A comparison of restored native grasslands and exotic grass pastures as wintering habitat for declining grassland bird species in the Southeastern United States

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Introduction Southeastern grasslands were not pristine when the first Europeans arrived in the 15th century. American Indians had modified the landscape through centuries of fire use, cultivation, and other activities (Denevan, 1992). However, native southeastern grasslands did not evolve with disturbance from intensive grazing. Livestock and intense grazing pressure arrived with the Europeans. Modifications to southeastern grasslands by the early 1900s included exclusion of fire, intensive grazing, and introduction of cultivated, sod-forming grasses, which resulted in an increase in hardwood trees and shrubs, changes in herbaceous species composition, and the near extirpation of native warm-season species such as switch grass (*Panicum virgatum*), big bluestem (*Andropogon gerardi*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), and eastern gamma grass (*Tripsacum dactyloides*) (Rasnake, 1992). A mosaic of cultivated pastureland, cropland, pine (*Pinus* spp.) plantations, and mixed pine-hardwood forests has replaced the grassland and grassland savanna habitats that were present in the southeast. Most pastures now are planted in introduced cool and warm-season grass species, such as fescue (*Festuca arundinacea*), bermuda (*Cynodon dactylon*), and bahia grass (*Paspalum notatum*). Several songbird species are associated closely with the structure of the native bunchgrass-forb community. Species including the Henslow's sparrow (*Ammodramus henslowii*), Bachman's sparrow (*Aimophila aestivalis*), loggerhead shrike (*Lanius ludovicianus*), northern bobwhite (*Colinus virginianus*), eastern meadowlark (*Sturnella magna*), and Savannah sparrow (*Passerculus sandwichensis*) have experienced precipitous declines, likely due to landscape-level changes in habitat. This project aimed to identify the most effective method of creating and maintaining grassland habitat for declining grassland birds in the southeastern United States within an open agricultural landscape and forest openings.

Methods Twelve plots were established in central Georgia, 6 in an open agricultural landscape and 6 within a forested area. Three plots within each landscape were prepared in autumn 2001 and planted in spring 2002 with a mixture of little bluestem, big bluestem, and Indian grass at a rate of 7.84kg PLS/ha. The remaining sites were kept under current management of annual mowing and periodic burning. Fescue and bahia grasses dominated the control plots. The bird community was identified with mist netting during January-March 2003 and 2004. Each bird was banded, measured, and released. Capture rate (number of birds captured/mist net hour) was used as an index of avian abundance.

Results Data were analysed within year and within landscape. In 2003, there was no significant difference between capture rates in open planted (0.3863±0.154 birds/net hour) and open control (0.2199±0.1819 birds/net hour, $p=0.14$) plots, but forest planted plots had a significantly higher capture rate (0.306±0.206 birds/net hour) than the forest control plots (0.0341±0.017 birds/net hour). When capture rates for only grassland obligate sparrows were considered, the planted treatments within both landscapes yielded significantly more sparrows than the control treatment (open planted=0.298±0.049 sparrows/net hour, control=0.089±0.083 sparrows/net hour, $p=0.01$; forest planted=0.275±0.228, control=0.011±0.009, $p=0.058$). In 2004, capture rates were much lower in all plots. Capture rates did not vary between planted and control plots in either landscape (open plant v. control $p=0.23$; forest plant v. control $p=0.089$), although the data within the forested landscape tended towards a significant difference. High variance associated with low capture rates may have precluded the detection of a statistical difference. Sparrow capture rates were not significantly different between treatments within either landscape.

Conclusions Grassland bird winter abundances vary dramatically from year-to-year within the same landscape making year-to-year comparisons difficult. Native grass restoration may provide an important management tool for wintering grassland birds, especially within a forested landscape.

References

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