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BIRD USE OF BOBWHITE BRUSH SHELTERS ON A CONSERVATION RESERVE PROGRAM FIELD

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ABSTRACT

Northern bobwhite (*Colinus virginianus*) are known to use constructed brush shelters. The establishment of artificial shelters is a common practice in grasslands where woody cover is lacking. We evaluated the use of brush shelters by bobwhite and other bird species in a Conservation Reserve Program (CRP) field. Twenty-seven species of birds were observed at brush shelters versus 10 species at control sites. No species occurred exclusively at control sites. Brush shelters in CRP had positive effects on avian communities by providing sites for vocalizing, prey search, loafing, and nesting.

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INTRODUCTION

Northern bobwhite are known to use constructed shelters (Guthery 1980, 1986:77; Webb and Guthery 1983; Lehmann 1984:187; Boyer et al. 1989). Establishment of artificial shelters is a common management practice in grasslands where woody cover is lacking (Lehmann 1984:281, Guthery 1986:77, Boyer 1989:3). In 1985, the Food Security Act created the Conservation Reserve Program (CRP), which allowed landowners to establish native or introduced grasses on agricultural lands to reduce soil erosion and provide wildlife habitat. Depending upon the conservation practice implemented and the amount of land enrolled, woody cover could be a limiting factor for some wildlife species in CRP fields. Woody shelter (brush) provides loafing sites, whistling perches, and escape cover for bobwhite and other bird species (Guthery 1986:76, Lehmann 1984:283).

Boyer et al. (1989) evaluated 5 brush shelter designs and found that under laboratory conditions, teepee-style (see Boyer et al. 1989:Figure 1) shelters were preferred by bobwhite. In a field evaluation, nontarget species (primarily birds) also preferred teepee-style shelters (Boyer 1989), although preference by bobwhites could not be evaluated because of insufficient

sample size. In this paper, we evaluate the use of teepee-style brush shelters by bobwhites and other birds in a CRP field that was kept free of natural woody cover.

STUDY AREA AND METHODS

This study was conducted at the Texas A&M University-Kingsville Bomer Wildlife Research Area in Duval County, Texas, from September 1991–June 1993. Average annual precipitation for the area is 56 centimeters with an average maximum daily temperature range of 22–29 Celsius (NOAA 1993). One-half of the 48-hectare Bomer Research Area is under CRP contract and planted in Kleingrass (*Panicum coloratum*). The other half is primarily native thorn-scrub and is managed exclusively for northern bobwhite.

Five clusters of 6 teepee-style brush shelters (hereafter referred to as brush shelters) were erected during the CRP in June–August 1991. We followed the suggestions of Lehmann (1984:187), Johnson and Guthery (1988), and Boyer et al. (1989) and constructed brush shelters in clusters. Brush shelters were oriented in a 2-X-3 grid with approximately 8–10 meters between shelters. Each of the 5 clusters was paired with a control area of equal size (25 × 40 meters) with ≥ 40 meters between cluster and control areas and located > 350 meters from native brush.

Each cluster and control area was visited 65 times by 5 observers (325 cluster- and 325 control-visits). At least 6 hours elapsed between consecutive visits. Each cluster and control area was monitored by circling the area in a vehicle at slow speed (6–10 kilo-

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Table 1. Birds observed at brush shelters on a Conservation Reserve Program field, Duval County, Texas, September 1991–June 1993.

Species	No. of occurrences	
	Shelter	Control
Meadowlark spp. (<i>Sturnella</i> spp.)	40	16
Northern bobwhites (<i>Colinus virginianus</i>)	15	8
Loggerhead shrikes (<i>Lanius ludovicianus</i>)	22	0
Scissor-tailed flycatcher (<i>Muscivora forficata</i>)	17	1
Savannah sparrow (<i>Passerculus sandwichensis</i>)	10	1
Grasshopper sparrow (<i>Ammodramus savenarum</i>)	1	9
Black-shouldered kite (<i>Elanus leucurus</i>)	8	0
Dickcissel (<i>Spiza americana</i>)	5	3
Vesper sparrow (<i>Poocetes gramineus</i>)	4	3
Cooper's hawk (<i>Accipiter cooperii</i>)	4	0
Black-bellied whistling duck (<i>Dendrocygna autumnalis</i>)	3	1
Ground dove (<i>Columbigallina passerina</i>)	2	2
American kestrel (<i>Falco sparverius</i>)	3	0
White-tailed hawk (<i>Buteo albicaudatus</i>)	3	0
Sparrow (unidentified)	2	1
Redwinged blackbird (<i>Agelaius phoeniceus</i>)	2	0
Northern mockingbird (<i>Mimus polyglottos</i>)	2	0
White-throated sparrow (<i>Zonotrichia albicollis</i>)	2	0
Phyruloxia (<i>Phyruloxia sinuata</i>)	2	0
Mourning dove (<i>Zenaidura macroura</i>)	2	0
Cactus wren (<i>Campylorhynchus brunneicapillum</i>)	2	0
Lark sparrow (<i>Chondestes grammacus</i>)	1	0
Golden-fronted woodpecker (<i>Centurus aurifrons</i>)	1	0
Ash-throated flycatcher (<i>Myiarchus cinerascens</i>)	1	0
Carolina chickadee (<i>Parus carolinensis</i>)	1	0
Common nighthawk (<i>Chordeiles minor</i>)	1	0

meters per hour). Number of avian species and number of individuals per species were recorded for each visit. We assumed birds were using a cluster if they were in or on the brush shelter or within the 0.1-hectare treatment area. We assumed birds were using a control area if they were within the 0.1-hectare control area. Birds were never flushed from one treatment area to another. Species richness and Simpson's diversity index were calculated for each treatment by season (Hair 1980: 270–271). Seasons were spring (Mar–May), summer (Jun–Aug), fall (Sep–Nov), and winter (Dec–Feb).

RESULTS AND DISCUSSION

Twenty-seven species of birds were observed at brush shelters versus 10 species at control sites (Table 1). Of the 27 species of birds recorded, no species occurred exclusively at control areas and 17 occurred at brush shelters exclusively. Of the 17 species that occurred exclusively at brush shelters, loggerhead shrikes (*Lanius ludovicianus*), and raptors accounted for 39 and 32% of the observations, respectively. Raptor species included black-shouldered kites (*Elanus leucurus*), Cooper's hawks (*Accipiter cooperii*), white-tailed hawks (*Buteo albicaudatus*), and American kestrels (*Falco sparverius*) (Table 1).

Species richness was greater on brush shelters than

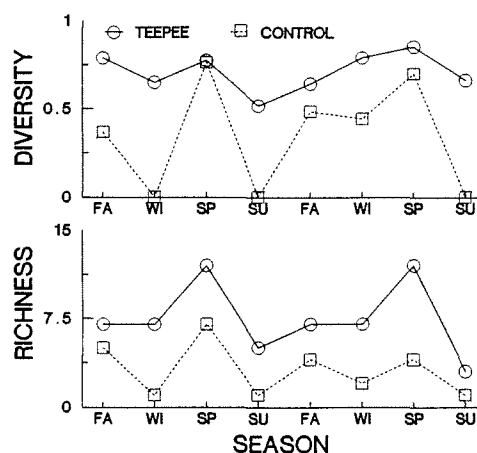


Fig. 1. Seasonal trends in species richness and Simpson's diversity index on brush shelter and control sites in a Conservation Reserve Program field, Duval County, Texas, September 1991–June 1993. Seasons are fall (FA: Sep–Nov), winter (WI: Dec–Feb), spring (SP: Mar–May), and summer (SU: Jun–Aug).

on controls in all season-year combinations (Figure 1) and ranged from 12 (spring 1992, 1993) to 3 (summer 1993) on brush shelters. Simpson's diversity index, from brush shelters was greater than or equal to controls in all season-year combinations (Figure 1) and ranged from 0.86 (spring 1993) to 0.52 (summer 1992) on brush-shelter areas.

Many researchers have recommended brush-shelter establishment in areas with sparse woody cover to enhance bobwhite populations. Effects of game management on nontarget species are rarely a consideration when prescribed. Webb and Guthery (1983) found that a variety of bobwhite management practices increased avian abundance and diversity. Boyer (1989) also found that bobwhite management benefitted nontarget species. Quail management practices seem to have positive or neutral effects on nongame species (Harveson 1994).

In south Texas, brush shelters in CRP fields were used by a variety of birds for different reasons. Bobwhites seasonally used brush shelters with peak observations occurring in spring and summer ($n = 14$), coinciding with breeding activity (Guthery et al. 1988) and male vocalization (Johnson and Guthery 1988). Brush shelters provided perch sites for raptors, flycatchers, and other insectivores. Brush shelters also provide midday loafing coverts for bobwhites (Johnson and Guthery 1988, Boyer et al. 1989) and nesting structure for songbirds.

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