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# Steward's Circle

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## Spring Burning and Grassland Area: Effects on Henslow's Sparrow (*Ammodramus henslowii* [Audubon]) and Dickcissel (*Spiza americana* [Gmelin]) in Eastern Kansas, USA

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Henslow's sparrow (*Ammodramus henslowii* [Audubon]) and dickcissel (*Spiza americana* [Gmelin]) are considered characteristic bird species of the tallgrass prairie of North America. The dickcissel, however, tends to be more common in sparse vegetation (Kendeigh 1941) and will typically nest in disturbed habitats such as roadsides (Meanley 1963, Warner 1992) and cropland (Good and Dambach 1943; Graber and Graber 1963; Bryan and Best

1991, 1994). Broad-leaved plants (forbs) tend to dominate over grasses at dickcissel nest sites (Kendeigh 1941; Good and Dambach 1943; Zimmerman 1966, 1971, 1982; Zimmerman and Finck 1982; Finck 1984). Henslow's sparrow, in contrast, tends to be most abundant in areas of tall, dense vegetation with abundant litter (Graber and Graber 1963, Zimmerman 1988, Herkert 1991, Cully and Michaels 2000).

Henslow's sparrow is considered to be highly area-sensitive, whereas dickcissel is less sensitive to area (Herkert 1991, 1994; Herkert et al. 1993). Henslow's sparrow is considered to be intolerant of grassland fragmentation, whereas the dickcissel is relatively tolerant of grassland fragmentation (Herkert et al. 1993). Most studies of area-sensitivity, or fragmentation tolerance, of these species have been conducted in the eastern fringe of the tallgrass prairie where grassland areas are smaller and more fragmented, as opposed to eastern Kansas, USA, where grassland tracts are large and less fragmented.

Spring burning is typically practiced for restoration and management of tallgrass prairie (McClain 1983). In the Flint Hills and Osage Plains of eastern Kansas, ranchers use annual spring burning in conjunction with intensive early stocking of cattle for range management (Launchbaugh and Owensby 1978). In this system, grass is burned in late spring (median date 1 May) and cattle is stocked, after burning, with twice the normal rate of yearling steers (2.5 ha / steer) than would be stocked for yearlong continuous grazing. This grazing system yields higher gains for yearling steers than are obtained with conventional yearlong continuous grazing. Burning can impact nearly 100% of any given native prairie pasture (B. E. Flock, Kansas Department of Wildlife and Parks, Emporia, unpubl. data) and as much as 60%–70% of

the general landscape.

We examined relative abundance of Henslow's sparrow and dickcissel in large burned and unburned tallgrass prairie tracts in eastern Kansas within a predominantly grassland landscape. Our data are purely observational and only document relative differences in presence by habitat units, and so do not address issues of source-sink dynamics.

We established six transects, 366 m long, in six randomly selected tallgrass prairie tracts. There were 7 stops at 52.3-m intervals along each transect. Prairie tracts were located on the Kansas Department of Wildlife and Parks Melvern Wildlife Management Area in Osage County. The study area is located within the Osage Plains (Osage Questas; Lauver et al. 1999) and is typified by the *Andropogon gerardii* Vitman (big bluestem)–*Sorghastrum nutans* (L.) (Indian grass) plant community, which occurs on somewhat poorly to well drained, level to moderately steep uplands. Other plants typical of this community include *Amorpha canescens* Pursh (lead plant), *Dalea Lucanus sp.* (prairie clover), and *Schizachyrium scoparium* (Michx.) Nash-Gould (little bluestem) (Lauver et al. 1999). Land use in the vicinity of the study area is 43% tallgrass prairie, 17% non-native cool-season grassland, 2% CRP (Conservation Reserve Program) grassland, 19% cultivated cropland, 9% forested, 1% wetland, and 1% urban. Remaining area is in reservoir (U.S. Corps of Engineers Melvern Reservoir). CRP grasslands are primarily crop fields that have been enrolled into the U.S. Department of Agriculture Conservation Reserve Program's practice CP2 (see [www.fb-net.org/CRP/cp2.htm](http://www.fb-net.org/CRP/cp2.htm)). All CP2 fields on the study area were planted to native tallgrass prairie grasses but were generally denser due to a heavy seeding rate when established.

Bird counts were conducted in July 1995, 1996, and 1997 between local sunrise and 2.5 h after sunrise. More than one transect was counted in a morning, but each transect was counted only once in a year. Counts were not conducted during rain or winds exceeding 16 km hr<sup>-1</sup>. At each stop, a recording of a male Henslow's sparrow song

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was played and the number of singing Henslow's sparrow and dickcissel males was recorded for 2 min. Each study tract was visited in spring early to determine the burn status of the tract in that year.

We digitized maps of the grassland study tracts to examine area relationships and landscape characteristics using ARCVIEW 3.2 (ESRI, Inc., Redlands, Calif). We calculated area (ha) and perimeter (m) of study tracts. Distances (m) from each study tract to the other study tracts were measured. We used ANOVA in SPSS (SPSS, Inc., Chicago, Ill.) to examine numbers of Henslow's sparrow and dickcissel in burned vs. unburned tracts. Area, perimeter, and distance measures were compared with paired Kruskal-Wallis tests. We set  $P \leq 0.10$ .

We counted 22 Henslow's sparrows during seven counts (relative abundance  $0.17 \pm 0.08$  SE ha<sup>-1</sup>) and 200 dickcissels during 17 counts (relative abundance  $1.13 \pm 0.28$  SE ha<sup>-1</sup>). Henslow's sparrows were present in five of the six tracts, whereas dickcissels were present in all six tracts.

In 1995, four of the six tracts were burned in the spring, while in 1996 only one tract was burned; in 1997, two of the six were burned (Table 1). Burned tracts had significantly fewer Henslow's sparrows ( $F_{1,5} = 4.02$ ,  $P = 0.10$ ) and the same numbers of dickcissels ( $F_{1,15} = 0.05$ ,  $P > 0.10$ ) as compared to unburned tracts (Figure 1).

The mean area of the six tracts was  $36.3 \pm 14.9$  SE ha (range 37.3 ha), and mean perimeter was  $3451.2 \pm 1042.9$  SE m (range 2687.0 m). The mean distance to other tracts was  $5323.8 \pm 1,103.3$  SE m (range 3308.0 m) (Table 2). There was no difference between the number of Henslow's sparrows and dickcissels counted and tract area ( $x^2 = 3.9$ ,  $P = 0.42$  Henslow's;  $x^2 = 5.3$ ,  $P = 0.51$  dickcissel), perimeter ( $x^2 = 0.81$ ,  $P = 0.94$  Henslow's;  $x^2 = 5.9$ ,  $P = 0.43$  dickcissel), and distance to other tracts ( $x^2 = 4.8$ ,  $P = 0.30$  Henslow's;  $x^2 = 8.2$ ,  $P = 0.22$  dickcissel).

For both dickcissel and Henslow's sparrow, there were no significant differences in numbers of birds counted on different size tracts (Henslow's  $x^2 = 3.9$ , 4 df,  $P =$

0.42; Dickcissel  $x^2 = 5.3$ , 6 df,  $P = 0.51$ ), on tracts of different perimeter length (Henslow's  $x^2 = 0.81$ , 4 df,  $P = 0.94$ ; dickcissel  $x^2 = 5.9$ , 6 df,  $P = 0.43$ ), or on tracts of different distances to each other (Henslow's  $x^2 = 4.8$ , 4 df,  $P = 0.30$ ; dickcissel  $x^2 = 8.2$ , 6 df,  $P = 0.22$ ).

The results of our limited study in a predominantly grassland landscape confirm

that Henslow's sparrow is generally not found in burned areas. We did not, however, find a relationship between Henslow's sparrow and area of grassland tract, perimeter of grassland tract, or distance between grassland tracts studied during this project.

Presence of dickcissel was not dependent on burning: we observed equivalent num-

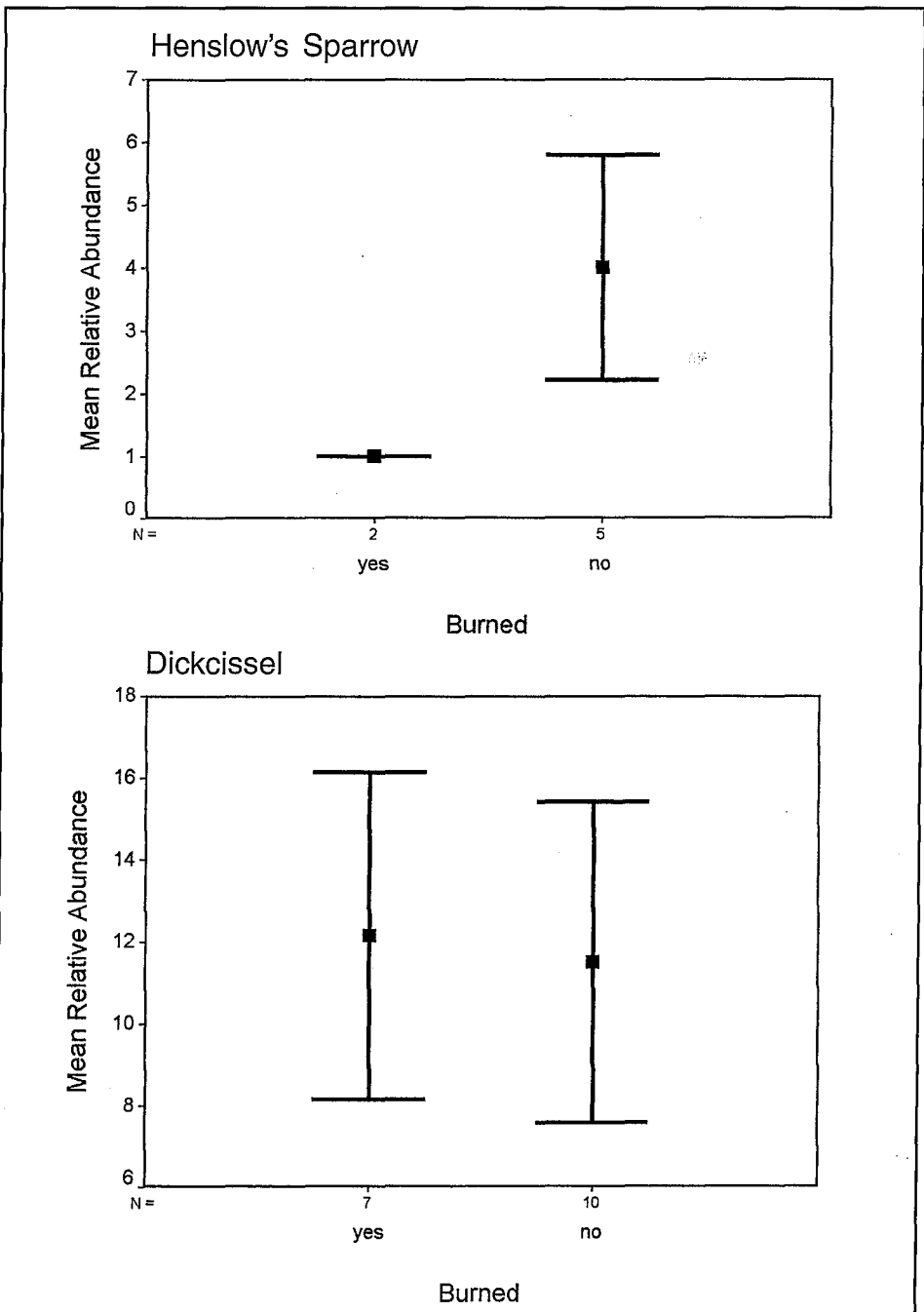


Figure 1. Relative abundances of singing male Henslow's sparrows and dickcissels on burned and unburned tallgrass prairie tracts in eastern Kansas, 1995-1997. Vertical bars equal 2 SE.

**Table 1. Burning treatment of experimental tracts on the Melvern Wildlife Management Area, Kansas, 1995-1997.**

TRACT	1995	1996	1997
4	burned	unburned	unburned
4B	burned	unburned	unburned
5A	burned	unburned	burned
5B	unburned	burned	unburned
6	unburned	unburned	unburned
8	burned	unburned	burned

**Table 2. Characteristics of study tracts on the Melvern Wildlife Management Area, Kansas, 1995-1997.**

Tract Number	Area (ha)	Perimeter (m)	Average Distance from Other Tracts (m)
4	52.9	4,421.0	4,712.6
4B	17.7	2,520.0	4,922.0
5A	19.7	2,187.0	3,539.6
5B	38.3	3,021.0	5,808.2
6	55.0	4,874.0	6,112.8
8	34.1	4,224.0	6,847.6

bers of birds in both types of tracts. Our data suggest that the dickcissel is not influenced by area of the grassland tract. There was also no relationship between dickcissel counts and tract perimeter and distance to other grassland tracts.

Our results are important in that they demonstrate that both Henslow's sparrow and dickcissel appear to be responding to the larger landscape configuration rather than the individual grassland tract. More studies need to focus on grassland birds using avian population dynamics to measure the ability of predominately grassland landscapes to support avian populations. This information would contribute to the study of grassland birds at their range limits.

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