Grassland Bird Nesting Ecology in Linear vs. Block Early Succession Habitat

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Introduction

Recent loss of early-succession habitat in agricultural landscapes of the Southeast corresponds with the removal of strip-cover habitat. Such land-use alterations are a primary factor of grassland bird population declines. Federal conservation programs advocate replacing linear and block habitat in agricultural lands to restore ecosystem functions and wildlife habitat as part of a Conservation Management System (CMS). However, differential benefits between linear and block early-succession habitat types in a CMS are poorly understood. Primary objectives of this research were to:

1) Enhance our understanding of temporal nest-use patterns among habitats.
2) Estimate nest density and nesting avian species richness in field borders, filter strips, riparian buffers and early-succession blocks.
3) Monitor avian reproduction in these habitats by modeling nest survival across habitat treatments and temporally throughout the nesting season.

Image 1. Early-succession block habitat on a row-crop farm in northwestern MS.

Image 2. Filter strips surround an irrigation ditch in northwestern MS.

Methods

This study was conducted on a 2,630 ha intensively row-cropped soybean farm in northwestern Mississippi. We evaluated nesting activity in 4 habitat treatments of early-succession habitat:

- Linear habitat
  1. Field borders (FB) were 30 m wide and planted with warm season grasses and partridge pea
  2. Filter strips (FS) were 30 m wide and planted with switch grass
  3. Riparian buffers (RB) were 60 m wide and planted for forest restoration and thus, represented habitat resultant of natural floral invasion
- Block habitat
  4. Early-succession block (Block) plots were 60 m wide and embedded in large (72 ha) forest restoration blocks.
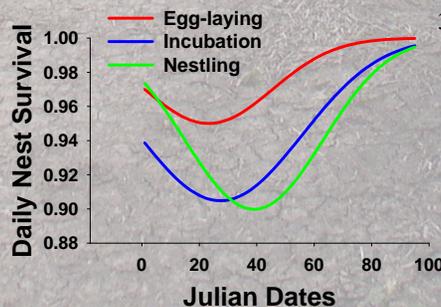
We conducted intensive nest searches throughout May-July of 2005 and 2006 by systematically pacing plots to flush nesting birds. Nests were monitored every 2-4 days to determine fate. Nest survival was modeled using Program MARK (Dinsmore et al. 2002).
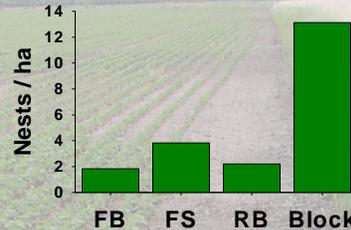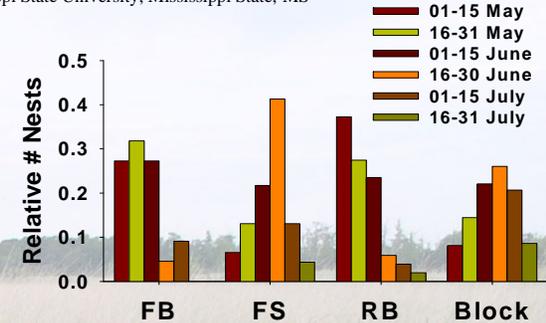

Figure 1. Total avian nest density per habitat.
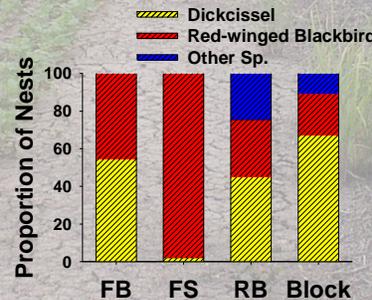
Figure 2. Proportion of nesting species per habitat treatment.

Figure 3. Seasonal patterns of nest survival for Dickcissels in 2006.

Figure 4. Relative number of total nests initiated during 2-week periods throughout the nesting season.

Results and Discussion

We found a total of 395 nests of 8 species in 2005 and 554 nests of 9 species in 2006 on all habitat types. Early-succession blocks and riparian buffers yielded eight and six nesting species, respectively, whereas field borders and filter strips attracted only Dickcissels (*Spiza americana*) and Red-winged Blackbirds (*Aegelaius phoeniceus;* Figure 2). Dickcissel (57.2%) and Red-winged Blackbird (32.5%) nested most commonly, however Mourning Dove (5.5%) and Eastern Meadowlark (3.1%) also nested regularly. Nesting density was greatest in early-successional block habitat and considerably lower in all other habitat types (Figure 1). Nest survival was lowest for Dickcissels during the period of highest nest density (mid-season) and highest at the end of the season (Figure 3).

This on-going study has provided important insight into the avian nesting community of a CMS, including:

1) Nest density was greatest in riparian buffers among linear habitats.
2) Field borders and riparian buffers appeared to provide nesting habitat only early in the nesting season, elucidating the need for a variety of habitat types to incorporate temporal nesting trends (Figure 4).
3) Contiguous, early-succession fields provided considerably enhanced benefits for the nesting avian community compared with linear habitat.

2006 Field Crew

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