

LESSER PRAIRIE-CHICKEN NEST SITE SELECTION AND VEGETATION CHARACTERISTICS IN TEBUTHIURON-TREATED AND UNTREATED SAND SHINNERY OAK IN TEXAS

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ABSTRACT.—Radiotelemetry was used to evaluate lesser prairie-chicken (*Tympanuchus pallidicinctus*) nesting response to herbicidal conversion of sand shinnery oak (*Quercus havardii*) rangeland to grassland. Hens selected nest sites in residual grasses within lightly grazed sand shinnery oak habitat with > 75% vertical screening in the first 0.33 m and 50% overhead cover.

Lesser prairie-chicken (*Tympanuchus pallidicinctus*) range has declined > 90% since the late 1800s (Taylor and Guthery 1980). This species is currently restricted to areas in Colorado, Kansas, Oklahoma, New Mexico, and west Texas that are dominated by sand shinnery oak (*Quercus havardii*), sand sagebrush (*Artemisia filifolia*), and short- and mid-prairie grasses (Jones 1963, Taylor and Guthery 1980).

Tebuthiuron (N-[5-(1,1-dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea) has been used to convert sand shinnery oak-dominated rangelands to short- or mid-prairie grass rangelands. Tebuthiuron has decreased sand shinnery oak densities by 85% (Doerr 1980), and grass yields have increased 300–900% (Pettit 1979). The effect of this conversion on lesser prairie-chicken populations is unknown. The objectives of this study were to ascertain habitat use by nesting female lesser prairie-chickens and to measure vegetation characteristics at nest sites in tebuthiuron-treated and untreated sand shinnery oak habitat.

Fieldwork was conducted 35 km north of Plains, Texas, in Cochran and Yoakum counties, during spring 1987–88. The area studied includes 4,145 ha of rangeland of which an area of 2,331 ha was treated in the late 1970s with tebuthiuron (0.56 kg/ha) in one contiguous block. The primary land use is cattle production. Short- and mid-grasses once co-dominated the area with sand shinnery oak but have been partially replaced by shinnery oak. Less frequent occurrences of sand sage-

brush, sand dropseed (*Sporobolus cryptandrus*), and purple three-awn (*Aristida purpurea*) are interspersed with a variety of forbs (Pettit 1979). Mean annual precipitation is 43 cm, of which > 80% occurs during thunderstorms from May through October (Dittmore and Hyde 1960).

Female lesser prairie-chickens were captured with walk-in traps or rocket nets on leks during spring (March–April 1987–88) display periods (Haukos et al. 1990). Captured hens were fitted with either solar-powered backpack transmitters (Brander 1967) or battery-powered poncho-mounted transmitters (Amstrup 1980). Nests were located by following radio-marked hens. Chi-square analysis with Yates correction for single degree of freedom was used to examine lesser prairie-chicken nest site habitat use (treated vs. control).

At initial nest location, four nest site vegetation characteristics were measured: (1) dominant vegetation type and species at nest site, (2) average vegetation height within 0.5 m of the nest site, (3) percent overhead cover, and (4) vegetation density surrounding the nest site. Percent overhead cover was estimated by averaging two nest canopy cover estimates from 23-mm wide-angle black and white photographs shot from within the nest bowl and overlain with transparent grids (Brown 1962). A profile board (each strata 33 × 15 cm) was used to estimate vegetation density with readings from each cardinal direction at each nest site (Nudds 1977). Readings were taken at a distance of 7 m from the nest site at a height of 1 m (Guthery et al. 1981). Density scores of

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0 (0%), 1 (> 0–5%), 2 (6–20%), 3 (21–40%), 4 (41–60%), 5 (61–80%), 6 (81–95%), and 7 (> 95%) were used; and the scores from each direction were then averaged.

Fifty-five female lesser prairie-chickens were captured on leks and fitted with radio transmitters. All trapped female lesser prairie-chickens selected nest sites in either treated or untreated sand shinnery oak habitat. Due to radio failure, hen predation, and hen emigration from the study area, only 13 lesser prairie-chicken nests were measured.

Of 10 nesting female lesser prairie-chickens captured in treated areas, 8 nested in untreated sand shinnery oak; this was more than expected ($\chi^2 = 4.92, P < .05$). All nests found were in residual grasses. Purple three-awn was the dominant vegetation species at the majority of the nest sites (9), followed by little bluestem (*Schizachyrium scoparium*) (3) and sand bluestem (*Andropogon hallii*) (1). Of the measured vegetation characteristics, vertical screening cover and percent overhead cover were the most important features of selected nest sites, presumably for protective cover (Table 1).

TABLE 1. Characteristics of lesser prairie-chicken nests (n = 13) in Yoakum and Cochran counties, Texas 1987–88.

Characteristic	\bar{x}	SD
Profile board score		
Strata 1 (0–33 cm)	5.40	1.03
Strata 2 (34–66 cm)	2.59	2.86
Strata 3 (67–99 cm)	0.60	0.60
Overhead cover (%)	42.33	16.24
Plant height (cm)	45.33	10.96

Only two nests were found in treated areas, both of which were in little bluestem. In treated sand shinnery oak, little bluestem provides better vertical screening cover than does purple three-awn. In untreated sand shinnery oak habitat the stems and foliage of oak provide the required vertical screening cover for nest sites, allowing the use of purple three-awn as a nest site.

Sell (1979) recommended that managers provide sand sagebrush and residual grass cover for nesting lesser prairie-chickens. In New Mexico, lesser prairie-chickens preferred ungrazed bluestem grasses, and successful nests were those having greater

amounts of cover (Davis et al. 1979). Davis et al. (1979) reported that nest success was greatly reduced in areas of moderate to heavy grazing.

Tebuthiuron treatments of sand shinnery oak in combination with heavy grazing pressure may reduce valuable verticle screening cover needed to provide preferred lesser prairie-chicken nest sites. A grazing schedule and intensity should allow at least 75% vertical screening in the first 0.33 m of cover from ground level and approximately 50% overhead cover to provide nest sites for lesser prairie-chickens in both treated and untreated sand shinnery oak habitats.

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