Grassland Bird Communities in Potential Bioenergy Crop Fields in Southern Wisconsin

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Background/Questions/Methods

Demand for biomass-based energy, or bioenergy, is increasing in the U.S. due to concerns about climate change, energy security, and air and water quality. Currently, corn is the dominant crop source for bioenergy production on agricultural lands in Wisconsin. However, perennial grasslands have the potential to provide renewable bioenergy and additional ecosystem services and wildlife habitat compared to corn. Grassland birds, which have experienced extensive population declines due to habitat loss, may particularly benefit from grasslands grown for bioenergy. We asked what factors influence grassland bird community structure in potential bioenergy crop fields in southern Wisconsin. We studied 3 potential bioenergy crop fields: corn, grass-dominated (e.g., monocultures of Switchgrass [*Panicum virgatum*]), and diverse native prairie restorations (i.e., fields with mixtures of grasses and flowering forbs). We surveyed birds in 11 corn, 8 grass-dominated, and 22 prairie fields during 2011-2012. We measured vegetation characteristics, calculated landscape metrics, and assessed bioenergy potential (from estimates of harvestable biomass) for all grassland fields (grass-dominated and prairie fields). We predicted that grassland fields with greater plant diversity, moderate levels of biomass and canopy cover, and more grassland habitat in the surrounding landscape would have the greatest abundance and species richness of grassland birds.

Results/Conclusions

Grass-dominated fields contained fewer forbs and plant species and had greater grass cover than prairie fields. Estimated harvestable biomass ranged from 920 kg/ha to 5,840 kg/ha in grassland fields but did not differ significantly between grass-dominated and prairie fields. Several bird species of greatest conservation need were observed in grassland fields, including Dickcissel (*Spiza americana*) and Henslow's Sparrow (*Ammodramus henslowii*). Total bird abundance and species richness were greatest in prairie fields, followed by grass-dominated fields and corn fields, respectively. Abundances of several bird species (e.g., Song Sparrow [*Melospiza melodia*] and Common Yellowthroat [*Geothlypis trichas*]) were positively associated with forb cover in grassland fields. Bird abundance was highest at intermediate levels of biomass, suggesting an optimal level of biomass that may provide habitat for the most birds. This research suggests that among the potential bioenergy crop fields we studied, prairie fields offer the best bird habitat, and grass-dominated fields provide better bird habitat than corn fields. Bioenergy crop production is predicted to increase in the future; grassland bird habitat should be a factor considered when deciding among potential bioenergy crops.