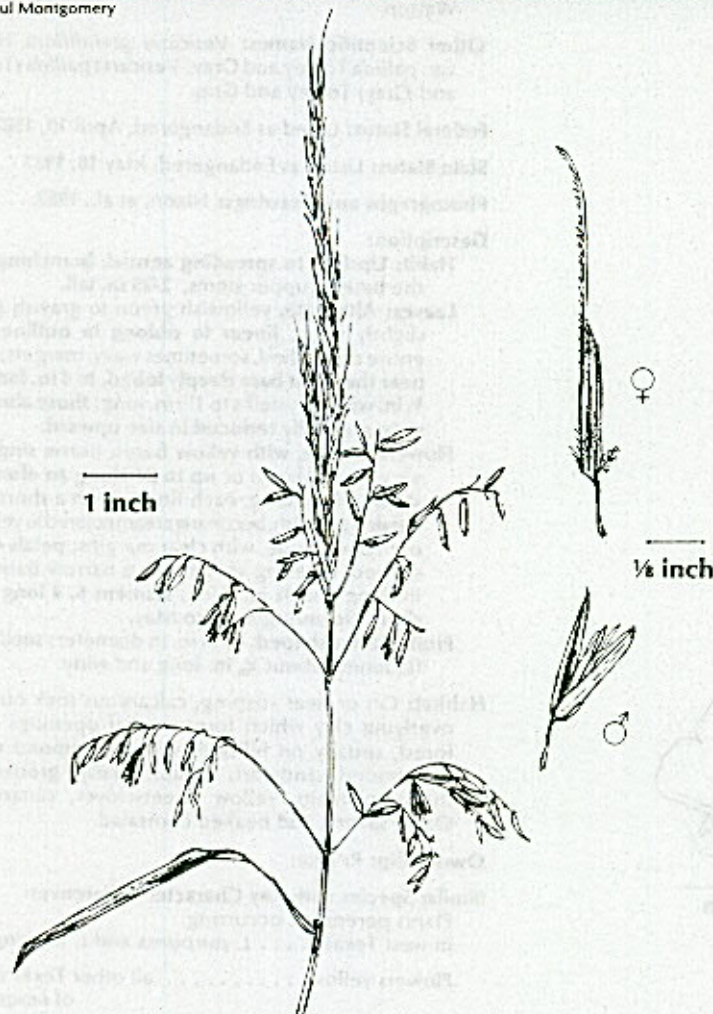
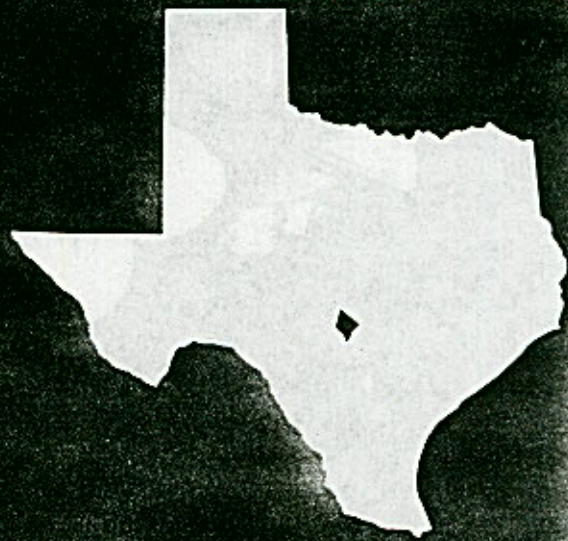


Leaves, flowers, and fruit of white bladderpod

Common Name:
Texas wild-rice



Paul Montgomery



Inflorescence and male (♂) and female (♀) florets of Texas wild-rice

Scientific Name: *Zizania texana* Hitchcock

Other Scientific Names: None

Federal Status: Listed as Endangered, April 26, 1978

State Status: Listed as Endangered, April 29, 1983

Photographs and Drawings: Hitchcock, 1950, p.563; Beaty, 1975; Correll, 1975, p.278; Gould, 1975, p.48.

Description:

Habit: Aquatic perennial, 3 to 7 ft. long, below surface in swift water with only flowering stalk above, or upper stems and leaves above surface in slow water; stems rooting at joints.

Leaves: Linear, elongate, green, to 45 in. long, 1/4 to 1 in. wide.

Flowers: Arranged in a narrow panicle, 6-13 in. long, 1/2 to 4 in. wide, spreading male branches below, tighter female branches above; spikelet with one flower without glumes; male spikelets 1/4 - 1/2 in. long, 1/6 - 1/8 in. wide; female spikelets 1/6 - 1/2 in. long, 1/6 - 1/8 in. wide, tipped by rough bristles 3/8 - 1 1/8 in. long; flowering spring and autumn.

Fruit: "Seeds" black, brown, or greenish, cylindrical, 1/6 - 5/16 in. long, 1/16 in. wide; maturing late spring to late autumn.

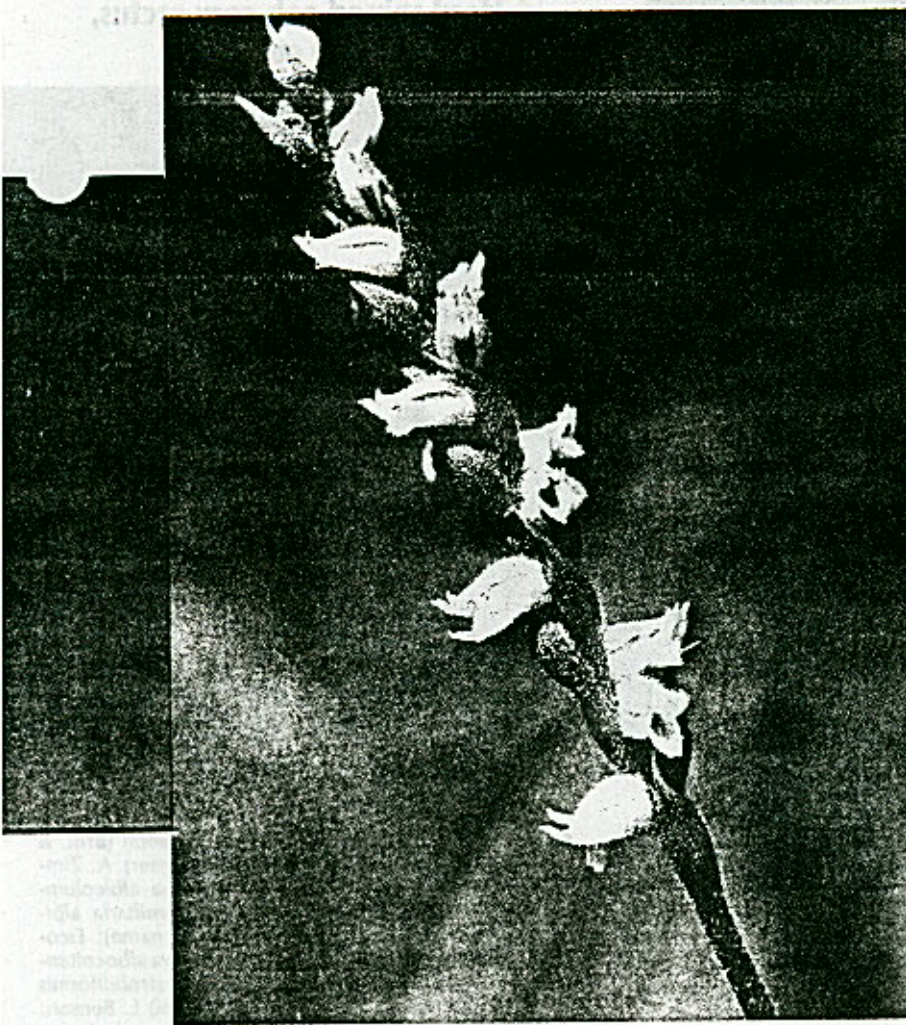
Habitat: Clear, constant temperature, spring-fed stream, with pondweed, water-celery, arrowhead, and parrot's-feather.

Ownership: Private and State of Texas.

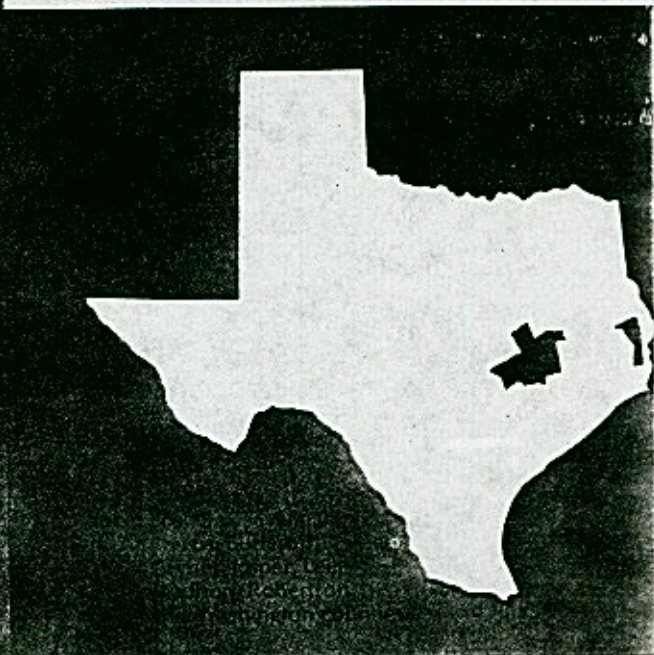
Similar Species with Key Character Differences:

Male and female flowering branches not segregated; distribution shallow waters, open sun, east Texas *Zizaniopsis miliacea*

Common Name:
Navasota ladies'-tresses
 Parks ladiestresses



Paul Montgomery



Scientific Name: *Spiranthes parksii* Correll

Other Scientific Names: None

Federal Status: Listed as Endangered, May 6, 1982

State Status: Listed as Endangered, April 29, 1983

Photographs and Drawings: None easily obtainable.

Description:

Habit: Erect perennial herb, 8-15 in. tall, with clustered, fleshy roots; stems slender, with several, tubular, tapering sheaths.

Leaves: Primarily at ground level, linear, usually gone by flowering time.

Flowers: Cream-colored, few, small, in a loose spiral up the stem, to $\frac{1}{4}$ in. long, $\frac{1}{8}$ in. in diameter, close to the stem; bracts directly below flower, broadly lance-shaped, with pointed, white tips, $\frac{1}{8}$ - $\frac{3}{8}$ in. long; sepals longer than petals, lance-shaped to narrowly triangular, pointed at the tip, hairy on the outer surface, $\frac{3}{16}$ - $\frac{5}{16}$ in. long, $\frac{1}{16}$ - $\frac{1}{8}$ in. wide; side petals with a green central stripe, egg-shaped to rounded, sometimes notched at the tip, $\frac{1}{16}$ - $\frac{1}{4}$ in. long, about $\frac{1}{8}$ in. wide; flowering late October to early November.

Fruit: Not described.

Habitat: Open wooded margins of slightly eroded, intermittent, minor tributaries of Brazos and Navasota Rivers in the Post Oak Woodlands, with post oak, blackjack oak, yaupon, American beautyberry, and little bluestem.

Ownership: Private and Texas Department of Highways and Public Transportation.

Similar Species with Key Character Differences:

Flowers in tighter spiral up the stem, usually white; bracts below flowers not white-tipped *Spiranthes cernua*

Lower petal (lip) with green central stripe *S. gracilis* var. *gracilis*

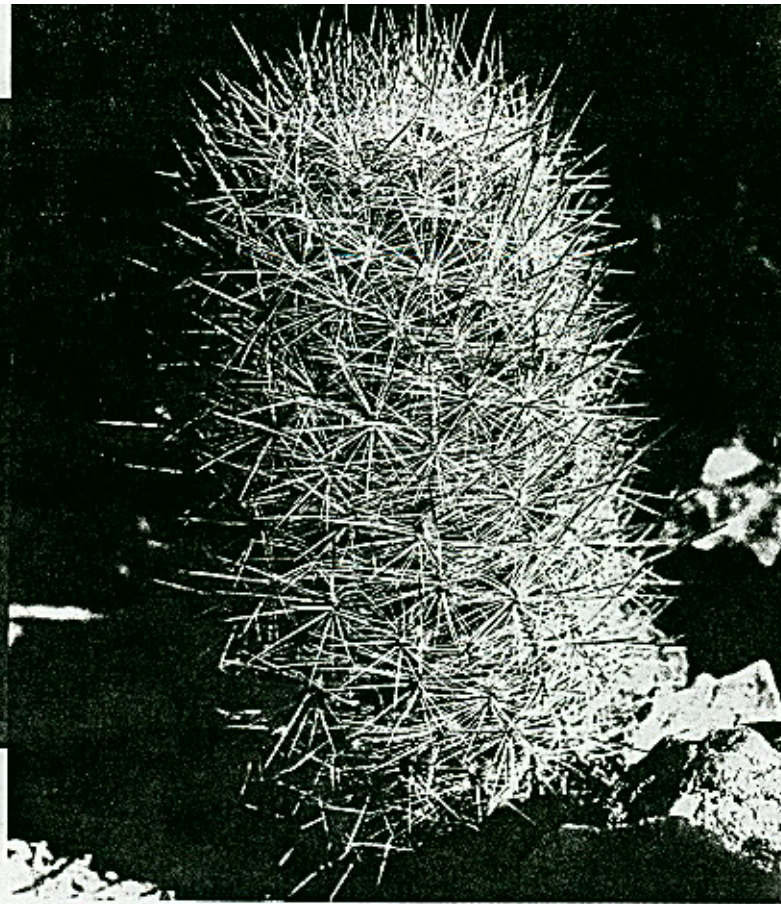
In the non-flowering condition, *S. parksii* is indistinguishable from other *Spiranthes* species.



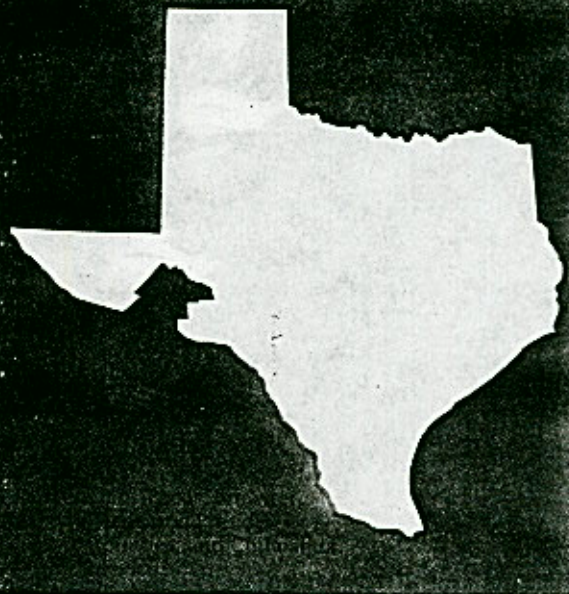
$\frac{1}{2}$ inch

**Inflorescence of
 Navasota ladies'-tresses**

**Hard spined cob cory cactus,
White column**



Paul Montgomery



Scientific Name: *Coryphantha strobiliformis* (Poselger) Moran var. *durispina* (Quehl) L. Benson

Other Scientific Names: *Coryphantha sneedii* (Britt. & Rose) Berger var. *albicolumnaria* (Hester) A. Zimmerman (not published); *Coryphantha albicolumnaria* (Hester) D. Zimmerman; *Mammillaria albicolumnaria* (Hester) Weniger (invalid name); *Escobaria albicolumnaria* Hester; *Escobesseyia albicolumnaria* Hester ex L. Benson; *Coryphantha strobiliformis* (Poselger) Orcutt var. *durispina* (Quehl) L. Benson; *Mammillaria strobiliformis* Scheer var. *durispina* Quehl; *Mammillaria strobiliformis* Scheer f. *durispina* Schelle; *Escobaria tuberculosa* (Engelm.) Britt. & Rose var. *durispina* (Quehl) Borg

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

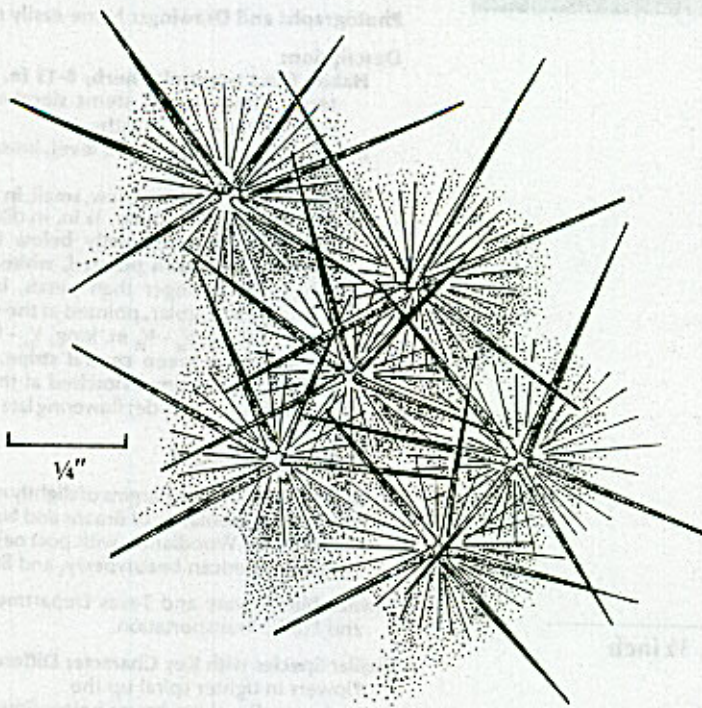
Photographs and Drawings: Weniger, 1970, plate 36; Benson, 1982, plate 176 (misidentified as *Coryphantha dasyacantha* var. *dasyacantha*); Weniger, 1984, p. 200.

Description:

Habit: Stems cylindrical, erect, single, rarely forming loose clumps in old age, 3-10 in. tall, 1½-2½ in. in diameter, with aggregations of crystals less than ¼ in. wide, but easily seen without magnification; tubercles cylindrical or egg-shaped, ¼-½ in. long, ⅛-¼ in. in diameter; areoles all alike.

Spines: Hiding the stem, more or less white in color, straight, very rigid and brittle; central spines spreading in all directions, pink or very light red when young, turning translucent white with red-brown tips with age, 11-17, with 1-5 inner central spines, ⅜-¾ in. long, surrounded by 9-16 outer central spines, ⅜-¾ in. long; outer spines snowy white, fine, some almost bristle-like, 25-35, ⅛-¾ in. long.

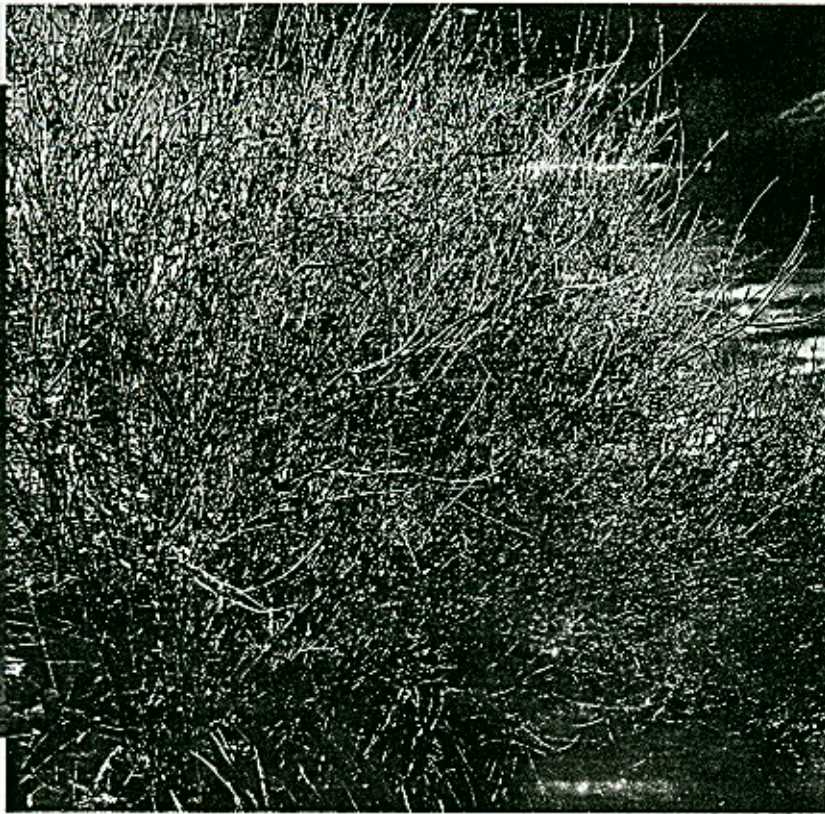
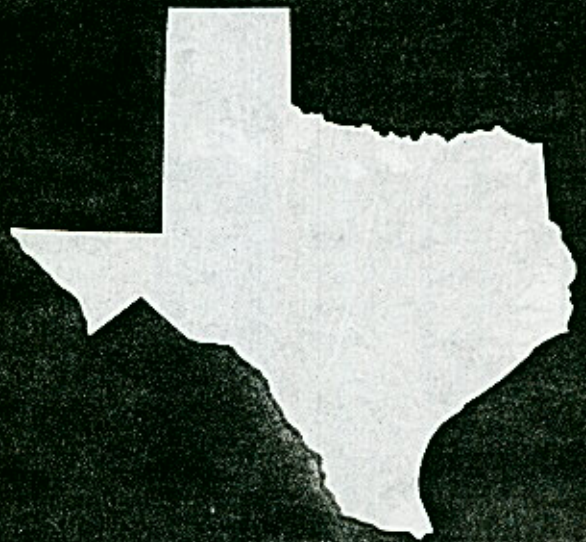
Flowers: Pale rose pink to bright magenta or whitish, small, not opening widely, funnel-shaped, at the top of the stem, ⅜-¾ in. wide, ¼-1 in. tall; stigma lobes white; anthers bright yellow; flowering March to May, according to rainfall, opening in the afternoon.



**Typical spine clusters of
Silverlace cactus**

(continued on back)

Common Name:
Brush-pea
Desert pea, Johnston genistidium



Paul Montgomery

Scientific Name: *Genistidium dumosum* L.M. Johnston
Other Scientific Names: None
Federal Status: Category 2, U.S. Fish and Wildlife Service
State Status: Candidate

Photographs and Drawings: Warnock, 1970, p. 54; Vines, 1976, p. 561; Powell, 1988, p. 208.

Description:

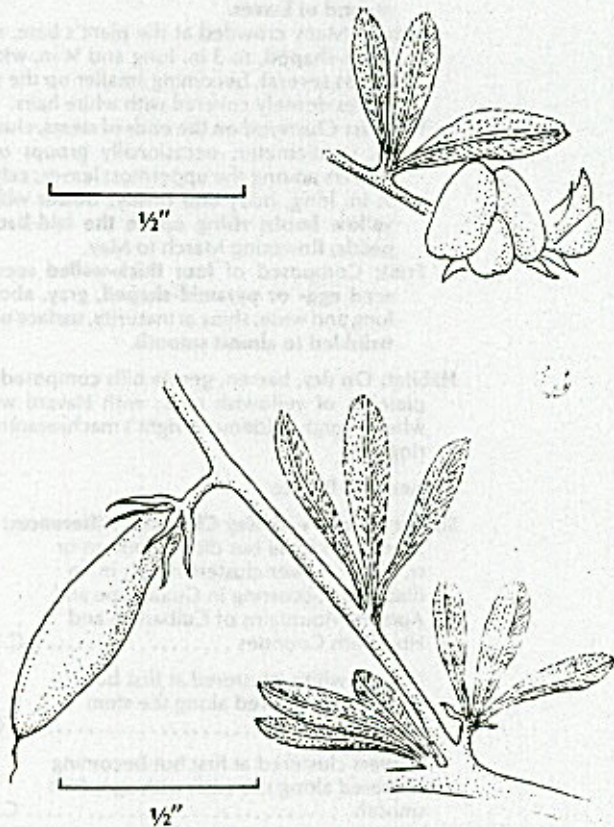
Habit: Rounded, unarmed, erect shrub to 3 ft. tall; with numerous, slender, rigid branches arising from the base; young branches greenish-gray with minute white hairs, with 8-15 ribs; older branches darker or olive-green, hairless, and woody at the base.

Leaves: Alternate, single or divided into three leaflets, often without leaves during droughts, densely hairy, on stalks $\frac{1}{2}$ - $\frac{3}{8}$ in. long, stipule awl-shaped, rigid, less than $\frac{1}{6}$ in. long; leaflets oblong lance-shaped, $\frac{3}{16}$ - $\frac{3}{4}$ in. long, $\frac{1}{6}$ - $\frac{1}{8}$ in. wide, firm, coming to a point at the tip, middle leaflet on a very short leaf stalk and larger than outer leaflets.

Flowers: Solitary or several loosely scattered along a short branch coming from the leaf base; individual flower stalks $\frac{1}{6}$ - $\frac{1}{8}$ in. long; calyx bell-shaped, overall about $\frac{1}{4}$ in. long, slightly hairy, more or less 2-lipped; **flower yellow**, sometimes with greenish spots $\frac{1}{8}$ - $\frac{1}{6}$ in. long, with five petals, **resembling a pea flower**; upper petal roundish, abruptly bent downward, clawed; side petals yellow, oblong crescent-shaped; bottom petals yellowish to white, crescent-shaped; stamens 10, 9 joined and one free, about $\frac{1}{4}$ in. long; flowering June to September.

Fruit: Resembling a pea pod, $\frac{1}{4}$ -1 in. long, to $\frac{1}{8}$ in. wide, linear, straight, dry, opening spontaneously, tip rounded or blunt, often with an abrupt sharp-pointed tip; seeds 4-6, roundish, flattened.

Habitat: Desert shrublands on dry, rocky limestone hills with lechuguilla, rough false agave, plume columbia, black grama, leatherstem, acacia, and candelilla.



**Flowers and fruit of
 Brush-pea**

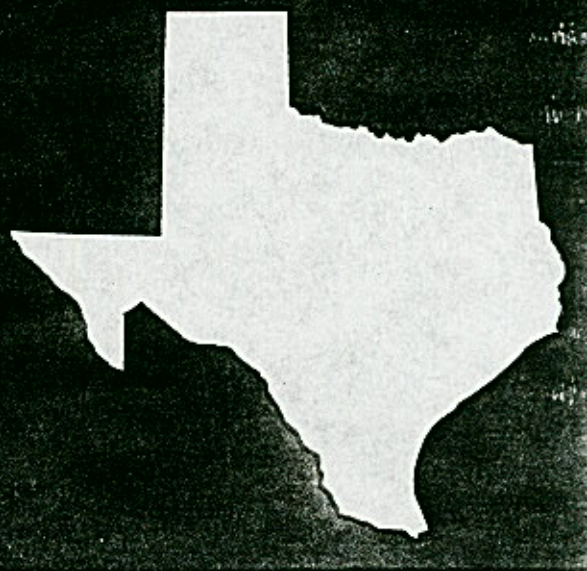
(continued on back)

Terlingua Creek cat's-eye

Terlingua Creek cryptantha



Paul Montgomery



Scientific Name: *Cryptantha crassipes* I.M. Johnston

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: None published.

Description:

Habit: Erect perennial to 2 ft. tall, covered with silvery hairs, developing a dense mound of leaves at the plant's base, with few to many, erect, unbranched, 4-12 in. long, hairy flowering stalks arising from the mound of leaves.

Leaves: Many crowded at the plant's base, narrowly lance-shaped, to 3 in. long and ¼ in. wide; stem leaves several, becoming smaller up the stem; all leaves densely covered with white hairs.

Flowers: Clustered on the ends of stems, clusters ¾-1 in. in diameter, occasionally groups of a few flowers among the uppermost leaves; calyx about ½ in. long, hairy and bristly; flower white, with yellow knobs rising above the laid-back white petals; flowering March to May.

Fruit: Composed of four thick-walled seeds; each seed egg- or pyramid-shaped, gray, about ⅓ in. long and wide, shiny at maturity, surface obscurely wrinkled to almost smooth.

Habitat: On dry, barren, gentle hills composed of small platelets of yellowish rock; with Havard wildbuck-wheat, rough coldenia, Wright's machaeranthera, and ringstem.

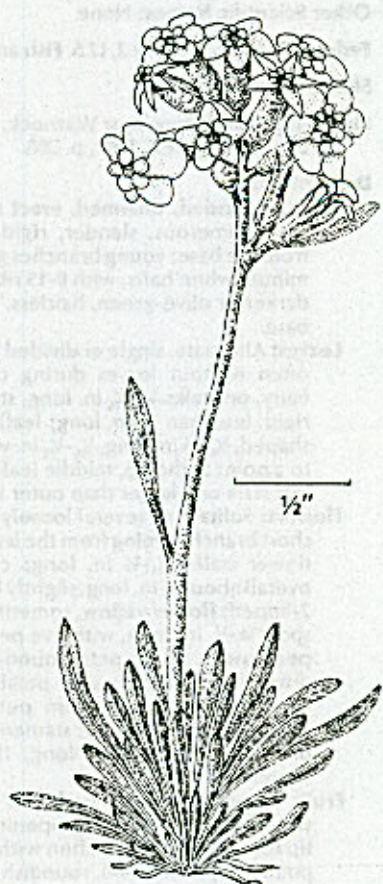
Ownership: Private.

Similar Species with Key Character Differences:

Seeds with small but distinct bumps or wrinkles; flower clusters ¼-1 ¼ in. in diameter; occurring in Guadalupe and Apache Mountains of Culberson and Hudspeth Counties *C. paysonii*

Flowers white, clustered at first but becoming scattered along the stem with age *C. oblata*

Flowers clustered at first but becoming scattered along the stem with age; fruit smooth *C. palmeri*

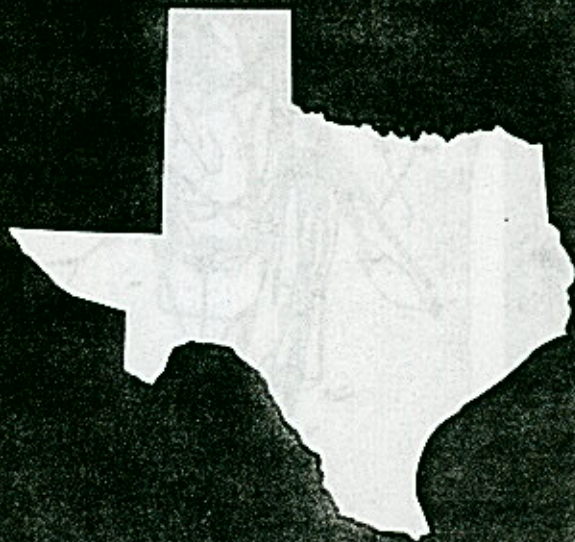


Entire plant of
Terlingua Creek cat's-eye

Common Name:
Hinckley's oak
Hinckley oak



Paul Montgomery



Scientific Name: *Quercus hinckleyi* C.H. Muller

Other Scientific Names: None

Federal Status: Listed as Threatened, August 26, 1988

State Status: Listed as Threatened, December 30, 1988

Photographs and Drawings: Warnock, 1970, p. 28; Vines, 1976, p. 159; Powell, 1988, p. 99.

Description:

Habit: Dwarf, evergreen, much-branched shrub to 4 ft. high, forming dense stands; twigs slender, light brown.

Leaves: Thick, stiff, leathery, gray-green, very small, $\frac{3}{8}$ - $\frac{1}{2}$ in. long and wide, egg-shaped or almost round in outline, heart- or ear-shaped at the base, pointed or blunt at the top and spine-tipped, hairless, waxy, margins wavy, with coarse spiny teeth; veins obscure; leaf stalks very short, about $\frac{1}{8}$ in. long.

Flowers: Male flowers in very small, loose, elongate clusters, cluster $\frac{1}{8}$ - $\frac{1}{4}$ in. long; female flowers very hairy.

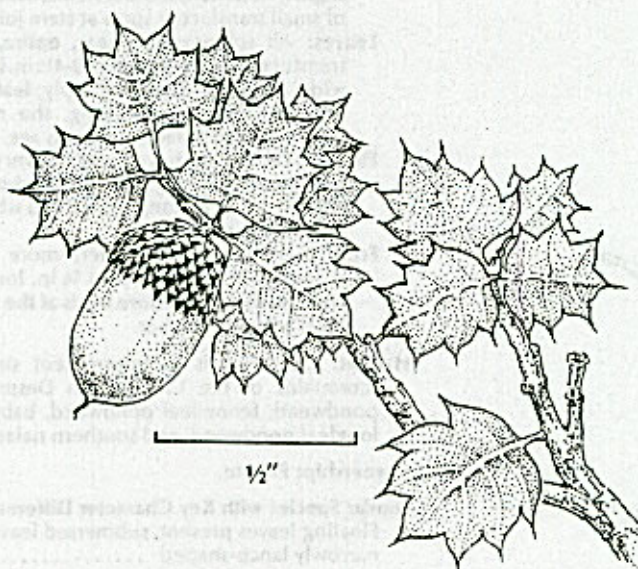
Fruit: Produced on an annual basis, solitary or paired, stalkless or on short stalks to $\frac{3}{8}$ in. long; acorns oval in shape, $\frac{3}{8}$ - $\frac{1}{2}$ in. broad, brown, hairless, maturing in the fall; acorn cups shallow, saucer-shaped, $\frac{1}{2}$ - $\frac{3}{4}$ in. broad, $\frac{1}{2}$ - $\frac{3}{4}$ in. deep, margins more or less wavy.

Habitat: Desert shrublands on dry limestone slopes; with tickbush, sotol, lechugilla, resurrection plant, myrtle-croton, and evergreen sumac.

Ownership: Texas Parks and Wildlife Department and private.

Similar Species with Key Character Differences:

Leaves without spine-tipped teeth, oblong to elliptic in outline *O. depressipes*



**Leaves and fruit of
Hinckley's oak**

(continued on back)

Common Name:
Little Aguja pondweed



Paul Montgomery



Scientific Name: *Potamogeton clystocarpus* Fernald

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: Correll and Correll, 1975, p. 106.

Description:

Habit: Aquatic with much branched, rounded to slightly flattened, slender stems, usually with a pair of small translucent spots at stem joints.

Leaves: All submersed, linear, entire, light-green, translucent to sub-opaque, 2-4½ in. long, ¼-½ in. wide, tip pointed, often sharply; leaf bracts clasping, less than ¼ in. long, the margins free, becoming much lacerated with age.

Flowers: Generally above water; flower stems thread-like, ¾-2¾ in. long; flowers in short cylindrical clusters ¼-¾ in. long, with 2 or 3 whorls, minute, less than ¼ in. long.

Fruit: Generally below water; more or less egg-shaped to rounded, about ¼ in. long and ⅛ in. wide, with two or more warts at the base; fruiting early May to October.

Habitat: Quiet pools in intermittent streams in the mountains of the Chihuahuan Desert, with leafy pondweed, fennelleaf pondweed, baby pondweed, longleaf pondweed, and southern naiad.

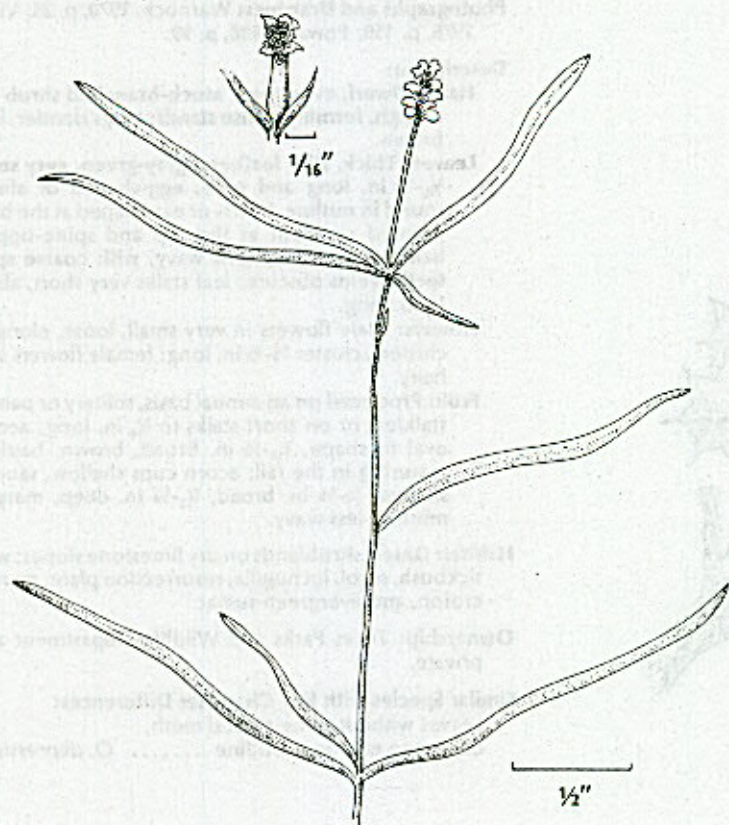
Ownership: Private.

Similar Species with Key Character Differences:

Floating leaves present, submersed leaves narrowly lance-shaped *P. nodosus*

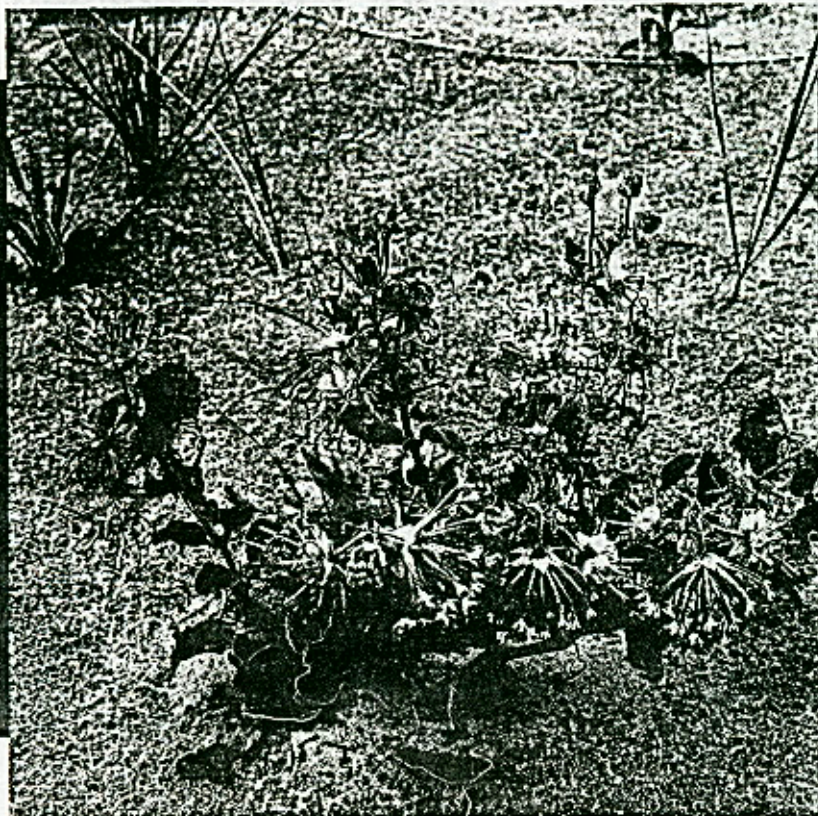
Leaf bracts more than ¼ in. long; fruits without warts *P. foliosus*, *P. pectinatus*, and *P. pusillus*

Flowers borne singly, not in clusters *Najas guadalupensis*

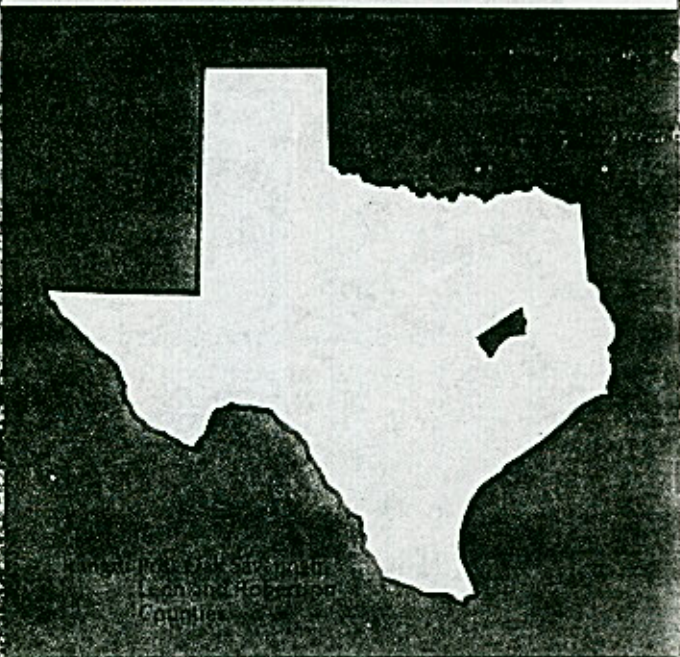


Leaves and flower cluster of
 Little Aguja pondweed

Common Name:
Large-fruited sand verbena



Jackie Poole



Scientific Name: *Abronia macrocarpa* L.A. Galloway

Other Scientific Names: None

Federal Status: Listed as Endangered, September 28, 1988

State Status: Listed as Endangered, December 30, 1988

Photographs and Drawings: U.S. Fish and Wildlife Service, 1987, p. 3.

Description:

Habit: Ascending to semi-erect perennial herb, from fleshy to semi-woody, long taproot; stems to 20 in. tall, covered with sticky hairs.

Leaves: Opposite, more or less egg-shaped, covered with sticky hairs, $\frac{3}{4}$ -2 in. long, $\frac{3}{8}$ -1 $\frac{1}{8}$ in. wide.

Flowers: Pink-purple, with 20 to 75 flowers arranged in a spherical nodding head up to 4 in. across; individual flowers tubular $\frac{3}{8}$ -1 $\frac{1}{4}$ in. long, with an expanded five-lobed border $\frac{1}{4}$ - $\frac{1}{2}$ in. across; flowering late March to early June.

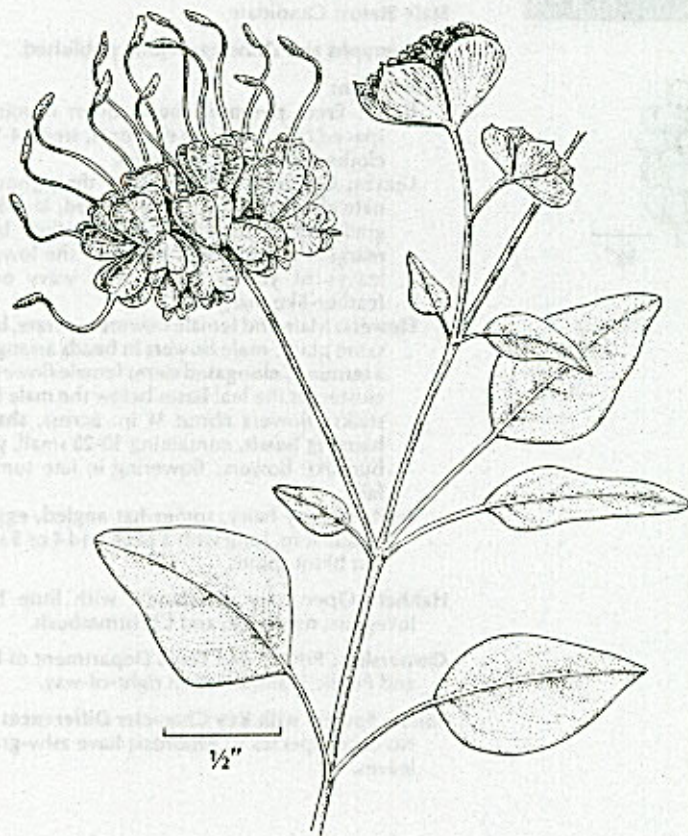
Fruit: Turbine-shaped, with 5 wings, papery, $\frac{5}{16}$ - $\frac{3}{8}$ in. long, $\frac{5}{16}$ - $\frac{1}{2}$ in. wide; seeds brown, $\frac{1}{16}$ - $\frac{1}{8}$ in. long.

Habitat: Bare, wind-blown sand dunes surrounded by post oak woodlands; often growing with Indian blanket, goldenmane tickseed, silver croton, and ciliate rhododod.

Ownership: Private land.

Similar Species with Key Character Differences:

No other species of *Abronia* have large, papery-thin fruits.

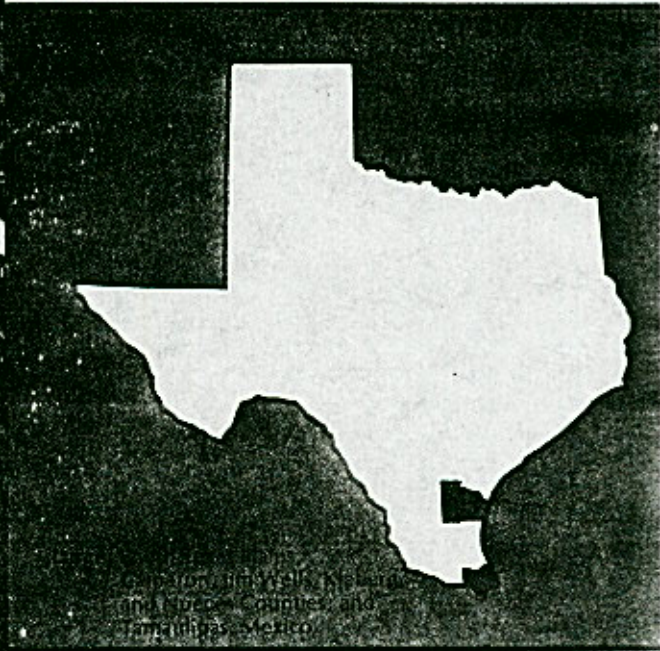


Leaves, buds, and fruits of
Large-fruited sand verbena

Common Name:
South Texas ragweed



Jackie Poole



Scientific Name: *Ambrosia cheiranthifolia* Gray

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: None published.

Description:

Habit: Erect perennial herb, often forming close-spaced colonies from the roots; stems 4-12 in. tall, clothed with ashy gray hairs.

Leaves: Opposite below (nearly throughout), alternate above, oblong lance-shaped, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. long, gradually narrowed to an unstalked base; leaf margins unlobed and entire or the lower, larger leaves of young shoots with wavy or slightly feather-like margins.

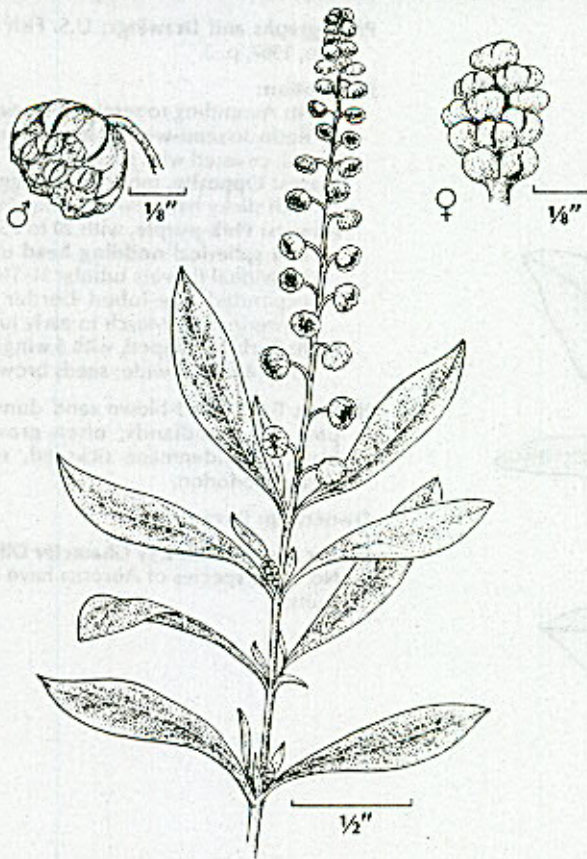
Flowers: Male and female flowers separate, but on the same plant; male flowers in heads arranged along a terminal, elongated stem; female flowers in small clusters at the leaf bases below the male flowering stalks; flowers about $\frac{1}{4}$ in. across, shaped like hanging bowls, containing 10-20 small, yellowish, bud-like flowers; flowering in late summer and fall.

Fruit: Slightly hairy, somewhat angled, egg-shaped, about $\frac{1}{8}$ in. long with a beak and 4 or 5 spreading but blunt spines.

Habitat: Open clay grasslands; with little bluestem, lovegrass, mesquite, and Christmasbush.

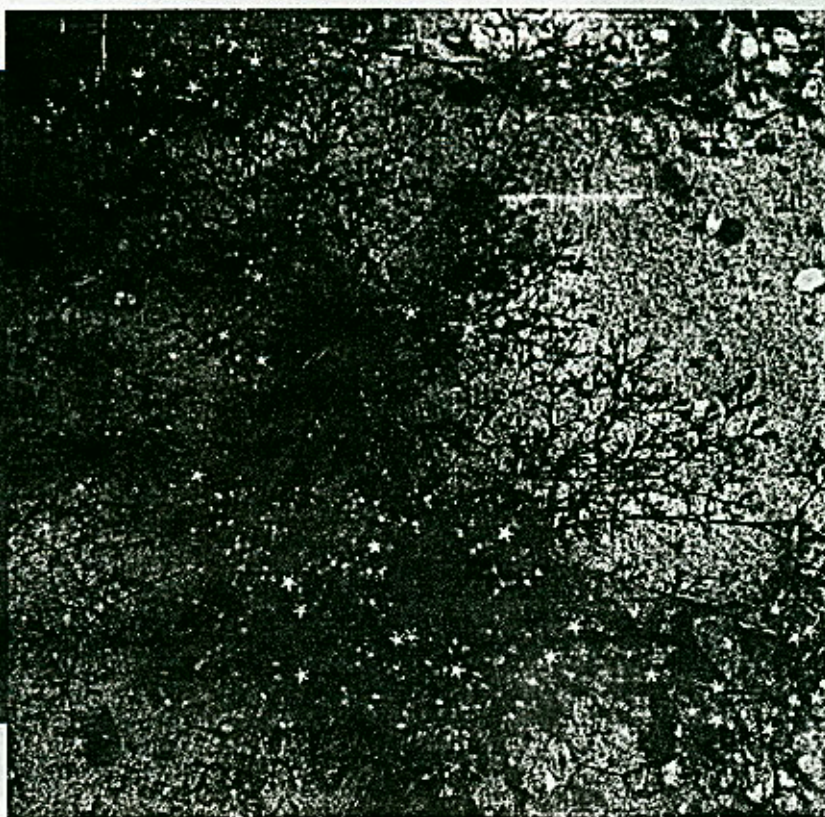
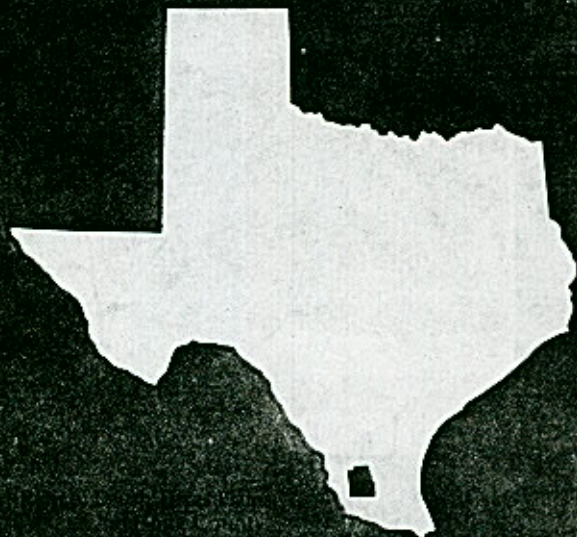
Ownership: Private and Texas Department of Highways and Public Transportation right-of-way.

Similar Species with Key Character Differences: No other species of *Ambrosia* have ashy-gray, entire leaves.



Male and female flowers,
and inflorescence of
South Texas ragweed

Common Name:
Bushy whitlow-wort



Jackie Poole

Scientific Name: *Paronychia congesta* Correll

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: Turner, 1983, p. 21.

Description:

Habit: Low, tufted perennial herb to 8 in. tall, stems densely covered with short hairs, stems clustered or more or less branched.

Leaves: Linear, sharp-pointed, flat against the stem and congested or overlapping; middle stem leaves $\frac{3}{8}$ - $\frac{1}{4}$ in. long, usually about equal in length to the lance-shaped, tissue-like stipules.

Flowers: In clusters at the top of branches, exceeding the bracts and leaves, flowers minute, about $\frac{1}{8}$ in. across, lemon-yellow, with bristly hairs, star-shaped, each point gradually terminating in a short, erect, straight awn; flowering in early summer (June) and probably in autumn if there is ample rainfall.

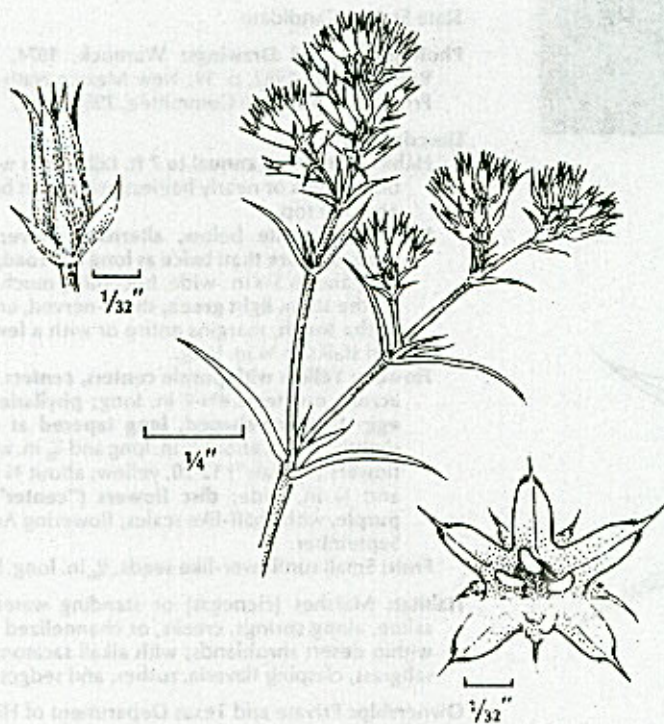
Fruit: Small, bladder-like, one-seeded.

Habitat: Barren, gypseous, rocky slopes along the breaks of the Rio Grande Plains; with ceniza, Texas palo-verde, acacia, Mexican persimmon, black dalea, calderona, guayacan, and false-mesquite calliandra.

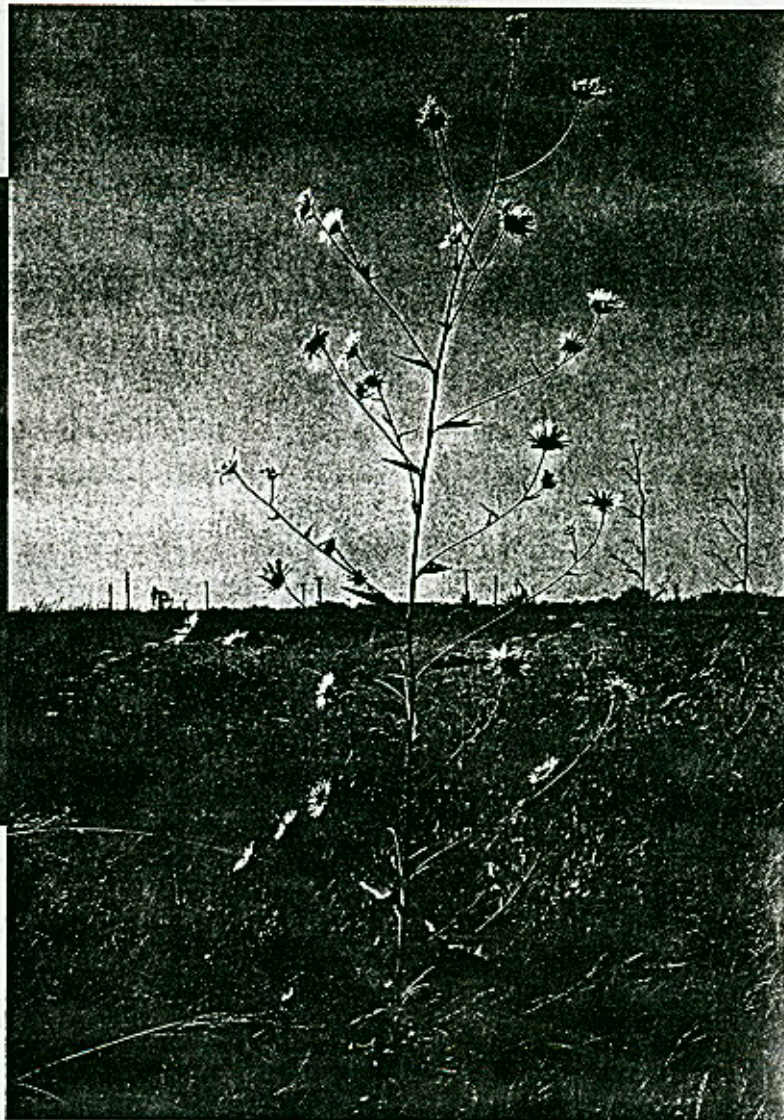
Ownership: Private land.

Similar Species with Key Character Differences:

Flower hairless or unevenly hairy, but not with bristly hairs; flower points abruptly terminating into a spreading awn *Paronychia jamesii*

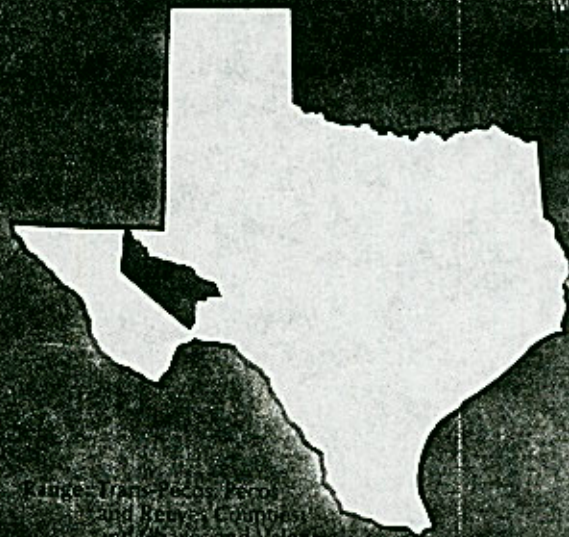


Branch, flower, and fruit
Bushy whitlow-wort



Jackie Poole

Common Name:
Puzzle sunflower
 Gyp sunflower, Paradoxical sunflower,
 Pecos sunflower



King Range, Pecos Range
 and Reyes Mountains
 and Chisos and Valero
 Mountains, New Mexico

Scientific Name: *Helianthus paradoxus* Heiser

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: Warnock, 1974, p. 140;
 Rogers et al., 1982, p. 19; New Mexico Native Plants
 Protection Advisory Committee, 1984, p. 41.

Description:

Habit: Taprooted annual to 7 ft. tall; stems with stiff, bristly hairs or nearly hairless, with short branches near the top.

Leaves: Opposite below, alternate above; lance-shaped, more than twice as long as broad, to 7 in. long and to 3/4 in. wide, becoming much smaller up the stem, light green, three-nerved, and gritty to the touch, margins entire or with a few teeth; leaf stalks to 3/4 in. long.

Flowers: Yellow with purple centers, centers to 3/4 in. across, on stems 4 3/4-7 in. long; phyllaries 16-20, egg- to lance-shaped, long tapered at the tip, slightly rough, about 3/8 in. long and 3/16 in. wide; ray flowers ("petals") 12-20, yellow, about 3/4 in. long and 1/4 in. wide; disc flowers ("center") deep purple, with chaff-like scales; flowering August to September.

Fruit: Small sunflower-like seeds, 1/16 in. long, hairless.

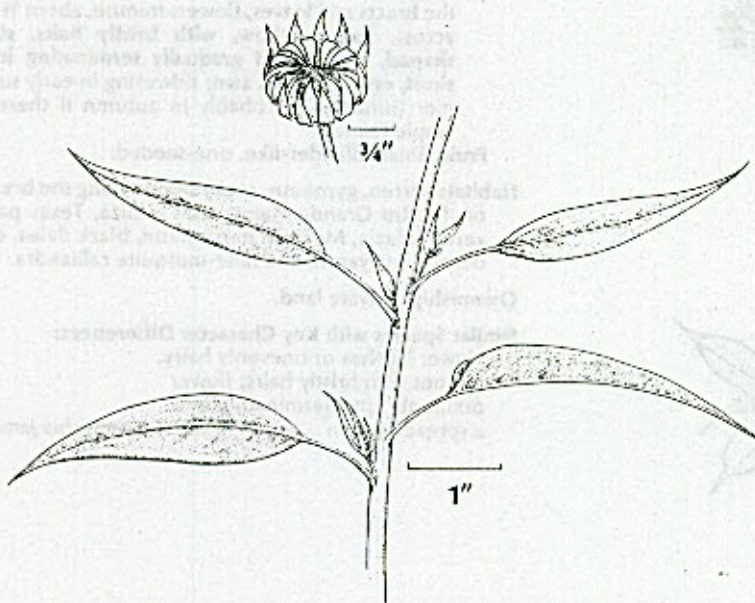
Habitat: Marshes (ciénegas) or standing water, often saline, along springs, creeks, or channelized streams within desert shrublands; with alkali sacaton, inland saltgrass, clasping flaveria, rushes, and sedges.

Ownership: Private and Texas Department of Highways and Public Transportation right-of-way.

Similar Species with Key Character Differences:

Leaves heart-shaped; on deep sands *H. neglectus*

Leaves usually egg-shaped to triangular; phyllaries with abruptly pointed tips, not long-tapering *H. annuus*

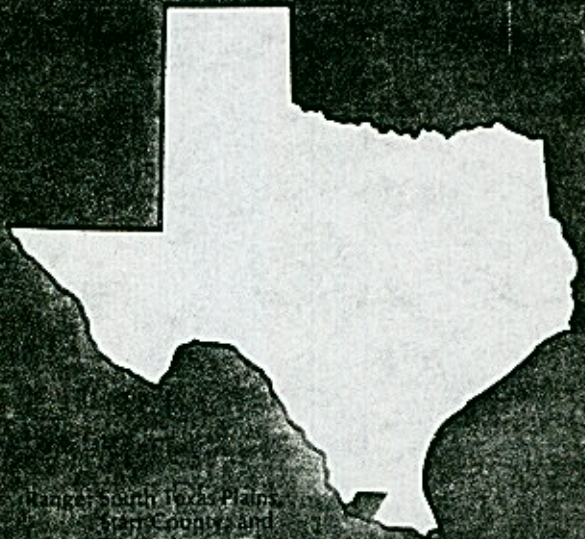


**Phyllaries and leaves of
 Puzzle sunflower**

Common Name:
Star cactus
Sea-urchin cactus, Sand dollar cactus



Paul Montgomery



Hanger, South Texas Plains,
 Starr County, and
 Furea Leon and
 Terrell, Mexico

Scientific Name: *Echinocactus asterias* Zucc.

Other Scientific Names: *Astrophytum asterias* (Zucc.)
 Lemaire

Federal Status: Category 2, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: Weniger, 1970, plate 19;
 Benson, 1982, p. 723, 724; Weniger, 1984, p. 100;
 Montgomery, 1988, p. 32.

Description:

Habit: Stem single, low dome- or disk-shaped, 2-6 in. in diameter, level with ground to 2½ in. tall, body dull green, covered with white or yellowish dots, divided by narrow, distinct grooves into usually 8 broad, almost flat ribs; areoles circular, ¼-¾ in. across filled with dense, straw-colored to gray wool, distributed in a line between the grooves of each rib.

Spines: None.

Flowers: Yellow with orange base, 2-3½ in. across, 2 in. tall, opening widely; "petals" spoon-shaped; stigma yellowish with 10-12 shallow lobes; flowering April to May.

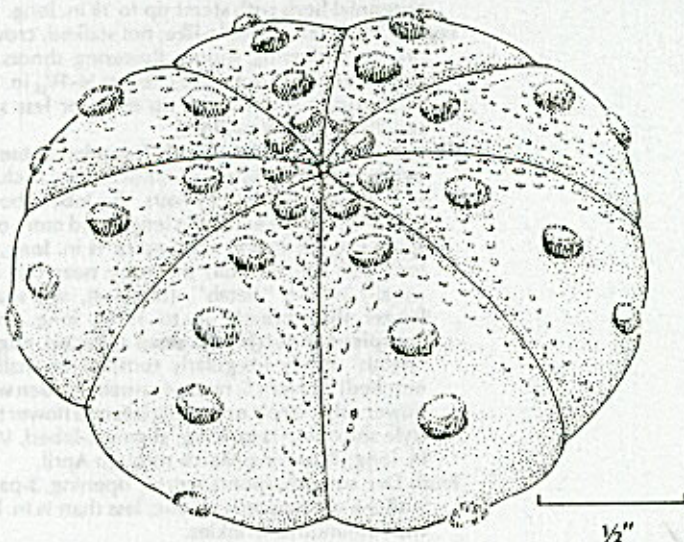
Fruit: Green or pink, usually obscured by dense woolly hairs from areoles, fleshy, oval, ½-¾ in. long, about ½ in. in diameter; seeds brown, shiny, about ⅛ in. long.

Habitat: Open shrubland on dry, gravelly slopes or flats at low elevation; with shoregrass, sneezeweed, goldenweed, and mesquite.

Ownership: Private.

Similar Species with Key Character Differences:

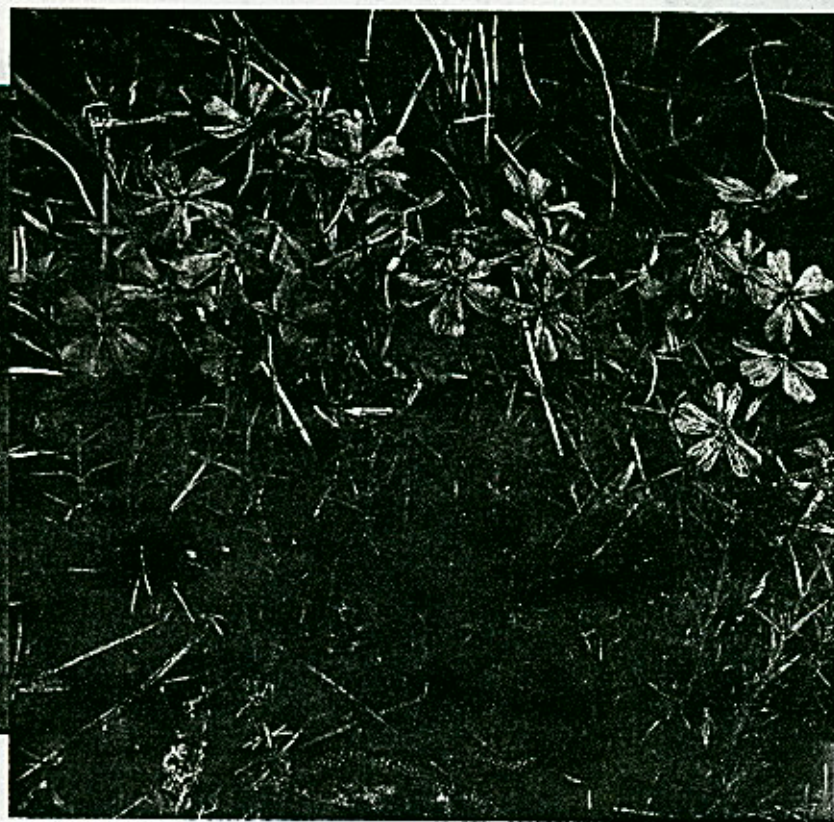
Crowded, overlapping, triangular tubercles, upper surfaces covered by numerous fissures; flowers white to pink or magenta *Ariocarpus fissuratus*



**Non-flowering plant of
 Star cactus**

(continued on back)

Common Name:
Texas trailing phlox



Paul Montgomery



Range: Pinelands, Hardin, Polk, and Tyler Counties

Scientific Name: *Phlox nivalis* Lodd. ssp. *texensis* Lundell

Other Scientific Names: *Phlox texensis* (Lundell) Lundell

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: Ajilvsgi, 1979, p. 87.

Description:

Habit: Spreading to prostrate, often matted evergreen perennial herb with stems up to 18 in. long.

Leaves: Persistent, needle-like, not stalked, crowded on non-flowering shoots, flowering shoots with shorter and broader leaves; leaves $\frac{3}{8}$ - $1\frac{1}{16}$ in. long, rarely up to $\frac{1}{8}$ in. wide, tip more or less spiny, usually bent downward.

Flowers: Pink, rose-pink, bluish, lavender, or purplish petals, with a reddish or purplish center; in clusters of 3-6; calyx with sticky hairs, the lobes about or equal to the flower tube in length and more or less spine tipped; flower tube up to $\frac{3}{8}$ in. long, with long soft hairs within the tube near the base, usually with 5 "petals", (rarely 4), egg-shaped, longer than broad, up to $\frac{1}{2}$ in. long, with a conspicuous notch $\frac{1}{8}$ in. deep at the tip, edges of "petals" rarely irregularly toothed or shallowly notched; stamens 5, rarely 4, usually hidden within flower tube, rarely extending beyond flower tube; style short, $\frac{1}{16}$ - $\frac{3}{8}$ in. long; stigma 3-lobed, $\frac{1}{32}$ - $\frac{1}{16}$ in. long; flowering March through April.

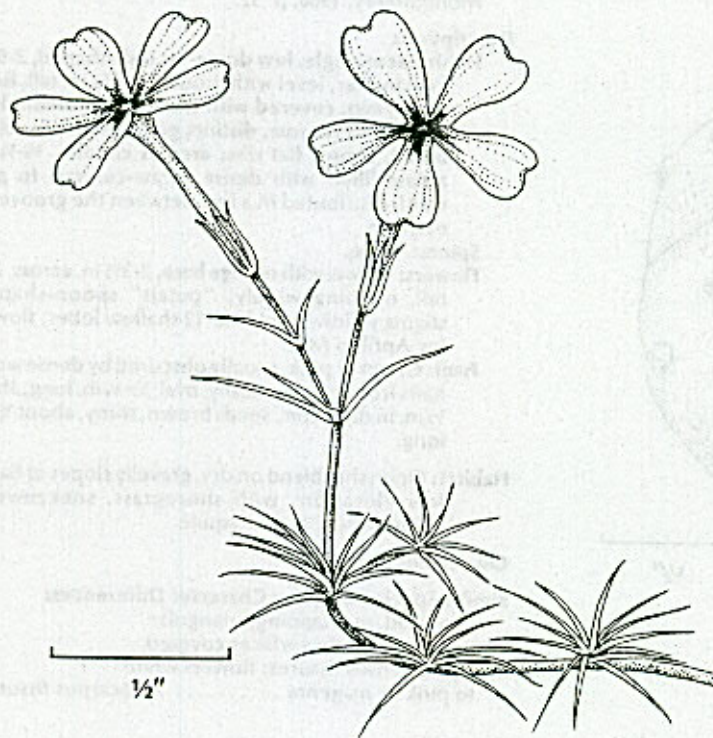
Fruit: Dry, smooth, spontaneously opening, 3-parted, with 3-6 seeds; seeds elliptic, less than $\frac{1}{8}$ in. long, with diminutive wrinkles.

Habitat: In open, longleaf pine savannahs, fire-maintained pinelands, and the edges of young pine plantations on deep, sandy soil; with the bird-foot violet.

Ownership: Private, Texas Nature Conservancy, and the Big Thicket National Biological Preserve.

Similar Species with Key Character Differences:

Leaves mostly linear, broader than needle-like; "petal" lobe about as broad as long *Phlox oklahomensis*

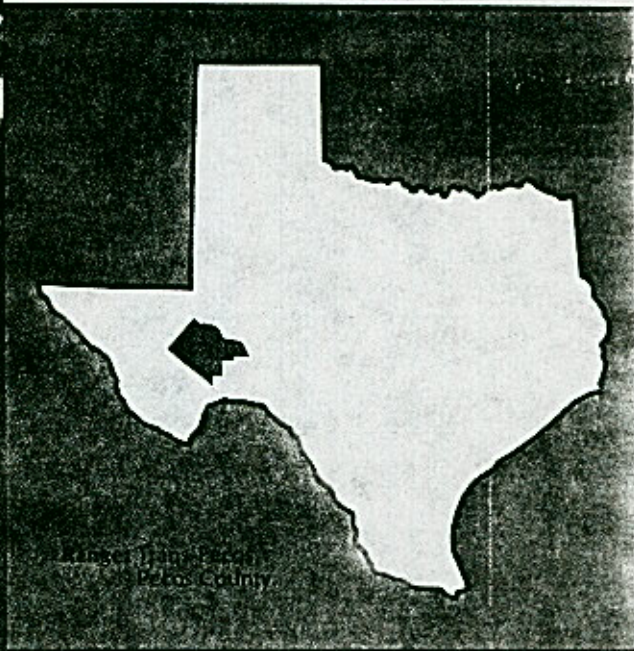


**Flowering stem of
Texas trailing phlox**

Common Name:
Tharp's blue-star
 Tharp's slimpod



David Riskind



Big Bend National Park
 Pecos County

Scientific Name: *Amsonia tharpii* Woods.

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: None published.

Description:

Habit: Perennial, 4-12 in. tall, from woody rootstock, covered with minute, rough hairs.

Leaves: Alternate to more or less whorled, crowded, minutely stalked, of two distinct types; lower leaves elliptic to lance-shaped, $\frac{3}{8}$ - $\frac{1}{2}$ in. broad; upper leaves linear to linear lance-shaped, with pointed tips, $\frac{1}{8}$ - $\frac{1}{16}$ in. wide, up to 2 in. long.

Flowers: Greenish-white to pale blue, at ends of branches, in clusters of 10-15, each flower on a hairy stalk about $\frac{1}{8}$ in. long; calyx with 5 narrowly lance- to needle-shaped, abruptly pointed, hairy lobes, $\frac{1}{16}$ - $\frac{1}{4}$ in. long; corolla 5-parted, showy, tubular, divided into 5 lobes at the top, noticeably constricted below the lobes, tube $\frac{1}{2}$ - $\frac{3}{4}$ in. long, lobes $\frac{1}{4}$ - $\frac{3}{8}$ in. long; stamens attached about $\frac{1}{16}$ in. below the constriction; flowering March to June, depending on rainfall.

Fruit: Dry, thick, spindle-shaped, opening along one side, $\frac{1}{4}$ - $\frac{4}{8}$ in. long; seeds 4-5, cylindrical, blunt at the top, corky, $\frac{1}{4}$ - $\frac{3}{8}$ in. long, $\frac{1}{16}$ - $\frac{1}{8}$ in. wide.

Habitat: Dry, sparsely vegetated, desert shrublands on somewhat eroded, lower slopes of limestone hills; with desert myrtlecroton, creosote bush, red-berry juniper, javelina-brush, mariola, burrograss, and threeawn.

Ownership: University of Texas and Texas Department of Highways and Public Transportation right-of-way.

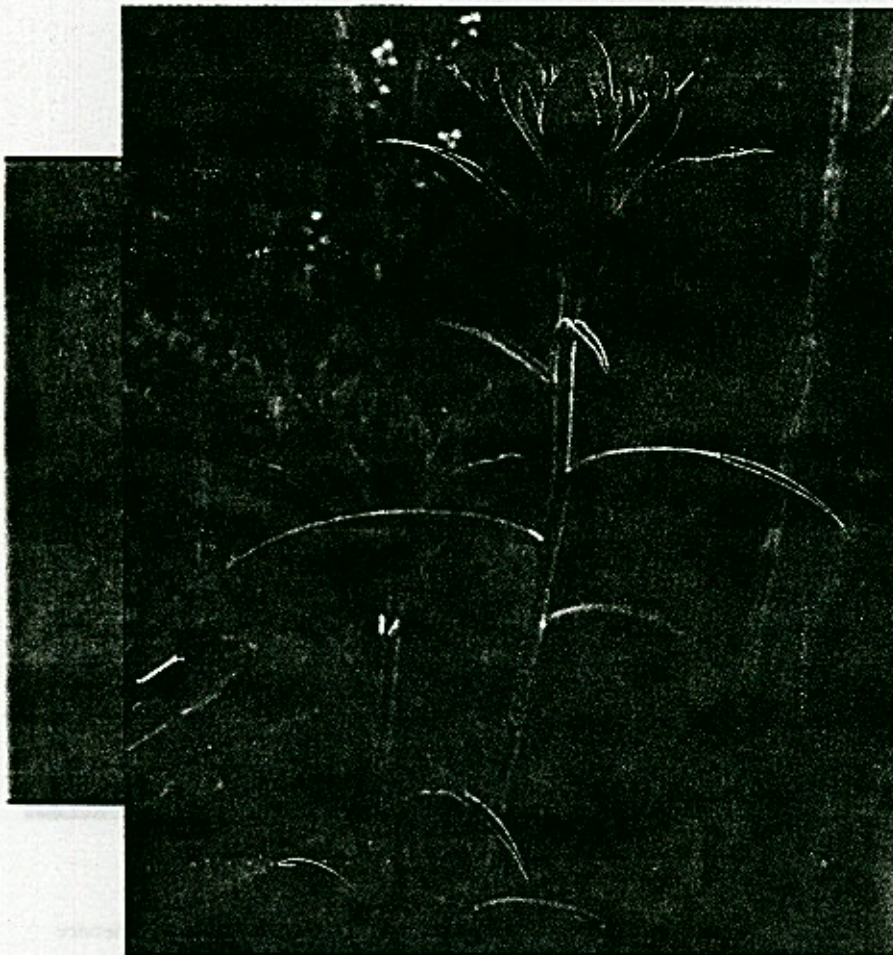
Similar Species with Key Character Differences:

Stems densely covered with crinkly hairs; fruit stout, resembling a string of beads, 2-3 in. long; forming dense colonies in sandy soils *A. arenaria*

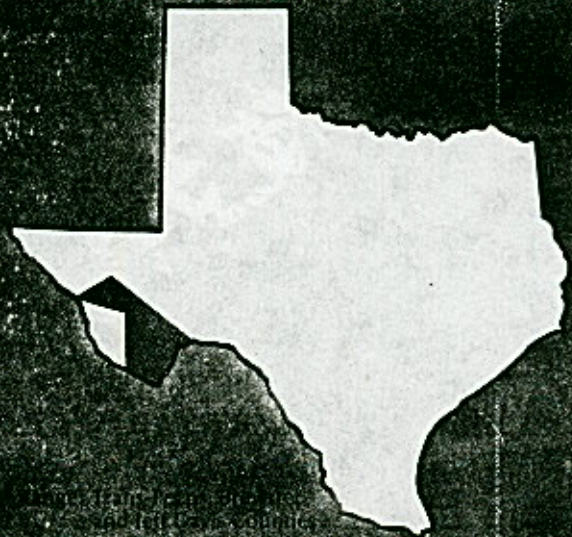


Flowers and fruits of
 Tharp's blue-star

Common Name:
Tall paintbrush
Chisos paintbrush



Jackie Poole



Scientific Name: *Castilleja elongata* Pennell

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: Warnock, 1970, p. 124.

Description:

Habit: Branching perennial, covered with fine, downy hairs, 8-16 in. tall, to 48 in. tall where protected by shrubs.

Leaves: Alternate, green to gray-green, linear, pointed at both ends, entire, three-ribbed, covered with fine, long, soft, shaggy hairs below, largest leaves 2¼-3½ in. long, ¼-⅝ in. wide, upper-most leaves slightly shorter and wider.

Flowers: In clusters at the ends of branches; bracts red to red-orange, ¼-1 in. long, three- to five-ribbed, three-parted at the tip; calyx red, ⅜-1 in. long, divided into two primary lobes about ¼ in. long, each primary lobe divided into two lance-shaped lobes, ⅝-⅞ in. long; corolla green, tubular, two-lipped, tube ⅝ in. long, upper lip ½ in. long, minutely hairy on the back, lower lip about ⅞ in. long; flowering April to October.

Fruit: Egg-shaped, dry, 2-parted, splitting down the middle when dry, about ⅝ in. long; seeds numerous, net-veined, ⅜-⅞ in. in diameter.

Habitat: In open woodlands and grasslands at moderate to high elevation, also historically known from desert grasslands and shrublands at low elevation; with Coahuila scrub oak, pinyon-ricegrass, mountain mahogany, alligator juniper, and Mexican pinyon at high elevations.

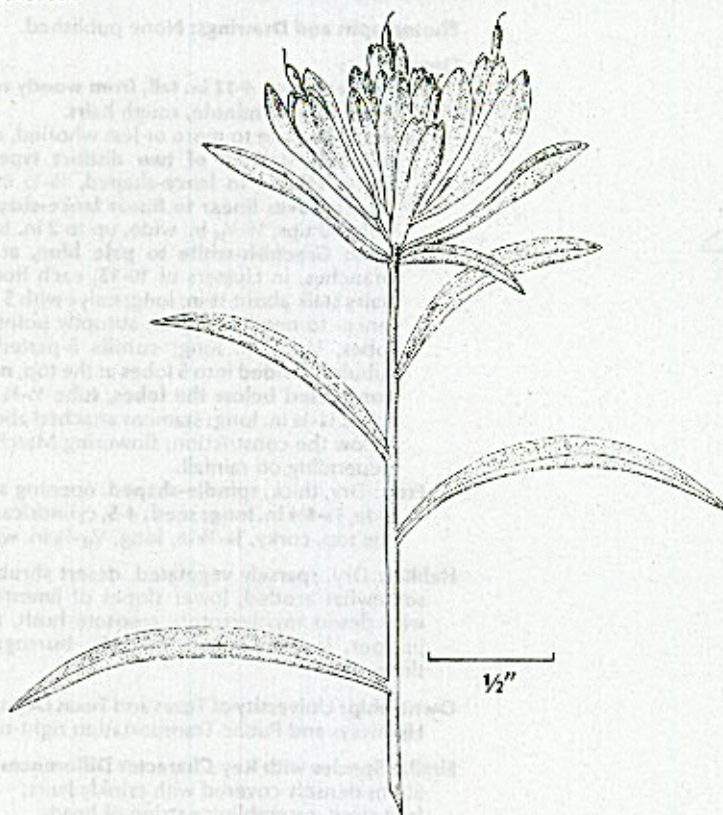
Ownership: Big Bend National Park and private.

Similar Species with Key Character Differences:

Stems more or less hairless; leaves fringed with minute hairs on margins; back of corolla with a fine covering of short, white wool *C. ciliata*

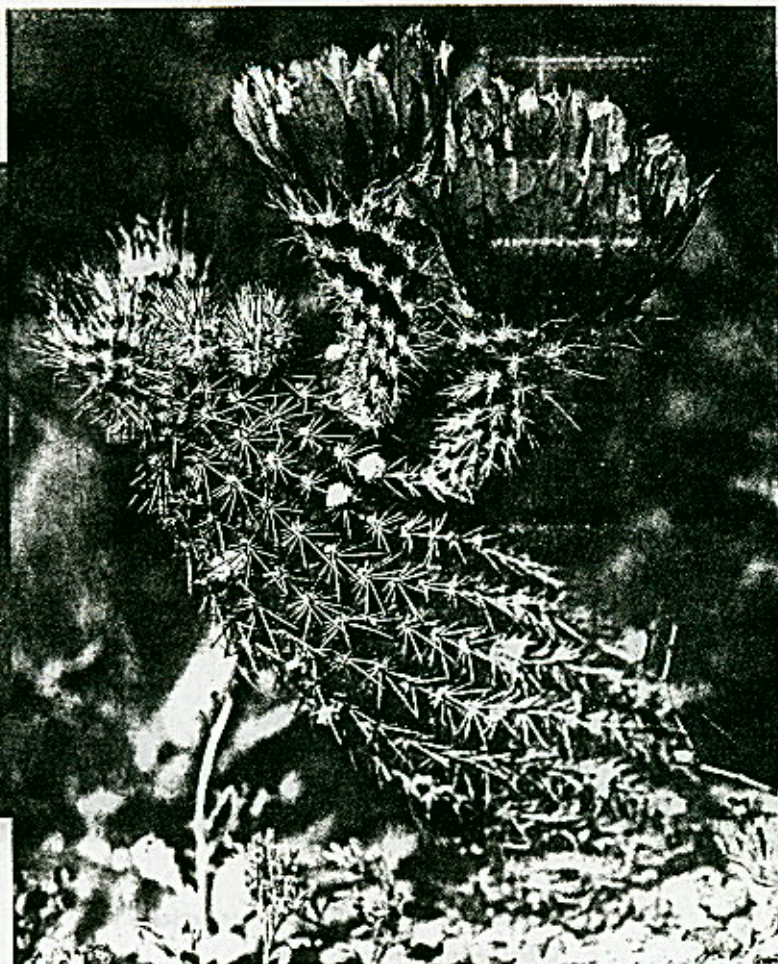
Stems white hairy or wooly; bracts entire or 3-lobed; calyx 1¼-1½ in. long, primary lobes ⅝-7/16 in. long, secondary lobes

1/16-2/16 in. long *C. integra*

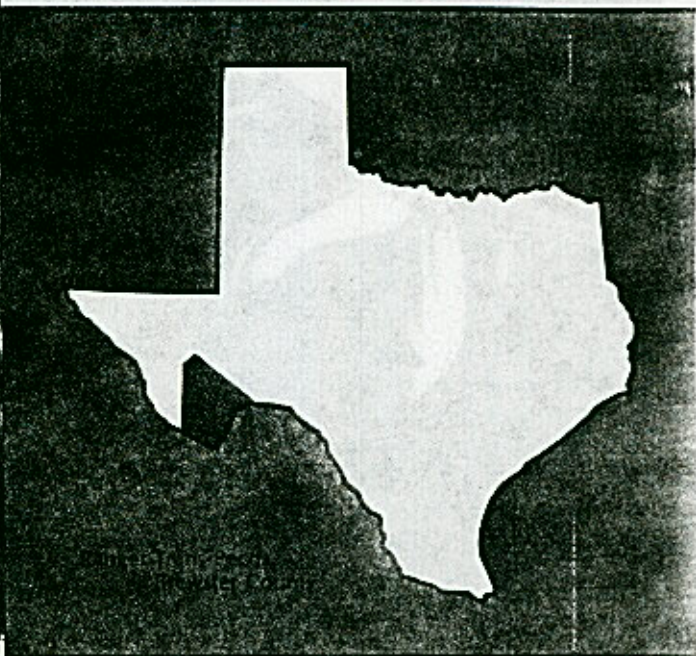


**Inflorescence of
 Tall paintbrush**

Common Name:
Chisos hedgehog cactus
 Chisos Mountain hedgehog,
 Chisos pitaya, Chisos hedgehog



Paul Montgomery



Scientific Name: *Echinocereus chisoensis* W.T. Marshall
 var. *chisoensis*

Other Scientific Names: *Echinocereus reichenbachii* (Terscheck) Haage f. ex Britt. & Rose var. *chisoensis* (W.T. Marshall) L. Benson; *Echinocereus chisosensis*, a misspelling.

Federal Status: Listed as Threatened, September 30, 1988

State Status: Listed as Threatened, December 30, 1988

Photographs and Drawings: Benson, 1982, plate 113; Warnock, 1970, p. 88; Weniger, 1970, plate 7; Weniger, 1984, p. 41.

Description:

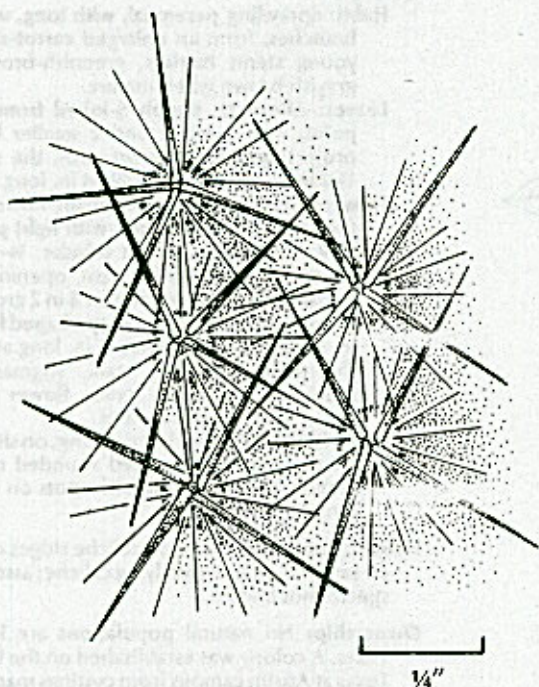
Habit: Stems single, rarely branching with age or injury, cylindrical, to 8 in. tall, slender, to 2 in. in diameter, deep green to blue- to yellowish-green, with 13-16 ribs composed of distinct tubercles separated by broad valleys; areoles circular and woolly at first, becoming oval and bare with age, $\frac{1}{8}$ in. or less across, about $\frac{1}{4}$ in. apart.

Spines: Sparse, not covering stems, slender, straight, whitish overall; central spines black to dark brown, usually with whitish bases, 1-4, one pointed outward, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, the others shorter and spreading; outer spines white or gray below and red-brown or maroon above, 10-15, bristle-like, evenly spaced, parallel to the stem, upper ones $\frac{1}{4}$ - $\frac{1}{2}$ in. long, progressively longer toward the bottom, lower ones $\frac{1}{4}$ - $\frac{1}{2}$ in. long.

Flowers: Rose with reddish centers, to 2½ in. long, $\frac{1}{2}$ in. in diameter, never opening widely; "petals" upright, oblong, to 2 in. long, with entire, pointed tips; style short, white, with 10 small, dark green stigma lobes; flowering April to July.

Fruit: Club-shaped, red and fleshy when ripe, 1-1½ in. long, about $\frac{1}{2}$ in. in diameter, covered with wool and bristle-like spines, becoming dry and splitting open with age; seeds egg-shaped, about $\frac{1}{16}$ in. long, black, warty.

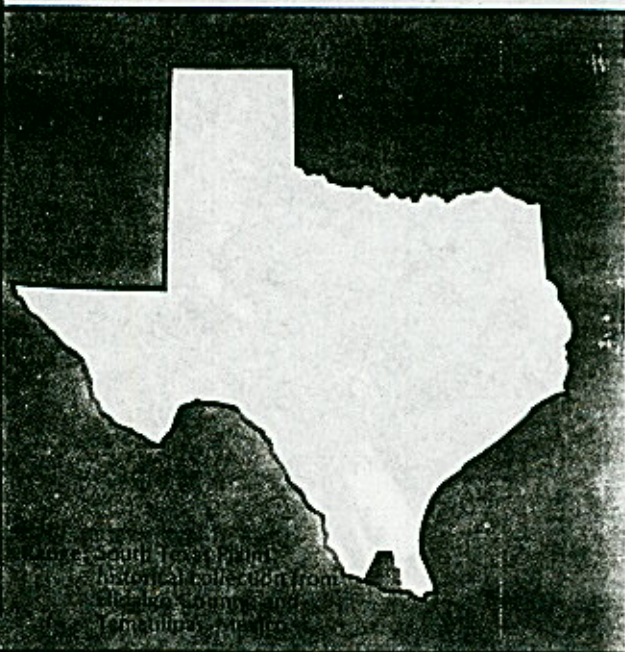
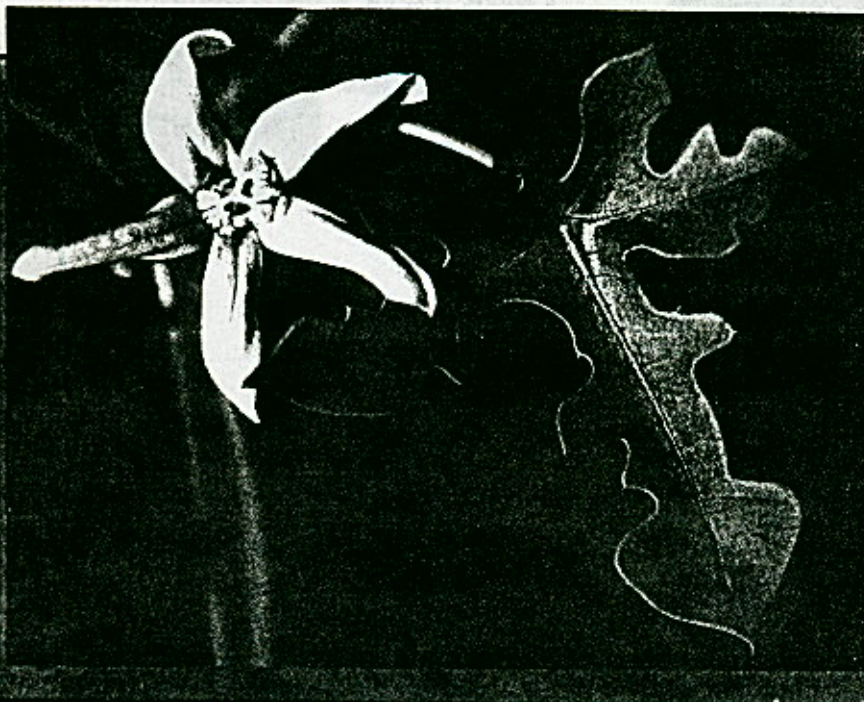
Habitat: Desert grasslands and shrublands at low elevation; with dog cholla, creosote bush, lechuguilla, ocotillo, and leatherstem.



Typical spine clusters of
 Chisos hedgehog cactus

(continued on back)

Common Name:
Walker's manihot



Site: South Texas Plains
 Collection from
 Walker's manihot
 Manihot sp.

Scientific Name: *Manihot walkerae* Croizat

Other Scientific Names: None

Federal Status: Category 1, U.S. Fish and Wildlife Service

State Status: Candidate

Photographs and Drawings: Rogers and Appan, 1973, p. 66.

Description:

Habit: Sprawling perennial, with long, weak slender branches, from an enlarged carrot-shaped root; young stems hairless, greenish-brown, turning grayish brown when mature.

Leaves: Alternate, deeply 5-lobed from a common point, with 3 major and 2 smaller lobes (often projecting sharply downward), the middle lobe $\frac{3}{8}$ -2 in. long; leaf stalks $2\frac{1}{4}$ -4 in. long.

Flowers: Separate male and female flowers borne on the same plant, streaked with light purple; male flowers 5-lobed, almost tubular, $\frac{1}{4}$ - $\frac{7}{16}$ in. long, borne on a elongated stem, opening later than female flowers; stamens 6 or 8 in 2 groups; female flowers with 5 separate strap-shaped lobes, $\frac{3}{16}$ - $\frac{5}{16}$ in. long, borne on stalks $\frac{3}{8}$ in. long at the base of the male flowering stalk, stigmas 3, many-branched, on short styles; flower in April to September, following rains.

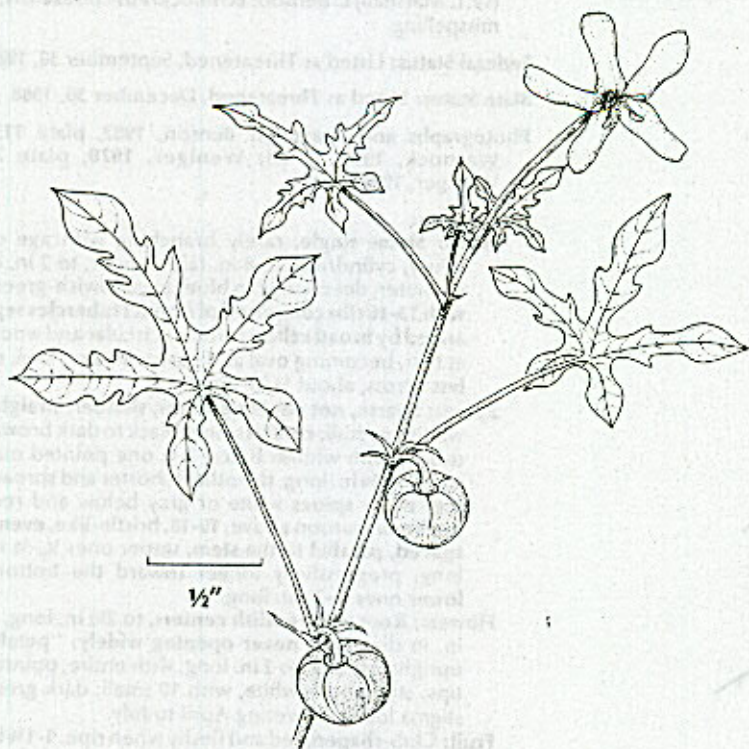
Fruit: Globe-like, dry, $\frac{3}{8}$ - $\frac{1}{2}$ in. long, on slightly downward curved stalks; seed rounded or flattened, grayish, with large blackish spots on sides, $\frac{5}{16}$ in. long, $\frac{1}{4}$ in. broad.

Habitat: Thorn shrubland on caliche ridges or grasslands on sandy loam soils overlying caliche; associated plant species not known.

Ownership: No natural populations are known from Texas. A colony was established on the University of Texas at Austin campus from cuttings made in La Joya, Texas.

Similar Species with Key Character Differences:

Leaf lobes broader; stamens 10; distribution outside of Texas *Manihot angustiloba*



Leaves, male flowers,
and fruits of
Walker's manihot

APPENDIX B

113 PLANT SPECIES PRESENTLY INCLUDED IN THE SLIDE COLLECTION

Species	Close	Type Photograph		Additional
		Plant	Habitat	
<i>Abronia macrocarpa</i>	✓	✓	✓	✓
<i>Agave glomeruliflora</i>	✓	✓	✓	
<i>Ambrosia cheiranthifolia</i>	✓	✓	✓	
<i>Amsonia tharpai</i>	✓	✓	✓	
<i>Ancistrocactus tobuschii</i>	✓	✓	✓	✓
<i>Anemone edwardsiana</i> var. <i>petraea</i>	✓	✓	✓	
<i>Anthericum chandleri</i>	✓	✓	✓	
<i>Aquilegia chrysantha</i> var. <i>hinckleyana</i>		✓		
<i>Arenaria livermorensis</i>	✓	✓	✓	
<i>Asclepias prostrata</i>	✓	✓		
<i>Aster laevis</i> var. <i>guadalupensis</i>	✓	✓		
<i>Aster puniceus</i> ssp. <i>elliotti</i> var. <i>scabricaulis</i>	✓	✓		
<i>Ayenia limitaris</i>	✓	✓	✓	
<i>Batesimalva violacea</i>	✓	✓	✓	
<i>Boerhavia mathisiana</i>	✓	✓	✓	
<i>Bonamia ovalifolia</i>	✓	✓		✓
<i>Brongniartia minutifolia</i>	✓	✓	✓	
<i>Caesalpinia brachycarpa</i>		✓		
<i>Callirhoe scabriuscula</i>	✓	✓	✓	✓
<i>Castilleja ciliata</i>	✓	✓	✓	
<i>Castilleja elongata</i>	✓	✓	✓	
<i>Cereus greggii</i> var. <i>greggii</i>	✓	✓	✓	
<i>Chaetopappa hersheyi</i>	✓	✓	✓	
<i>Cleome multicaulis</i>	✓	✓		
<i>Colubrina stricta</i>	✓	✓	✓	
<i>Coreopsis intermedia</i>	✓	✓	✓	
<i>Coryphantha albicolumnaria</i>	✓			
<i>Coryphantha chaffeyi</i>	✓			
<i>Coryphantha dasyacantha</i> var. <i>dasyacantha</i>	✓			
<i>Coryphantha duncanii</i>	✓			
<i>Coryphantha hersteri</i>	✓	✓		
<i>Coryphantha minima</i>	✓	✓	✓	✓
<i>Coryphantha ramillosa</i>	✓	✓	✓	✓
<i>Coryphantha sneedii</i> var. <i>sneedii</i>	✓	✓	✓	
<i>Crataegus warneri</i>	✓	✓	✓	

Species	Type Photograph			
	Close	Plant	Habitat	Additional
<i>Croton alabamensis</i> var. <i>texensis</i>	✓	✓	✓	✓
<i>Cryptantha crassipes</i>	✓	✓	✓	✓
<i>Cyperus graydioides</i>	✓	✓	✓	
<i>Cyperus onerosus</i>	✓	✓	✓	
<i>Cypripedium kentuckiense</i>		✓		
<i>Dalea reverchonii</i>	✓	✓	✓	
<i>Echinocactus asterias</i>	✓	✓	✓	✓
<i>Echinocereus chisoensis</i> var. <i>chisoensis</i>	✓	✓	✓	
<i>Echinocereus chloranthus</i> var. <i>neocapillus</i>	✓	✓	✓	✓
<i>Echinocereus lloydii</i>		✓	✓	
<i>Echinocereus rechenbachii</i> var. <i>albertii</i>	✓	✓	✓	
<i>Echinocereus viridiflorus</i> var. <i>davisii</i>	✓	✓		✓
<i>Eriocaulon koernickianum</i>	✓	✓	✓	
<i>Eriogonum suffruticosum</i>	✓	✓	✓	
<i>Escobaria guadalupensis</i>	✓	✓	✓	
<i>Festuca ligulata</i>	✓	✓	✓	
<i>Frankenia johnstonii</i>	✓	✓	✓	✓
<i>Fryxellia pygmaea</i>	✓	✓	✓	
<i>Gaillardia aestivalis</i> var. <i>winkleri</i>	✓			
<i>Galium correllii</i>	✓	✓	✓	
<i>Genistidium dumosum</i>	✓	✓	✓	
<i>Hedeoma apiculatum</i>	✓	✓	✓	
<i>Helianthus paradoxus</i>	✓	✓	✓	✓
<i>Hibiscus dasycalyx</i>	✓			
<i>Hexalectris revoluta</i>		✓		
<i>Hexalectris warnockii</i>	✓	✓	✓	✓
<i>Hymenoxys texana</i>	✓	✓	✓	✓
<i>Justicia runyonii</i>	✓	✓	✓	✓
<i>Lachnocaulon digynum</i>	✓	✓	✓	
<i>Lepidospartum burgessii</i>	✓	✓	✓	
<i>Lesquerella padilla</i>		✓	✓	
<i>Lesquerella thamnophila</i>	✓	✓	✓	
<i>Liatrus tenuis</i>	✓			
<i>Machaeranthera heterocarpa</i>		✓	✓	
<i>Manfreda longiflora</i>	✓	✓	✓	
<i>Manihot walkerae</i>	✓	✓		✓
<i>Matelea texensis</i>		✓		
<i>Neolloydia mariposensis</i>	✓	✓	✓	
<i>Nolina arenicola</i>	✓	✓	✓	

Species	Close	Type Photograph		Additional
		Plant	Habitat	
<i>Oenothera pilosella</i> var. <i>sessilis</i>	✓	✓	✓	
<i>Opuntia arenaria</i>	✓	✓	✓	✓
<i>Opuntia aureispina</i>	✓			
<i>Opuntia imbricata</i> var. <i>argentea</i>	✓	✓	✓	
<i>Paronychia congesta</i>	✓	✓	✓	
<i>Paronychia wilkinsonii</i>		✓		
<i>Pediocactus papyranchanthus</i>	✓	✓	✓	
<i>Penstemon alamosensis</i>	✓	✓	✓	
<i>Perityle bisetosa</i> var. <i>scalaris</i>	✓	✓	✓	
<i>Perityle vitreomontana</i>	✓	✓	✓	✓
<i>Philadelphus ernestii</i>	✓	✓	✓	
<i>Phlox nivalis</i> ssp. <i>texensis</i>		✓		
<i>Physostegia correllii</i>	✓	✓	✓	
<i>Physostegia longisepala</i>	✓	✓	✓	
<i>Polemonium pauciflorum</i> ssp. <i>hinckeyi</i>	✓	✓		
<i>Prenanthes barbata</i>	✓	✓	✓	✓
<i>Potamogeton clystocarpus</i>	✓		✓	
<i>Quercus graciliformis</i>	✓			
<i>Quercus hinckeyi</i>	✓	✓	✓	✓
<i>Rudbeckia scabrifolia</i>	✓	✓	✓	
<i>Salvia penstimenoides</i>	✓	✓	✓	✓
<i>Salvia summa</i>	✓	✓	✓	
<i>Scutellaria thieretii</i>	✓	✓	✓	
<i>Spiranthes parksii</i>	✓	✓	✓	
<i>Silene subciliata</i>	✓	✓	✓	
<i>Streptanthus bracteatus</i>	✓	✓	✓	✓
<i>Streptanthus cutleri</i>	✓	✓	✓	✓
<i>Styrax texana</i>	✓	✓	✓	
<i>Thalictrum arkansanum</i>	✓			
<i>Thalictrum texanum</i>	✓	✓	✓	✓
<i>Thelocactus bicolor</i> var. <i>flavidispinus</i>	✓			
<i>Thymophylla tephroleuca</i>	✓	✓	✓	✓
<i>Tillandsia baileyi</i>	✓	✓	✓	
<i>Trillium pusillum</i> var. <i>texanum</i>	✓	✓		
<i>Valerianella texana</i>	✓	✓	✓	
<i>Xyris drummondii</i>		✓	✓	
<i>Zanthoxylum parvum</i>	✓	✓	✓	✓
<i>Zizania texana</i>	✓	✓	✓	✓

**SPECIES PHOTOS
TO BE ADDED TO THE SLIDE COLLECTION**

- | | |
|--|-------------------------------------|
| <i>Acleisianthes crassifolia</i> | <i>Quercus boyrtonii</i> |
| <i>Agalinis auriculata</i> | <i>Quercus tardifolia</i> |
| <i>Agrimonia incisa</i> | <i>Schwalbea americana</i> |
| <i>Andrachne arida</i> | <i>Scirpus hallii</i> |
| <i>Aquilegia longissima</i> | <i>Scutellaria laevis</i> |
| <i>Argythamnia apheroides</i> | <i>Sedum robertsonianum</i> |
| <i>Astragalus mollissimus</i> var. <i>marcidus</i> | <i>Senna ripleyana</i> |
| <i>Brickellia brachyphylla</i> var. <i>hinckleyi</i> | <i>Sesuvium trianthemoides</i> |
| <i>Brickellia viejensis</i> | <i>Streptanthus sparsiflorus</i> |
| <i>Carex hyalina</i> | <i>Styrax youngae</i> |
| <i>Chamaesyce adondrina</i> | <i>Suaeda duripes</i> |
| <i>Chloris texensis</i> | <i>Symphoricarpos guadalupensis</i> |
| <i>Cleome multicaulis</i> | <i>Talinum rugospermum</i> |
| <i>Condalia hookeri</i> var. <i>edwardsiana</i> | <i>Thelypodium tenue</i> |
| <i>Coryphantha sucata</i> var. <i>nickelsiae</i> | <i>Xyris scabrifolia</i> |
| <i>Cyperus cephalanthus</i> | |
| <i>Dalea bartonii</i> | |
| <i>Dalea sabinalis</i> | |
| <i>Desmodium lindheirmeri</i> | |
| <i>Echinocereus papillosus</i> var. <i>angusticeps</i> | |
| <i>Eleocharis brachycarpa</i> | |
| <i>Eleocharis cylindrica</i> | |
| <i>Erigeron memegletes</i> | |
| <i>Forsellesia texensis</i> | |
| <i>Hedeoma pilosum</i> | |
| <i>Hedyotis butterwickiae</i> | |
| <i>Helianthus praecox</i> var. <i>hirtus</i> | |
| <i>Isoetes lithophylla</i> | |
| <i>Justicia wrightii</i> | |
| <i>Lechea mensalis</i> | |
| <i>Matelea radiata</i> | |
| <i>Mirabilis collina</i> | |
| <i>Opuntia engelmannii</i> var. <i>flexospina</i> | |
| <i>Osmorhiza mexicana</i> ssp. <i>bipatriata</i> | |
| <i>Ostrya chisosensis</i> | |
| <i>Paronychia maccartii</i> | |
| <i>Pediomelun humile</i> | |
| <i>Pediomelun trinervata</i> | |
| <i>Perityle bisetosa</i> var. <i>bisetosa</i> | |
| <i>Perityle huecoensis</i> | |
| <i>Perityle warnockii</i> | |
| <i>Phacelia pallida</i> | |
| <i>Phyllanthus ericoides</i> | |
| <i>Poa strictiramea</i> | |
| <i>Proboscidea spicata</i> | |