

Public Abstract

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Title: POPULATION DYNAMICS OF A MIGRANT SONGBIRD:

DO WE NEED TO MONITOR THE ENTIRE BREEDING SEASON?

In Missouri, long-distance migrant songbirds can have relatively long breeding seasons, extending all the way into September for some species. Early models that assessed population status throughout the Midwest determined that forest fragments were population sinks for migrant songbirds. However, these models did not incorporate field data from the entire breeding season, with data collection stopping well before the birds finished breeding. Although newer models have recently been developed to account for longer breeding seasons, for the most part the data used in the models are still only from a subset of the breeding season.

I investigated the breeding of an interior forest, long distance migrant bird, the Acadian Flycatcher (*Empidonax vireescens*), in Mid-Missouri to test whether seasonal fecundity is sufficiently high to support viable populations. I evaluated if the inclusion of the late season nests enabled these populations to have higher seasonal fecundity than predicted from a standard field season. However, seasonal fecundity can be difficult data to collect, so I also developed three individual-based models to predict seasonal fecundity, and compared the results of these models with the field data. I also looked at whether a re-nest attempt was influenced by the fate of the previous nest attempt.

I found that 89% of females successfully raised at least one brood and 28% of females successfully raised two broods. Acadian Flycatcher females produced at least 37% more female offspring than the standard models predicted. This results in a population that is nearly stable, as opposed to our current perception that they are a population sink.

The individual-based model that most successfully predicted empirically-derived seasonal fecundity included temporal variation in rates of daily nest survival. This underscores the importance of getting complete data from the entire breeding season, as the model that simply used a point estimate to determine rates of daily nest survival did not perform as well. All three individual-based models predicted observed seasonal fecundity with higher accuracy than any previous individual-based model.

After a failed nest attempt, birds built their next nest higher and further away than after a successful nest attempt. A nesting attempt was also slightly more likely to succeed, though this change was not significant.

This study only looked at the Acadian Flycatcher but the benefits of re-nesting late into the season should apply to other Mid Missouri long distance migrants as well. The

individual-based model can also be adapted to other species and can help us better understand their demography. It is important to note that not all species nest into September. Many cease breeding in July and therefore it is not safe to assume that seasonal fecundity is underestimated for all migrant songbirds. It is critical that large tract of contiguous forests remain.