Past territory use and level of interspecific competition influences the timing of territorial establishment and aggression in a non-migratory passerine

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**Introduction**

Timing of territory establishment is considered an important predictor of breeding success in migratory species, yet comparatively little research has focused on criteria for settlement time in non-migratory birds. Additionally, historical occupation ratios of nesting locations have not been correlated with habitat quality in passerines. Eastern bluebirds represent an appropriate study species as they are partial migrants and year-round residents of the Southern Appalachians.

Our field site (Boone, NC) is a mosaic of areas where 1) eastern bluebirds and tree swallows aggressively compete for nesting sites and 2) areas where bluebirds breed with little interaction with tree swallows. We quantified rates of nest box occupancy over the past 4 years and measured settlement time and aggression.

**Objectives**

1. Does past occupancy predict timing of territory establishment in Eastern bluebirds?
2. Does interspecific competition influence whether bluebirds will settle at a location?
3. How does interspecific competition affect bluebird aggression?

**Methods**

**Study Site**
- Boxes were chosen based on historical occupancy
- High occupancy: boxes used every year (2009-2012) (n=18)
- Low occupancy: boxes used in only 1 year (n=23)
- High and low competition areas were assigned based on past occupancy rates of bluebirds and tree swallows

**Defense/Aggression Trials**
- Bluebird response to simulated intrusion (bluebird playback) was quantified as aggressive if birds approached the speaker within 2 m and 2 mins

**Results**

1. Eastern bluebirds are significantly more likely to claim and defend nest-boxes with higher historical occupancy (Fig. 1)
2. Bluebirds are more aggressive towards conspecific playbacks when there is an increased tree swallow presence (Fig. 2)
3. After approximately half of our boxes had a nesting bird, playback trials ceased. At that time, boxes that were occupied first by bluebirds were significantly more likely to have a higher historical occupancy rate by bluebirds (Fig. 3)
4. Boxes were defended more consistently by bluebirds that laid their first egg earlier in the season (Fig. 4).

Together, these results suggest that past territory use is a strong predictor of habitat quality, and it influences the settlement timing of this partial migrant. Further, the natural range expansion of tree swallows is selecting for bluebirds to show increased aggression earlier in the breeding season in areas where they overlap territories.

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