Brush Control and the Welfare of Lesser Prairie Chickens in Western Oklahoma

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Recent advances in brush control have increased the capacity of certain areas to produce livestock, resulting in substantially increased net profit to the operator (McIlvain and Shoop, 1965). The practice of controlling brush for pasture improvement will likely continue indefinitely. However, complete eradication of brush species is seldom undertaken. Some species of brushy plants are valuable for winter and drought forage; they aid in the control of wind erosion, protect some grasses from grazing so that they will set seed, shade cool-season grasses, and aid in the recirculation of deeply leached soil minerals. Brush species are therefore considered "conservation devices" in some areas (McIlvain and Shoop, 1965).

The importance of brushy vegetation as an essential habitat component of the lesser prairie chicken has been repeatedly documented (Copelin, 1963; Hamerstrom and Hamerstrom, 1961; Jackson and DeArment, 1963; and Jones, 1963), but there is some disagreement relative to the possible effects of brush control on the species. The degree to which the bird is restricted to specific habitat components is not clear. This question of fidelity must be answered in order to construct a sturdy foundation of knowledge upon which to base a rational management program. The

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purpose of this study was to analyze the response of the lesser prairie chicken to brush control procedures in western Oklahoma. It is of primary importance that the ecological ramifications of such practices be studied and documented.

Seven study areas located in Harper, Woodward, and Ellis counties were selected for intensive investigation. They include regions which have been subjected to a rather wide spectrum of regional land-use practices. The sandsage-grassland and the shinnery oak-grassland game types of Duck and Fletcher (ca. 1943) were represented.

METHODS

The point-centered quarter developed by Cottam and Curtis (1956), and modified for use in grassland sampling by Dix (1958, 1961), was employed for sampling the vegetative complex. Plant life-form was noted in addition to species composition. The life-form classification used was that of Du Rietz (1931).

Data relative to habitat use were gathered by carefully observing lesser prairie chickens under field conditions. The data recorded for each observation included the height of the vegetation in which the birds were seen, the life-form of the vegetation and its approximate coverage, and species composition. When birds were flushed from a site, the point-centered quarter implement was placed at the flush point. The nearest plant to the point in each quarter was recorded and the distance to the nearest centimeter was noted. Additional information included height of the vegetation, life-form, and distribution. All data were taken in the late summer of 1965.

RESULTS

The total density (plants per m^2) shows that there is a greater difference between the shinnery oak and sandsage communities than between treated and nontreated areas within the same community (Fig. 1).

Relative densities of combined forbs and combined woody species are shown in Figs. 2 and 3. A significant increase in forbs is indicated in the treated sandsage areas. Shinnery oak areas showed pronounced variation in forb composition (Fig. 2). While the differences are not great, there are generally fewer woody life-forms in treated areas than in nontreated (Fig. 3). The most marked suppression of woody life-forms is manifest in the sprayed and burned study area. Grasses reached their greatest density in the sprayed and burned study area, but were of nearly uniform densities in the other areas.

Importance values (the sum of the relative density and relative frequency) are tabulated in Table I. The most important life-forms in all study areas were short-grass and mid-grass. There was, however, a greater preponderance of woody forms in the shinnery oak communities. The three most important species present in the sandsage areas were blue grama *(Bouteloua gracilis)*, sand dropseed *(Sporobolus cryptandrus)* and silver bluestem *(Andropogon saccharoides)*. Little bluestem *(Andropogon scoparius)*, shinnery oak *(Quercus havardii)*, and switchgrass *(Panicum virgatum)* were the most important species in the shinnery oak areas. The differences in dominants between the two vegetative types is evident.

Indices of stand similarity (Sorenson, 1948 in Dix, 1958) relative to life-form are shown in Table II. The greater similarity between stands in the same vegetative type (sandsage and shinnery oak-grasslands) is apparent. It is of interest to note that the least similar stands were the nontreated sandsage and nontreated shinnery oak.

Data relative to lesser prairie chicken habitat use indicated that the habitat components which were most commonly preferred were present in both sandsage and shinnery oak areas.

Discussion and Conclusion

Brushy species are reduced in stature by the control procedures, but without total eradication. Suppression of brush to a degree is the goal of this operation.

Hamerstrom, et al. (1957) suggest that an ecological patterning, or modification of the size, shape, number, or distribution of habitat types may be beneficial to prairie chickens. This ecological patterning is thought

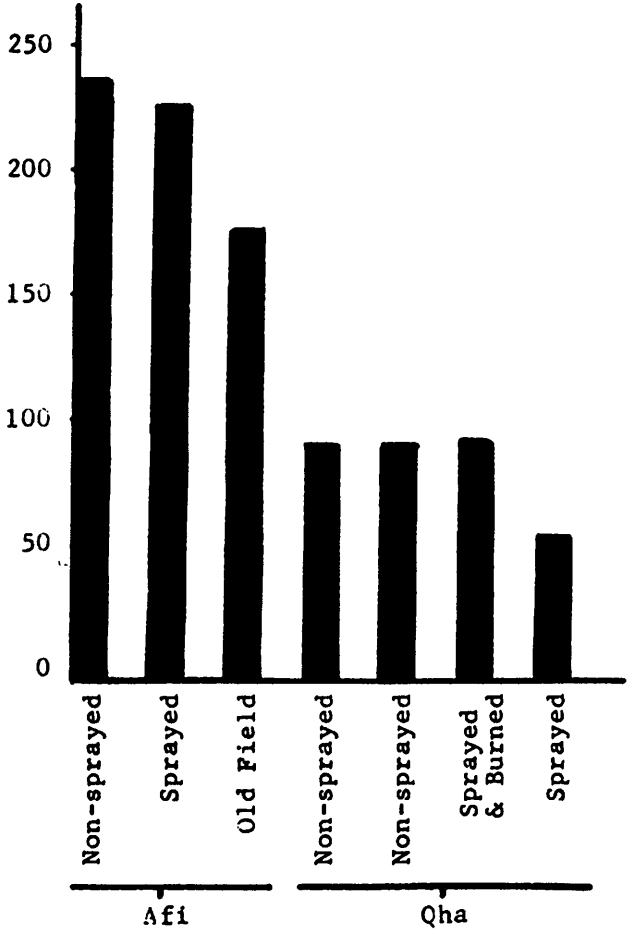

Fig. 1. Total density (plants/m²). Afi and Qha relate to sandsage *(Artemisia filifolia)* and shinnery oak *(Quercus havardii)* grassland types, respectively.

to present a more favorable total environment than a solid blocking. If left untreated, much of the area in this study would develop into a rather solid block of uniform aspect.

Habitat components used by lesser prairie chickens during the course of this study were present in both treated and nontreated areas, which implies that brush control did not seriously impair the welfare of the lesser prairie chicken. Some habitat components may not be used consistently by lesser prairie chickens throughout all seasons. A sequence of foods and coverts becomes available and disappears with time (Jones, 1963). Since this paper is based on data gathered during only one season, the study is of a preliminary nature. It will be necessary to study the phenological relationships of the vegetative complex relative to differential use by the birds in all seasons.

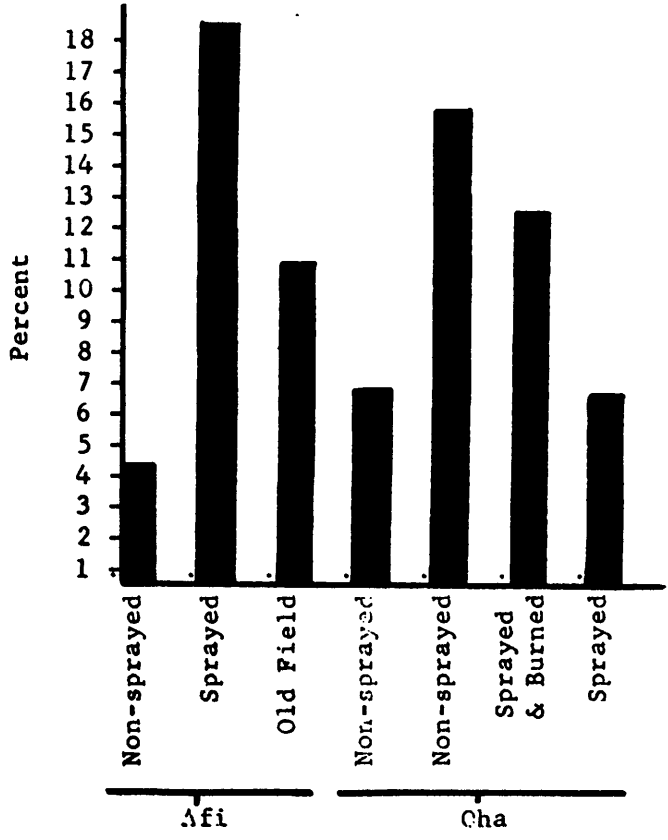

Fig. 2. Relative density of the forb life-forms.

TABLE I. FIVE MOST IMPORTANT LIFE-FORMS IN EACH STAND. IMPORTANCE VALUES WERE OBTAINED BY SUMMING RELATIVE FREQUENCY AND RELATIVE DENSITY. (S.G.=SHORT GRASS; M.G.=MID GRASS; T.G.=TALL GRASS; S.F.=SHORT FORB; M.F.=MID FORB; D.S.=DWARF SHRUB; H.S.=HALF SHRUB; D.H.S.=DWARF HALF SHRUB.)

	Non-sprayed	Sprayed	Old Field
Afl	S.G. (109.7)	S.G. (99.5)	S.G. (103.2)
	M.G. (51.6)	M.G. (45.8)	M.G. (45.8)
	H.S. (19.1)	S.F. (25.0)	S.F. (16.7)
	S.F. (10.1)	M.F. (19.1)	D.H.S. (14.7)
	T.G. (6.4)	D.S. (4.8)	M.F. (11.3)

	Non-sprayed	Non-sprayed	Sprayed & Burned	Sprayed
Qha	S.G. (57.7)	M.G. (51.3)	M.G. (79.9)	S.G. (81.5)
	M.G. (56.2)	S.G. (50.5)	S.G. (53.0)	M.G. (45.6)
	D.S. (49.3)	D.S. (43.0)	D.S. (33.6)	D.S. (45.0)
	D.H.S. (16.3)	M.F. (26.5)	S.F. (23.1)	S.F. (9.8)
	M.F. (10.1)	D.H.S. (13.8)	D.H.S. (5.6)	D.H.S. (6.8)

TABLE II. INDICES OF STAND SIMILARITY. NUMBERS ARE IN PERCENT.

		Afl			Oha			
	STAND	Non-Sprayed	Sprayed	Old Field	Non-Sprayed	Non-Sprayed	Sprayed & Burned	Sprayed
Afl	Non-sprayed							
	Sprayed	79.7						
	Old Field	82.4	88.5					
Oha	Non-sprayed	63.8	65.5	71.9				
	Non-sprayed	60.1	66.1	67.2	89.7			
	Sprayed & Burned	64.3	70.6	68.2	79.6	76.6		
	Sprayed	71.7	72.0	73.4	82.9	78.1	78.1	

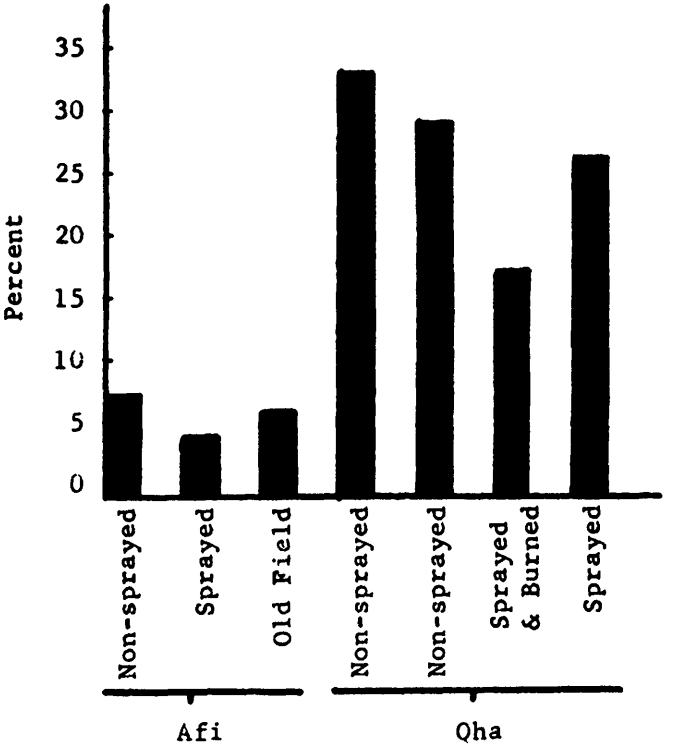

Fig. 3. Relative density of woody life-forms.

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