The Neighbourhood Watch: Does the promixity to neighbours influence nest success in Tree Swallows (*Tachycineta bicolor*)?

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Introduction

Tree Swallows and Mountain Bluebirds are directly competitors for secondary cavity nests. Once nests have been established, the birds remain in close proximity to one another but the majority of competition ceases.

There are a few competing hypotheses to explain the effect of neighbours on reproductive success.

The theory of **reciprocity** suggests that neighbours will aid each other in tasks, such as nest defense, when all neighbours mutually participate, thereby mutually increasing reproductive success [3, 4]. Neighbours also improve nest defense through alarm call **eavesdropping.** [5].

Density-dependent competition, behavioural interference, and the "**Dear Enemy**" theory suggests that an increase in neighbours will decrease reproductive success [1, 2, 6].

The goal of this study is to understand the relationship between Tree Swallow and Mountain Bluebird neighbours and reproductive success by looking at which factors may have a greater influence.

Methods

Collaborated with Kamloops Naturalist to monitor nesting behaviour at over 11 sites in Kamloops, BC from 2012 to 2019.

Recorded the number of eggs, nestlings, and fledglings for each Tree Swallow and Mountain Bluebird nest to determine nest success.

Determined the distance between nests using a GPS distance matrix to evaluate neighbour relationships.

Analyzed the relationship between con- and heterospecific neighbors on Tree Swallow nest success using negative binomial generalized mixed effects models.

Questions

1. Does the proximity to neighbours affect the reproductive success of Tree Swallows?
2. If so, do conspecific or heterospecific neighbours have a greater effect on Tree Swallow reproductive success?

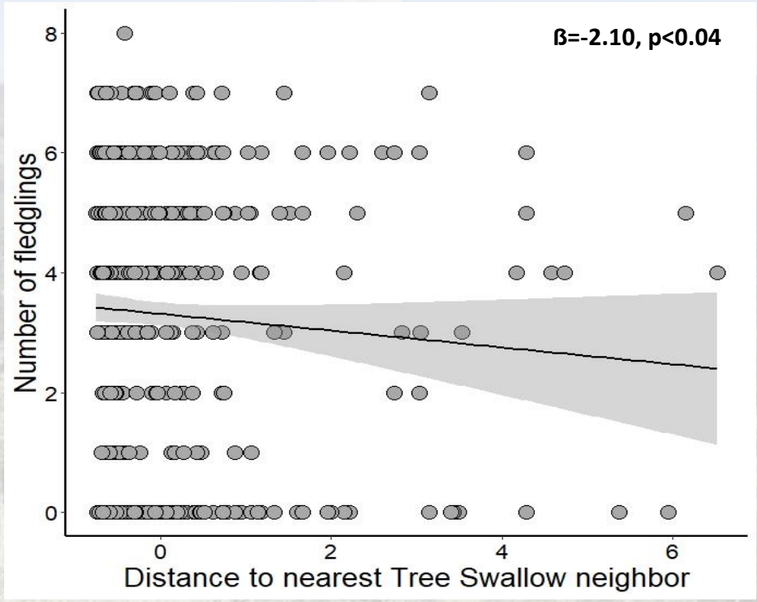

Figure 1. Tree Swallow nests that were in closer proximity to a conspecific neighbour had significantly more nestlings than those with a conspecific neighbour farther away (n=631)

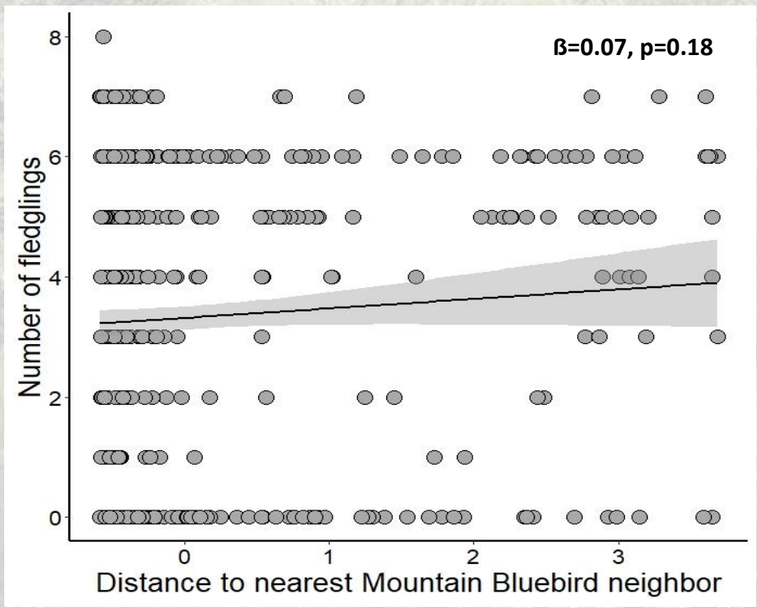

Figure 2. Tree Swallow nests that were in farther proximity to a heterospecific neighbour (i.e., Mountain Bluebird) had more fledglings. Although, this trend is much less significant (n=631).

Discussion

1. Proximity to neighbours affects Tree Swallow reproductive success

Neighbours had a varying effect on the number of nestlings, fledglings, and proportion of nestlings to fledge the nest.

Neighbours had no effect on the number of eggs.

2. Conspecific neighbours have a greater effect than heterospecific neighbours

More swallow **nestlings** in the nest boxes in closer proximity to conspecific neighbours (**nearest swallow neighbour**: ß=-2.10, p<0.04; Figure 1)

More swallow **nestlings** in nest boxes with more swallows in the area (**swallows within 1000m**: ß=-1.94, p<0.06).

Swallow nests with fewer conspecifics in the immediate area contained more **fledglings** (**swallows within 250m**: ß=-2.00, p<0.05)

Swallow nests with more conspecifics in the surrounding distant area contained more **fledglings** (**swallows within 1000m**: ß=1.70, p<0.09)

Swallow nests in further proximity to a heterospecific neighbour contained a higher **proportion of nestlings** that fledged the nest (**nearest bluebird neighbour**: ß=1.71, p<0.09)

Works Cited

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