Bed Sites of White-tailed Deer Fawns in South Texas

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Abstract: Canopy cover of vegetation was sampled at bed sites of 30 white-tailed deer (*Odocoileus virginianus*) fawns in south Texas during August 1986. Visual obstruction by vegetation to 1 m height was sampled at the bed sites, within 25 m of the bed sites, and at random points within 2 pastures. Mean canopy cover at bed sites was greatest for grasses (50.2%) and forbs (15.9%). Cover of woody plants within 25 m was 19%. Mean visual obstruction at the bed sites was consistently greater than that within 25 m or at random points within the 2 pastures. Fawns selected bed sites with more screening cover than the surrounding area and often (50%) bedded under or next to a woody plant. Net productivity of deer in October in the 2 pastures sampled averaged 0.28 fawns/female, based on results from a helicopter flight.

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Coyotes (*Canis latrans*) affect recruitment into southern Texas white-tailed deer populations through predation on young fawns (Cook et al. 1971, Beasom 1974, Carroll and Brown 1977, Guthery and Beasom 1977, Kie et al. 1979). Cook et al. (1971) reported an annual 50% birth-to-fall loss of radio-tagged fawns to coyotes over a 2-year period in San Patricio County. Carroll and Brown (1979) also used radio-tagged fawns to measure mean birth-to-fall loss to predators of 18.3% and 22.5% in Gonzales and Lavaca counties, respectively. Beasom (1974), Guthery and Beasom (1979), and Kie et al. (1979) measured substantial increases in fawn survival after predator removal in southern Texas.

Coyotes hunt by visual searching (Wells and Lehner 1978) so bed site cover presumably is important for white-tailed deer fawns which employ a "hider type" (Lent 1974) predator-avoidance strategy early in life. Despite the well-documented loss to predators in southern Texas, there is a lack of descriptive data on bed site preferences of fawns. Our objective was to describe vegetation structure at fawn bed sites and compare it to structure within 25 m of bed sites and at random points within 2 pastures.

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Methods

The study was conducted on the Encino Division of the King Ranch in Brooks County, Texas. The area has flat to gently rolling terrain and lies in the Rio Grande Plain vegetation region (Frances et al. 1966). Soils are deep, fine sands. Mean annual precipitation (measured on the area) was 61.4 cm, but highly variable amounts fall from year to year. The area is classified as semiarid (Visher 1954) because the average annual precipitation is exceeded by the 150-cm open-pan evaporation.

The woody vegetation was primarily honey mesquite (*Prosopis glandulosa*) and common live oak (*Quercus virginiana*), with scattered stands of hercules club (*Zanthoxylum clava-herculis*), bluewood condalia (*Condalia obovata*), and prickly-pear (*Opuntia* spp.). Prominent grasses were threeawns (*Aristida* spp.), seacoast bluestem (*Schizachyrium scoparius*), coast sandbur (*Cenchrus incertus*), and gulf cordgrass (*Spartina spartinae*). Important forbs were sunflowers (*Helianthus* spp.), crotons (*Croton* spp.), erect dayflower (*Commelina erecta*), camphor telegraph-plant (*Heterotheca subaxillaris*), milkpea (*Galactia canescens*), scratch daisy (*Croptilon divaricatum*), and milkweed (*Sarcostemma cynachoides*).

Most of the Encino Division was grazed continuously by cattle at a density of 9.5 ha/animal unit (AU). However, the 1,142-ha Barroso Pasture was divided into an 11-paddock short duration grazing cell. Stocking density averaged 7.6 ha/AU in this pasture, and the single cattle herd was rotated to a new paddock every 4–7 days.

Thirty fawns (estimated 1 to 3 weeks old) were captured from 11 to 28 July 1986. Fawns were located along roads by observing the behavior of female deer after an imitation fawn bleat was sounded. We concentrated on catching as many fawns as possible, and no attempt was made to stratify effort by habitat type, pasture, or other subdivision. Fawns were marked and released at the capture site. The bedsite of each captured fawn was marked with a stake, and site characteristics were sampled within 1 week.

Percent cover of grasses, forbs, and bare ground were estimated in a 1 m^2 rectangular plot (Daubenmire 1959) laid over the bed site. Woody plant cover within 25 m of the bed site was estimated by first reading 4 25-m line intercepts radiating out from the bedsite in the cardinal directions. Then woody cover was visually estimated for the whole area within 25 m (because the intercept lines frequently did not encounter woody plants even though some were present within 25 m). We also measured the distance from the bed site to the nearest woody plant.

A visual obstruction board (Robel et al. 1970, Nudds 1977) with alternating light-dark, 1-dm strata was used to sample vegetation structure from ground level to 1-m height (10 strata sampled). The percent of each stratum obstructed by vegetation was estimated to the nearest 1% from a kneeling position at a distance of 7 m from the board (Guthery et al. 1981). Obstruction measurements were taken along the transects radiating from each bed site in the 4 cardinal directions. On each transect, obstruction readings were taken with the board placed at the bed site and at 5, 10, 15, 20, and 25 m from the bed site. Fifteen randomly located 100-m transects were established in Barroso Pasture and the 2,444-ha Muertos Pasture (30 total transects). These pastures were not selected at random but rather because of a separate grazing study. Visual obstruction was estimated in the same manner as above with the profile board placed at 5-m intervals along each transect. Only 1 obstruction measurement was taken at each interval from 7 m along the direction of the transect. An analysis of variance (ANOVA) was performed with the 30 bed sites as blocks, 6 distance treatments (the bed site [0 m], 5 m, 10 m, 15 m, 20 m, and 25 m), and 2 vertical levels of visual obstruction (0.0–0.5 m and 0.6–1.0 m). A second ANOVA was performed with 3 treatments (the bed sites, $N = 30$; transects in Barroso Pasture, $N = 15$; and transects in Muertos Pasture, $N = 15$), and 2 levels of visual obstruction as before. Tukey's HSD test was used for posthoc mean comparisons.

In October 1986, net productivity was indexed for Barroso and Muertos Pastures from a survey by helicopter. Deer were classed as males, females, and fawns. Survey transects were 200 m wide and spaced to cover about 50% of the pastures. Two observers and the pilot sighted deer while flying at about 20 m altitude and at a speed of 72 km/hour. Net productivity was the number of fawns observed divided by the number of females observed.

Results and Discussion

Vegetation cover at and near bed sites (Table 1) was less than that estimated for white-tailed deer fawns in Iowa (Huegel et al. 1986). In Iowa the mean percent cover of grasses and forbs at bedsites was 111 and 130, respectively, and woody cover within 10 m was 130%. Garner et al. (1979) reported that fawns in Oklahoma selected bed sites with a composition of grasses of 48% to 85% (cover not reported), although height was a factor because fawns avoided sites with short grasses. Although fawns in our study bedded 4.8 m from the nearest woody plant on average, 50% of the bed sites were next to or under a woody plant. This indicated some selection for woody plants, since woody cover in the area of bed sites was relatively low (Table 1).

Fawns consistently selected ($P < 0.05$) bed sites with more mean percent visual obstruction/strata (Fig. 1). There was no difference ($P > 0.05$) in visual

Table 1. Mean vegetative cover (%) at bed sites of 30 white-tailed deer fawns, Brooks County, Texas, July 1986.

Statistic	Grass[a]	Forb[a]	Bare ground[a]	Woody plant[b]
$\bar{x}$	50.2	15.9	31.1	19.0
SD	21.9	14.4	19.7	18.2

[a]Estimated from a 1 m^2 plot (Daubenmire 1959) laid over each fawn bed site.
[b]Ocular estimate within a 25-m diameter circle around bed site.

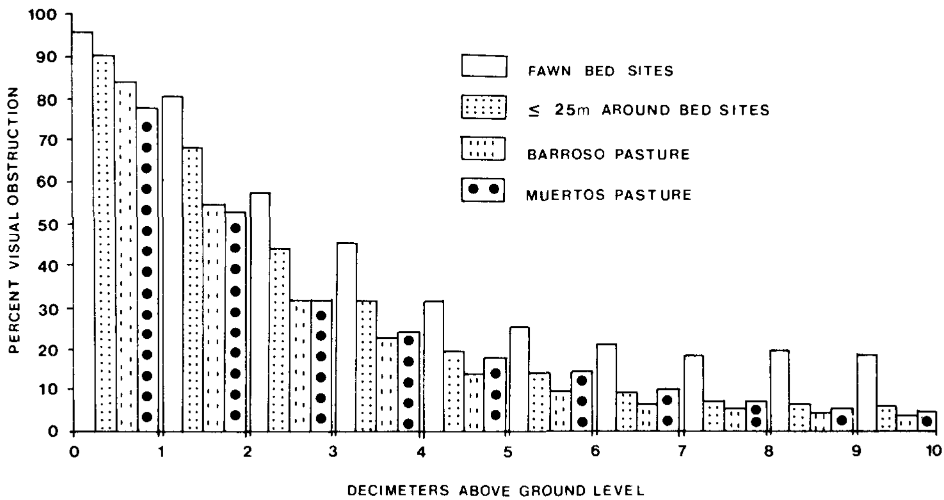

Figure 1. Mean percent visual obstruction by 1 dm vertical strata measured with a profile board at 30 white-tailed deer fawn bed sites (N = 120 readings/strata), at 5 to 25 m around the bed sites (N = 600)/strata), and at random sites in Barroso and Muertos pastures (N = 315/strata per pasture) in Brooks County, Texas, July 1986.

obstruction among means for distances of 5 to 25 m from the bed site, nor for Barroso and Muertos pastures. Additionally, there was no ($P > 0.43$) interaction between treatments and levels of visual obstruction in either of the ANOVAs. Huegel et al. (1986) used a profile board divided into 0.5-m segments to measure visual obstruction (from 3 m) at fawn bed sites and within 10 m. At the bed sites, they found mean visual obstruction of 98% from 0 to 0.5 m, and 96% for 0.5 to 1 m. Corresponding mean obstruction readings from within 10 m of the bed sites were nearly identical at 98% and 95%, respectively. Huegel et al. (1986) did not measure distant points. Thus, not only was screening structure less at our sites, but fawns seemed to be selecting clumps of greater obstruction within the immediate vicinity which was not the case in Iowa.

Deer net productivity in October was estimated to be 0.25 and 0.31 fawns/doe in Barroso and Muertos pastures, respectively. While we do not know if vegetative structure at bed sites influenced survival, fawns from across the area were seeking bed sites with more visual obstruction than the average available in Barroso and Muertos pastures. Since coyotes hunt by visual searching, presumably bed site cover should influence their impact on the fawn crop.

We believe that the fawn bed sites were a random sample of those available on the area, although this was difficult to evaluate. There was an extensive road network over which fawn searches were conducted and the habitat was not diverse. Barroso and Muertos pastures were not randomly selected from the more extensive area over which fawns were located. Nevertheless, the visual obstruction measurements and net productivity therein provide insight into general conditions in the area.

Although fawn mortality due to coyotes is better documented in southern Texas than anywhere in white-tailed deer range, this study provides the first data on structure at bed sites. We recommend additional study to determine if there is a direct relationship between coyote predation on fawns and bed site cover. If there is, bed site cover should readily be amenable to management through manipulation of livestock grazing, burning, and/or brush control.

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