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DIFFERENCES IN TIMING OF PARTURITION, BIRTHING SITES, AND BEDDING SITES OF FAWNS IN SYMPATRIC POPULATIONS OF DEER

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ABSTRACT—Mule deer (*Odocoileus hemionus*) have been declining throughout the western United States and white-tailed deer (*O. virginianus*) have remained stable or increased. In areas of sympatry, it is important to understand dynamics between the two species. Crockett County, Texas, provided an area where the two species occurred sympatrically at relatively high densities. In summers 2004–2005, we captured adult deer and fitted them with radiocollars and vaginal-implant transmitters. We monitored vaginal-implant transmitters to record date of parturition, to locate birth sites, and to aid in capture of neonates. We captured 101 neonates (68 mule deer and 33 white-tailed deer). We observed 45 parturition sites and 249 day-time bedding sites of fawns. Parturition in mule deer began ca. 1 month after white-tailed deer. Birth sites of mule deer were at higher elevations and on steeper slopes than those of white-tailed deer. Mule deer gave birth under junipers (*Juniperus*) more often than did white-tailed deer. Our best model used elevation, height of horizontal hiding cover, type of vegetation, canopy shrub, and an interaction between vegetation type and canopy shrub to differentiate between bedding sites of fawns of mule deer and white-tailed deer. Fawns of mule deer bedded at higher elevations in shorter hiding cover and commonly under junipers, whereas fawns of white-tailed deer commonly bedded under honey mesquite (*Prosopis glandulosa*) or in herbaceous vegetation. Our data show that fawns partition habitat in a manner similar to adults in this area.

RESUMEN—Las poblaciones de venado bura (*Odocoileus hemionus*) en el oeste de Norteamérica han disminuido mientras que las del venado cola blanca (*O. virginianus*) permanecen estables o han aumentado. Es importante entender las dinámicas entre las dos especies en áreas donde estas coexisten. El condado de Crockett, Texas, facilitó un área donde las dos especies coexistieron con densidades relativamente altas. En los veranos de 2004–2005, capturamos hembras adultas y les colocamos radio-collares e implantes vaginales con trasmisores de radio. Monitoreamos los implantes vaginales con trasmisor para registrar la fecha de parto, localizar el sitio del parto, y ayudar a capturar a los neonatos. Capturamos 101 neonatos (68 de venado bura y 33 de venado cola blanca), observamos 45 sitios de parto y 249 sitios con hechaderos diurnos de cervatos. Los partos de las venadas bura comenzaron aproximadamente 1 mes después que los de las venadas cola blanca y los sitios de parto de las venadas bura estuvieron a mayor elevación y en lugares más escarpados que los sitios de las venadas cola blanca. Las venadas bura parieron debajo de enebros (*Juniperus*) más frecuentemente que las venadas cola blanca. Nuestro mejor modelo utilizó la elevación del terreno, altura de la cobertura horizontal, tipo de vegetación, especie de arbusto del dosel, y la interacción entre el tipo de vegetación y especie de arbusto del dosel para diferenciar entre los hechaderos de cervatos de venado bura y de venado cola blanca. Los cervatos de venado bura utilizaron hechaderos a mayor altitud, con menor cobertura, y normalmente debajo de enebros, mientras que los cervatos de venado cola blanca frecuentemente usaron hechaderos debajo de mesquites (*Prosopis glandulosa*) o en vegetación herbácea. Nuestros datos muestran que los cervatos se dividen el hábitat de manera similar a los venados adultos en esta área.

Mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*) are sympatric along a general north-south zone from Alberta, Canada, through western Texas (Kramer, 1973; Hanley and Hanley, 1982; Stubblefield et al., 1986; Derr, 1991), although there are apparent differences in habitats occupied (Krausman and Ables, 1981; Geist, 1998). Mule deer have been in decline throughout most of the West (Denney, 1976; Ballard et al., 2001; deVos, Jr. et al., 2003), while white-tailed deer have remained stable or even increased in some places (Wiggers and Beasom, 1986; W. F. Harwell and H. G. Gore, in litt.). Some believe predation is the primary cause for decline in mule deer, supported by studies that show predation as an additive source of mortality (Cook et al., 1971; Smith and LeCount, 1979; Whitlaw et al., 1998; Ballard et al., 1999), but the decline may be caused by a multitude of interacting factors, specifically the relationship of the population to carrying capacity, which can vary from place to place (Ballard et al., 2001).

Crockett County, Texas, is on the ecotone between the arid Trans-Pecos region of Texas and the more mesic Edwards Plateau, and has sympatric populations of mule deer and white-tailed deer. Landowners in the area have practiced extensive predator control to reduce predation on livestock (Cook, 1984). Crockett County provided a unique situation where white-tailed deer and mule deer occurred sympatrically with relatively few predators. Previous studies in this area indicated that these species partitioned habitat based on topography and vegetation with adult mule deer using steeper slopes with less vegetative cover, while adult white-tailed deer selected flat areas with thicker cover (Avey, 2001; Avey et al., 2003; Brunjes, 2004).

Because deer may choose specific sites for parturition (Huegel et al., 1985; Schwede et al., 1993; Ciuti et al., 2005), we wanted to determine if habitat partitioning continued during parturition. Consequently, we measured microhabitat parameters of birth sites and day beds of fawns ≤19 days postpartum. We also sought to determine if a temporal partitioning of habitat might be occurring.

MATERIALS AND METHODS—*Study Area*—We monitored adults females and fawns of white-tailed deer and mule deer on private ranches in west-central Texas during summers 2004–2005. The four ranches comprised 26,066 ha of contiguous land in northwestern Crockett County, Texas. Crockett County lies on the eastern edge of the Edwards Plateau as it descends into the Trans-Pecos region. Precipitation varied greatly from year to year, but averaged 49 cm at the nearest weather station in Big Lake, Texas (ca. 48 km away; National Oceanic Atmospheric Administration, http://cdo.ncdc.noaa.gov/ancsum/ACS). Elevations were 730–880 m above sea level. Topography and vegetation varied across the site with southern portions being flatter than western and northern portions, which contained steep mesas with flat elevated tops.

We assigned type of vegetation by the dominant species of shrub. In some areas, two species of shrubs were co-dominant, and the area was classified as such. If >2 species of shrubs appeared to dominate the vegetation, then it was classified as a mixed-shrub community. We classified one type as a yucca-mixed community because it was dominated by succulents rather than a shrub.

Mesas generally contained two types of vegetation. Along the upper slopes and on the rim rock a mixed-yucca community consisted of lechuguilla (*Agave lechuguilla*), sotol (*Dasylirion texana*), and other species of yuccas (*Yucca*). A mixed-juniper (*Juniperus pinchotii*) community also existed on slopes and atop mesas.

Lowlands generally contained a even-stand shrub community in and along intermittent creeks, a mixed-tarbush (*Flourensia cernua*) community in xeric soils outside of intermittent creeks, and a mixed-mesquite (*Prosopis glandulosa*) community in the more mesic soils of lowlands. In places where types of vegetation met, areas of co-dominance occurred, resulting in the tarbush-juniper, juniper-mesquite, and tarbush-mesquite communities. Prickly pear (*Opuntia*), tasajillo (*Opuntia leptocaulis*), and cholla (*Opunita imbricate*) cacti occurred across the study area.

Capture of Adults—We captured adult females in early April 2004 and 2005 using a net-gun fired from a helicopter (Krausman et al., 1985). We captured 50 adult females (25 mule deer and 25 white-tailed deer) each year. Once netted, deer were tied, blindfolded, and transported via helicopter to a temporary processing center. At the processing center, we performed a sonogram to confirm pregnancy with ultrasound equipment (Aloka SSD-500V, Aloka, Inc., Tokyo, Japan; Smith and Lindzey, 1982). Pregnant females were fitted with a VHF radiocollar (Telonics, Mesa, Arizona; Advanced Telemetry Systems, Inc., Isanti, Minnesota), and implanted with a temperature sensitive vaginal-implant transmitter (Advanced Telemetry Systems, Inc., Isanti, Minnesota).

Birthing Sites and Capture of Neonates—After release, we monitored deer using radiotelemetry from a truck-mounted, null-peak system. We triangulated deer with the system from fixed stations to acquire data for location. We monitored signals from vaginal-implant transmitters nightly to collect data for timing and location of parturition, and to aid in capture of neonates. For neonates, whose mother expelled a vaginal-implant transmitter prematurely, we also measured new growth of hoof to determine timing of parturition (Sams et al., 1996; Haskell et al., 2007).

Once a vaginal-implant transmitter was expelled, we used a hand-held yagi antenna to locate the site. We identified birth sites by presence of a large bed site with small amounts of blood, placental fluids, or odor. Additional potential cues included feces that had been smashed during labor, activity of insects in the area where placental fluids might have been, and presence of many hoof prints. We marked parturition sites with flagging tape and a waypoint was taken with a Global Positioning System unit (GPS; Garmin model 76, Garmin Ltd., George Town, Cayman Islands) for subsequent vegetational analysis. We began searching for neonates immediately after classifying a site with a vaginal-implant transmitter as a birth site.

Ground crews of 2–7 people searched for neonates by walking transects between current location of the female and the birth site. We usually located fawns in the general direction of the female (Carstensen et al., 2003). We hand-captured fawns and fitted them with an expandable radiocollar (model M4200 series, Advanced Telemetry Systems, Inc., Isanti, Minnesota). To obtain location of bedding sites, we observed fawns about every other day for the first 3 weeks of life, or until they repeatedly flushed from their bedding sites. Bedding sites were marked in the same manner as parturition sites. We returned later to conduct vegetational analyses, so as not to disturb the resting fawn.

Vegetational Analyses—We returned to birthing and bedding sites usually within 21 days to record type of vegetation, horizontal cover (i.e., hiding cover), canopy cover, distance from bedding site to the nearest shrub, height and radius of shrubs in canopy, potential shading, slope, aspect, and elevation. We used a 2-m-tall cover board with 20-cm stripes to assess horizontal hiding cover (Nudds, 1977; Griffith and Youtie, 1988). We recorded the lowest strip that was ≥50% hidden by vegetation in the four cardinal directions at distances of 5 m. Next, we recorded percentage canopy cover by laying our head in the bedding site and looking up through an ocular tube with a 5 by 5 grid. We classified any grid cell that contained ≥50% vegetation as covered. To investigate selection of shrubs, we measured distance from the center of bedding sites to base of the nearest shrub. We recorded height, radius, and species of shrubs in the canopy. Lastly, we recorded slope and aspect with a compass-clinometer (Ranger15, Silva, Sollentuna, Sweden) and elevation to the nearest meter with GPS.

We compared seven models from parameters chosen a priori using AIC_C-parameter estimates, *SE*s, and *P*-values (Burnham and Anderson, 2002; Stephens et al., 2005) to differentiate between bedding sites used by fawns of mule deer and white-tailed deer. To narrow the number of parameters used in our candidate models, we grouped data into three categories; physical features, vegetation composition, and vegetation structure. We used AIC_C-parameter estimates within each category to select the parameters used in our seven candidate models. We evaluated goodness-of-fit of the most-parameterized model (Burnham and Anderson, 2002) using the Hosmer-Lemeshow test (Hosmer and Lemeshow, 2000). We used univariate tests (e.g., Mann-Whitney *U*-test and chi-square goodness-of-fit tests) to identify differences in characteristics of birthing site and timing of parturition between mule deer and white-tailed deer. We report means ±1 *SE* in the text and median values in the appropriate table.

RESULTS—*Date of Parturition*—We determined birthing date for 74 adult females (48 mule deer and 26 white-tailed deer) with the aid of vaginal-implant transmitters and systematic searching of grids to locate neonates. Timing of parturition differed between species ($U = 125.00$, $P \leq 0.001$); white-tailed deer gave birth earlier in summer than mule deer. Our sample included young-of-the-year white-tailed deer, which mature late in autumn and, thus, give birth later in summer. This timing of births extended the fawning period of white-tailed deer (range, 19 May–6 August) and created considerable overlap with mule deer (range, 20 June–20 August). Median dates (white-tailed deer = 18 June, mule deer = 21 July) indicated that peak fawning occurs 33 days apart. For more detailed results and discussion concerning birth dates of fawns in west-central Texas see Haskell et al. (2008).

Birthing Sites—Retention rate of vaginal-implant transmitters in 2004 was low and allowed for location of only 13 (eight mule deer and five white-tailed deer) birthing sites. The fawning season of 2005 had higher retention of vaginal-implant transmitters. We pooled our data for the 2 years yielding a larger sample ($n = 45$; 24 mule deer and 21 white-tailed deer; Table 1). Mule deer birthed at sites 4° steeper and 45 m higher than those of white-tailed deer. Slope and elevation were statistically different, but may have little biological significance. More importantly, mule deer gave birth under junipers more often ($\chi^2 = 18.04$, $df = 3$, $P \leq 0.001$) than white-tailed deer, which used more mesquites and herbaceous vegetation than mule deer (Fig. 1). The two species also used types of vegetation differently ($\chi^2 = 21.77$, $df = 7$, $P = 0.003$). Mule deer gave birth in mixed junipers and yuccas more commonly than did white-tailed deer, which commonly used mixed mesquites (Fig. 2). The two species did not differ in their use of aspect ($\chi^2 = 7.28$, $df = 4$, $P = 0.122$)

Bedding Sites of Fawns—We collected data from bedding sites of fawns ($n = 249$; 121 mule deer and 128 white-tailed deer) to evaluate differences in characteristics of bedding sites for each species ($n = 249$; 121 mule deer and 128 white-tailed deer). We considered seven models with different combinations of six variables (Table 2). Our most-parameterized model had a good fit ($\chi^2 = 4.772$, $df = 8$, $P = 0.782$). Our best model based on AIC_C-values contained five parameters; elevation, height of horizontal hiding cover, type of vegetation, plants in canopy, and an interaction between plants in canopy and type of vegetation. We then tested each of these parameters with a Mann-Whitney *U*-test to determine if species differed.

Fawns of mule deer used higher ($U = 2{,}727.0$, $P \leq 0.001$) elevations ($\bar{x} = 810$ m ± 3.74) than fawns of white-tailed deer ($\bar{x} = 766$ m ± 1.71). Fawns of mule deer used bedding sites with

TABLE 1—Median, mean (±*SE*), *U*-statistic, and *P*-value for continuous variables measured at parturition sites of adult deer in Crockett County, Texas, June–August 2004 and 2005 ($n = 24$ for mule deer *Odocoileus hemionus* and 21 for white-tailed deer *O. virginianus*).

Parameter	Median	Mean	*U*-statistic	*P*-value
Distance from shrub (cm)				
Mule deer	77.50	95.38 (12.18)		
White-tailed deer	91.00	101.57 (14.00)	218.50	0.446
Elevation (m)				
Mule deer	802.50	807.83 (9.21)		
White-tailed deer	763.00	763.05 (2.56)	109.50	≤0.001
Horizontal cover (cm)				
Mule deer	37.50	41.77 (7.41)		
White-tailed deer	30.00	37.62 (9.37)	215.00	0.398
Height of shrub (m)				
Mule deer	2.00	1.73 (0.27)		
White-tailed deer	3.00	2.45 (0.42)	195.00	0.190
Radius of shrub (cm)				
Mule deer	115.50	124.67 (20.13)		
White-tailed deer	114.00	117.14 (20.19)	242.50	0.828
Percentage canopy cover (%)				
Mule deer	0.00	34.67 (8.78)		
White-tailed deer	60.00	44.57 (8.95)	226.50	0.540
Slope (°)				
Mule deer	3.00	5.88 (1.59)		
White-tailed deer	1.00	1.52 (0.46)	129.00	0.004
Shading potential (klx)				
Mule deer	43.83	39.26 (5.40)		
White-tailed deer	37.81	37.18 (5.41)	243.00	0.838

shorter ($U = 5{,}524.5$, $P \leq 0.001$) hiding cover ($\bar{x} = 41$ cm ± 2.87) than fawns of white-tailed deer ($\bar{x} = 58$ cm ± 3.12). Plants in canopy ($\chi^2 = 39.69$, $df = 4$, $P \leq 0.001$) chosen to bed under and type of vegetation ($\chi^2 = 65.88$, $df = 7$, $P \leq 0.001$) differed between bedding sites of fawns of mule deer and white-tailed deer. Fawns of mule deer bedded under junipers more often, while white-tailed deer used mesquites (Fig. 3). Fawns of mule deer were more commonly in mixed-juniper and mixed-yucca vegetation than were those of white-tailed deer, while white-tailed deer used mesquite flats more commonly than did mule deer (Fig. 4). The interaction term in our model suggested there was a difference in how fawns of mule deer and white-tailed deer used plants in the canopy in relation to type of vegetation (Fig. 5). For example, in the tarbush vegetational community (Fig. 5c), mule deer did not use junipers, whereas in mixed junipers, mule deer used juniper shrub for canopy ca. 60% of the time (Fig. 5a). Additionally, the interaction may be used to describe differences between the two species of deer in the same vegetational community. For example, in mixed-mesquites mule deer used ''other'' categories of shrubs ca. 50% of the time (Fig. 5c), while white-tailed deer in mixed-mesquites used ''other'' shrubs only ca. 15% of the time (Fig. 5d).

DISCUSSION—*Birthing Sites*—The most biologically significant difference between birthing sites was in plants in the canopy. Adult female mule deer used herbaceous growth only twice and never used mesquites, but juniper was used 54% of the time. Mule deer in our study area used types of vegetation in which juniper was a primary species and other types in which juniper was not a primary species; therefore, we might

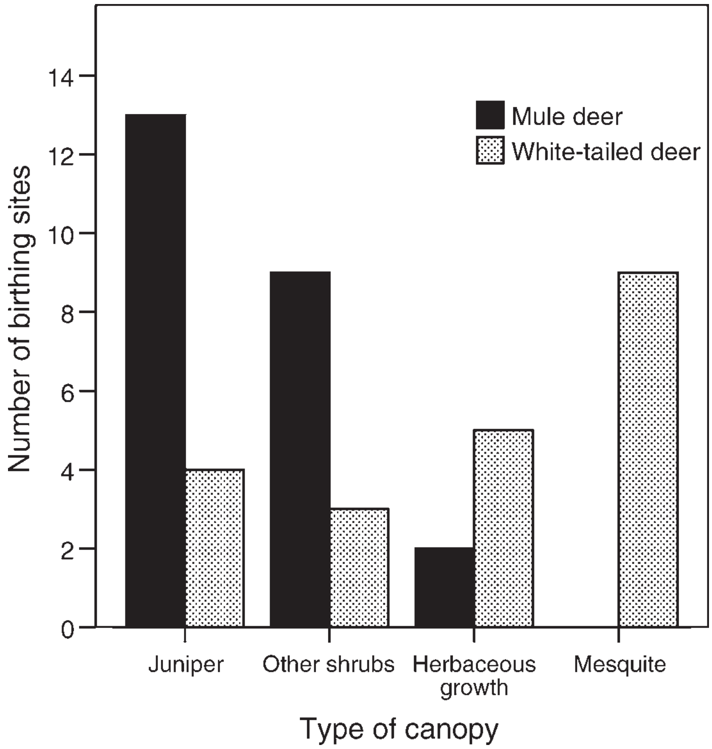

Fig. 1—Frequency of type of canopy used as parturition sites by mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*) in Crockett County, Texas, summers 2004 and 2005.

have expected a uniform distribution of use of plants in the canopy. With mesquites and herbaceous growth only accounting for 8.3% of parturition sites for mule deer, it appears that mule deer select junipers for birthing. White-tailed deer range primarily on lowlands, and that may explain why herbaceous growth and mesquites were commonly used (61.9%) for parturition sites while junipers (19.0%) were less common.

Although elevational relief on our study site was slight in comparison to other areas where the two species of deer occur sympatrically (Krausman and Ables, 1981; Avey, 2001), they did appear to separate on the basis of slope and elevation. Our study contained numerous mesas with steep slopes vegetated with junipers and these areas appeared to be used exclusively by adult female mule deer for birthing, whereas, adult female white-tailed deer used lowlands and avoided slopes.

Bedding Sites of Fawns—We speculated before this study that fawns of each species would use similar habitats with temporal differences between them, or that timing of parturition would not differ and that the two species would use habitats differently. Previous research in Crockett County indicated adults partitioned habitat based on elevation (Brunjes, 2004), size of plants (Avey, 2001), and type of vegetation (Avey, 2001; Avey et al., 2003; Brunjes, 2004). We considered these parameters plus visual obstruction (height of hiding cover), shading potential, and species of plants that fawns chose to bed under as key variables to differentiate habitat used by fawns as bedding sites. We detected both a temporal difference and differential use of habitat.

Elevation and type of vegetation are broad-scale, landscape variables, so we should look to behaviors of adult deer to explain these differences. One potential explanation for the difference in elevation and type of vegetation could be the strategies to avoid predators employed by adults of each species. Geist (1998) indicated that mule deer use open landscapes to spot predators at a distance, while white-tailed deer use dense cover and quick escape as their anti-

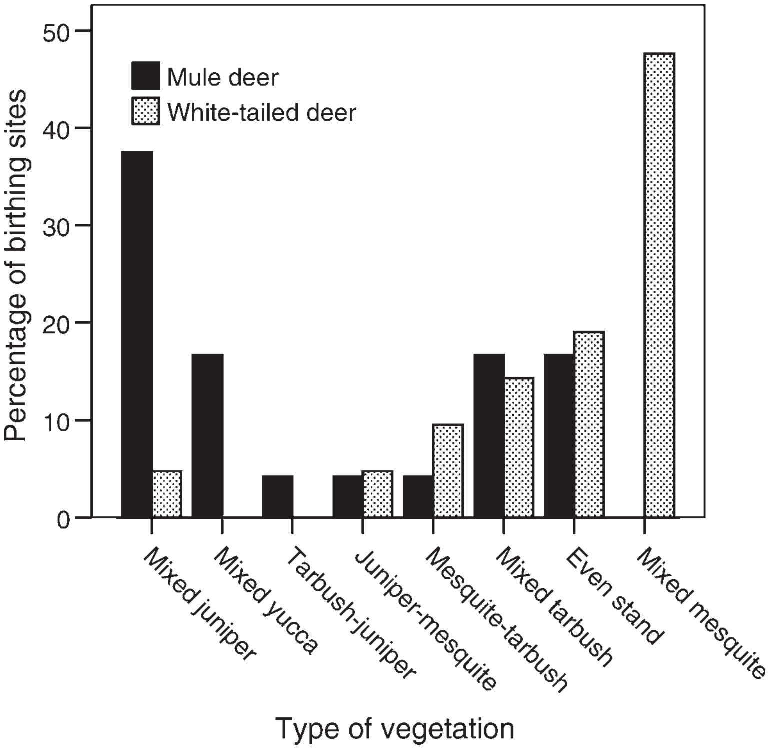

FIG. 2—Percentage of birthing sites by type of vegetation for mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*) in Crockett County, Texas, summers 2004 and 2005.

predator strategy. Fawns of mule deer used mixed-juniper and mixed-yucca types of vegetation 45.5% of the time, while white-tailed deer only used them 6.2% of the time. These two types of vegetation had low densities of shrubs when compared to other types of vegetation. These types occurred at higher elevations and on slopes, which, in addition to fewer shrubs, should aid in spotting potential predators. Conversely, 44.5% of bedding sites of fawns of white-tailed deer were in mixed-mesquites and mixed-even stands, which had a much higher density of shrubs.

Adults may choose broad-scale landscape parameters, and their anti-predator strategies may explain differences we detected for type of vegetation and elevation, but fawns choose the actual bed site (Marchinton and Hirth, 1984; Huegel et al., 1986; Uresk et al., 1999), and the two species used the same strategy for survival ≤18 days postpartum (Geist, 1981, 1998; Marchinton and Hirth, 1984). If fawns were employing the same strategy for survival, then we would expect that they would use similar microhabitat. Our data support this notion because only two microhabitat parameters differed between species.

Species of canopy shrub chosen to bed under and height of hiding cover differed statistically between species, but it may not have differed functionally. White-tailed deer used mesquites and herbaceous growth to bed under, whereas mule deer used more junipers. Fawns probably cue on concealment properties of bedding sites. However, fawns of mule deer used shorter hiding cover than those of white-tailed deer. Fawns of both mule deer and white-tailed deer bed in hiding cover that is functionally the same because it is taller than a bedded fawn ($\bar{x}$ = 41 cm for mule deer, $\bar{x}$ = 58 cm for white-tailed deer).

Another possible explanation for differences between fawns of mule deer and white-tailed deer is that pressure of predation was not the driving force in selection of bedding sites. Our study site has a low density of predators (Avey, 2001; Brunjes, 2004), which might explain why fawns were not choosing microhabitat similarly.

TABLE 2—Candidate models for describing differences between bedding sites of fawns of mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*) in Crockett County, Texas, summers 2004 and 2005 (n = 249). Models are ordered by AIC_C-values.

Model	−2 log(L)	K	AIC_C	ΔAIC_C	w_i
Elevation + height of hiding cover + type of vegetation + species of canopy + (type of vegetation * species of canopy)	185.60	18	224.57	0.00	0.71
Elevation + height of hiding cover + height of canopy shrub + type of vegetation + species of canopy + (type of vegetation * species of canopy)	185.36	19	226.68	2.11	0.25
Elevation + type of vegetation + species of canopy + (type of vegetation *species of canopy)	193.31	17	229.96	5.39	0.05
Elevation + height of hiding cover + type of vegetation + height of canopy shrub	213.85	13	241.39	16.82	0.00
Elevation + height of hiding cover + height of canopy shrub	236.46	5	246.71	22.14	0.00
Elevation + height of hiding cover + type of vegetation	240.14	12	265.46	40.89	0.00
Constant only	344.99	2	349.04	124.47	0.00

For fawns, 3–6 weeks postpartum is a critical time during which their movements are minimal and they rely on hiding as a primary defense against predation (Jackson et al., 1972; Geist, 1981; Ozoga et al., 1982; Marchinton and Hirth, 1984). During 2 summers, we observed only 11 of 107 fawns die from predation ≤18 days postpartum. With so few predations during the vulnerable

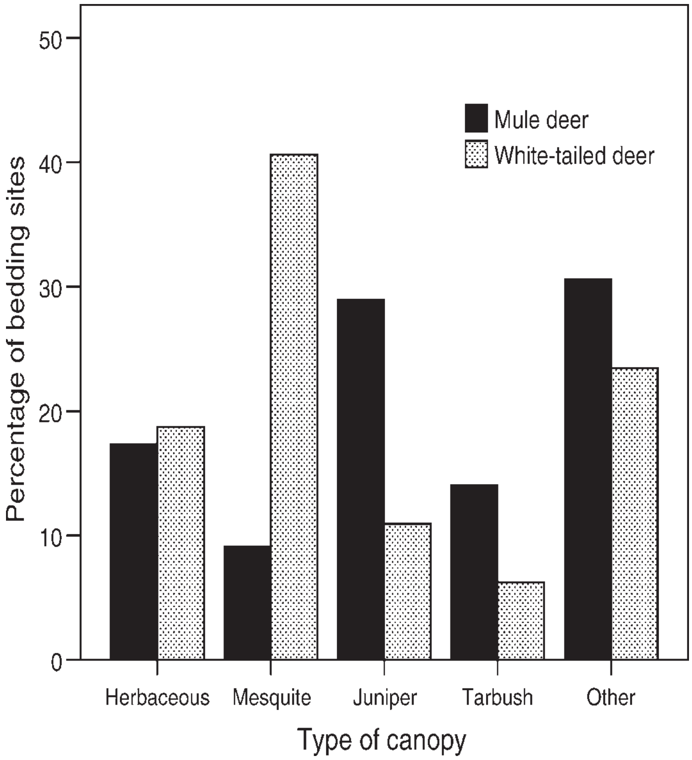

FIG. 3—Percentage of bedding sites by type of canopy used by fawns of mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*) in Crockett County, Texas, summers 2004 and 2005.

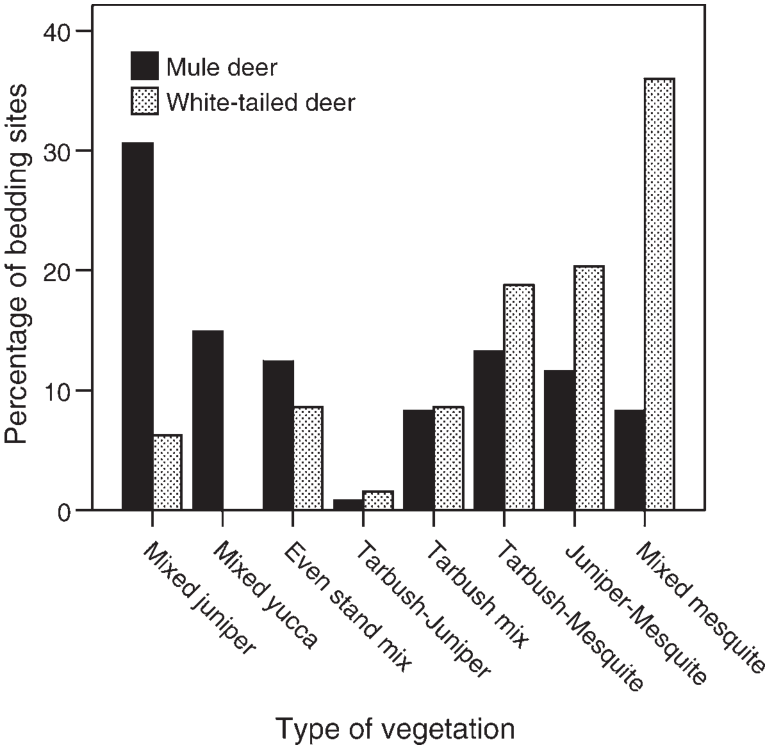

FIG. 4—Percentage of bedding sites by type of vegetation for fawns of mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*) in Crockett County, Texas, summers 2004 and 2005.

early stage of life (i.e., when fawns hide instead of flee as their primary defense), pressure from predation may not be the driving force behind selection of bedding sites on our study area. A future study in an area of sympatry using a control and treatment (i.e., removal of predators) could provide insight into the role of predation on habitat partitioning by fawns.

Conclusions—Fawns of mule deer and white-tailed deer used habitat differently. Fawns appear to partition habitat in the same manner as adults. Our data for parturition sites of adults show similar differences between adult females as do our bedding sites for fawns. Both fawns and adult mule deer used higher elevations, canopy of junipers, and open vegetation (e.g., mixed junipers and yuccas). Previous studies on our study site also determined that adults partitioned habitat on the basis of elevation, slope, type of vegetation, and cover of shrubs (Avey, 2001; Avey et al., 2003; Brunjes, 2004). Avey (2001) reported that adult mule deer used steeper slopes, less shrub cover, and greater forb cover than white-tailed deer. Brunjes (2004) focused on a broader scale to reveal that mule deer used vegetation associated with junipers, steeper slopes, and higher elevations. White-tailed deer used vegetation that had mesquites and were denser than those used by adult mule deer.

Our study demonstrates that junipers and mesquites (often considered undesirable shrubs) are important to habitat of mule deer and white-tailed deer. Land managers should consider this during range management. Although our study does not provide an answer to the proper amount of shrubs needed (there are upper and lower bounds), it is clear that complete removal of junipers and mesquites would not benefit populations of deer.

This project was completed with hard work and cooperation of many people. We thank Texas Parks and Wildlife Department and Texas Tech University for funding and use of equipment. We owe a debt of gratitude to everyone involved in field work; A. Haskell, A. Sanders, D. Larson, and J. Reed labored to collect data for this project. Additionally, we thank landowners and land managers in Crockett County, Texas, who gave access to property.

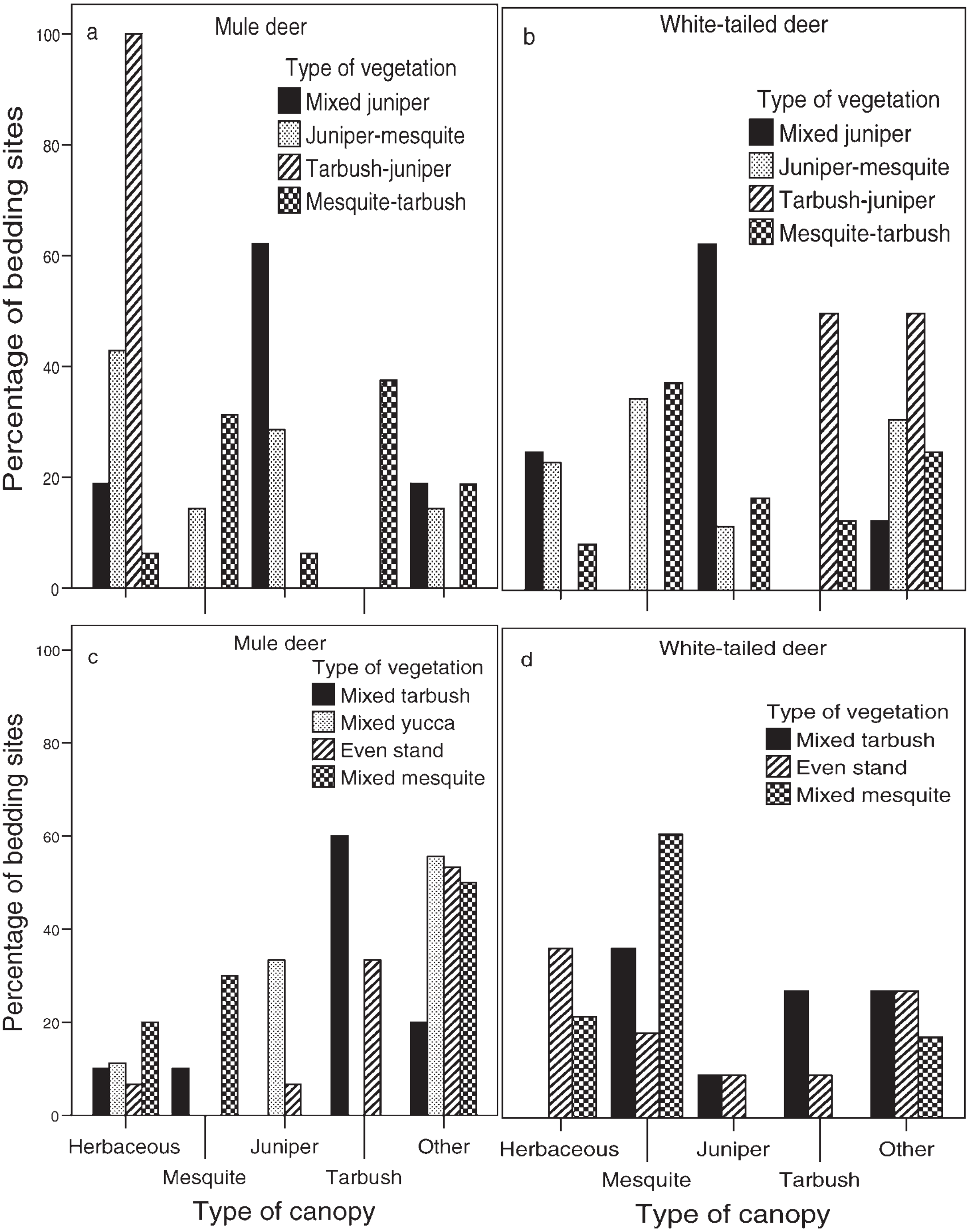

FIG. 5—Interactions between type of vegetation and type of canopy chosen by fawns of mule deer (*Odocoileus hemionus*) and white-tailed deer (*O. virginianus*) in Crockett County, Texas, summers 2004 and 2005. Comparing bars within a graph and between graphs vertically (within species) shows an interaction is present. Comparing graphs horizontally and diagonally (between species) shows how the interaction can be useful in describing differences in bedding sites.

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