Challenges Describing the Relative Abundance of Grassland Birds in Grazing Studies

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Switchgrass (Panicum virgatum) and big bluestem (Andropogon gerardii) have often been promoted as dual-purpose (forage/wildlife habitat) species. As part of a grazing trial conducted in Michigan (2) on Kalamazoo series (fine-loamy, mixed, mesic Typic Hapudalfs) soils at W. K. Kellogg Biological Station, we attempted to describe the relative abundance of grassland birds, but encountered practical challenges related to the experimental area. Four replications of three rotationally grazed pasture treatments were arranged in a completely randomized design. Experimental units ranged from 1.0 to 2.1 ha in size. Treatments included:

(i) A pasture composed primarily of cool-season grasses and legumes (CS-Only) including: perennial ryegrass (Lolium perenne), quackgrass (Agropyron repens), alfalfa (Medicago sativa), white clover (Trifolium repens), red clover (Trifolium pratense), and orchardgrass (Dactylis glomerata).

(ii) An integrated big bluestem and cool-season grass-legume pasture (CS-BBS). One-third of the system was a monoculture of big bluestem, and two-thirds was composed cool-season grasses and legumes.

(iii) An integrated switchgrass and cool-season grass-legume pasture (CS-SG). One-third of the system was a monoculture of switchgrass, and two-thirds was composed of cool-season grasses and legumes.

Bird counts were conducted using four straight-line transects through the center of each experimental unit, in June and July of 2004 and 2005. Survey transects were 50 m wide and surveys began approximately 30 min after sunrise. Birds were included in the data set unless they were (i) on a fence between experimental units or on the perimeter fence, (ii) observed less than six times, (iii) Canada geese (Branta canadensis). Species meeting these criteria included savannah sparrow (Passerculus sandwichensis), red-winged blackbird (Agelaius phoeniceus), bobolink (Dolichonyx oryzivorus), and barn swallow (Hirundo rustica).

Because of low bird numbers, the total number of birds observed within each experimental unit was used rather than the frequency of individual species. PROC GLIMMIX (SAS Institute Inc., Cary, NC) was used to conduct ANOVA tests. The statistical model for bird relative abundance included the effect of treatment; day-of-year was treated as a random effect. While the model was statistically significant, the only comparison that approached statistical significance ($P = 0.07$) was between the CS-BBS and CS-SG treatments. Each CS-BBS pasture had an average of 2.6 birds per transect, while CS-Only and CS-SG treatments had 1.9 and 1.7, respectively.