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Sink or ecological trap for tree swallows in Central Minnesota?

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Predicting Desirable Nesting Factors in *Tachycineta bicolor*

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Introduction

When shopping for a home, humans evaluate certain criteria before buying—neighborhood, size, etc. Animals do the same. When offered two locations, either a high-quality or low-quality habitat, the healthiest individuals typically occupy high-quality locations.¹ Remaining low-quality habitat, or “sink”, is left for the least fit. An exception to this theme occurs when fit individuals show preference for low-quality habitat, in which case, the highly desired low-quality habitat functions as an ecological trap.^{2, 3}

Study Area

Tree Swallow (*Tachycineta bicolor*) populations nesting in Saint John's Abbey Arboretum (SJ) and Wildwood County Park (WW) were selected. Both sites are found transition zone between two biomes, best characterized as a mixture of wetlands, prairie, and woodlands. Nest boxes and their occupants were monitored seasonally for three years.

Methods

Nest box and habitat edge characteristics were examined to define location differences (Fig. 1). Maternal health and vocal aggression were used to evaluate relative fitness of the two populations. Data were analyzed using Binomial Logistic Regression.

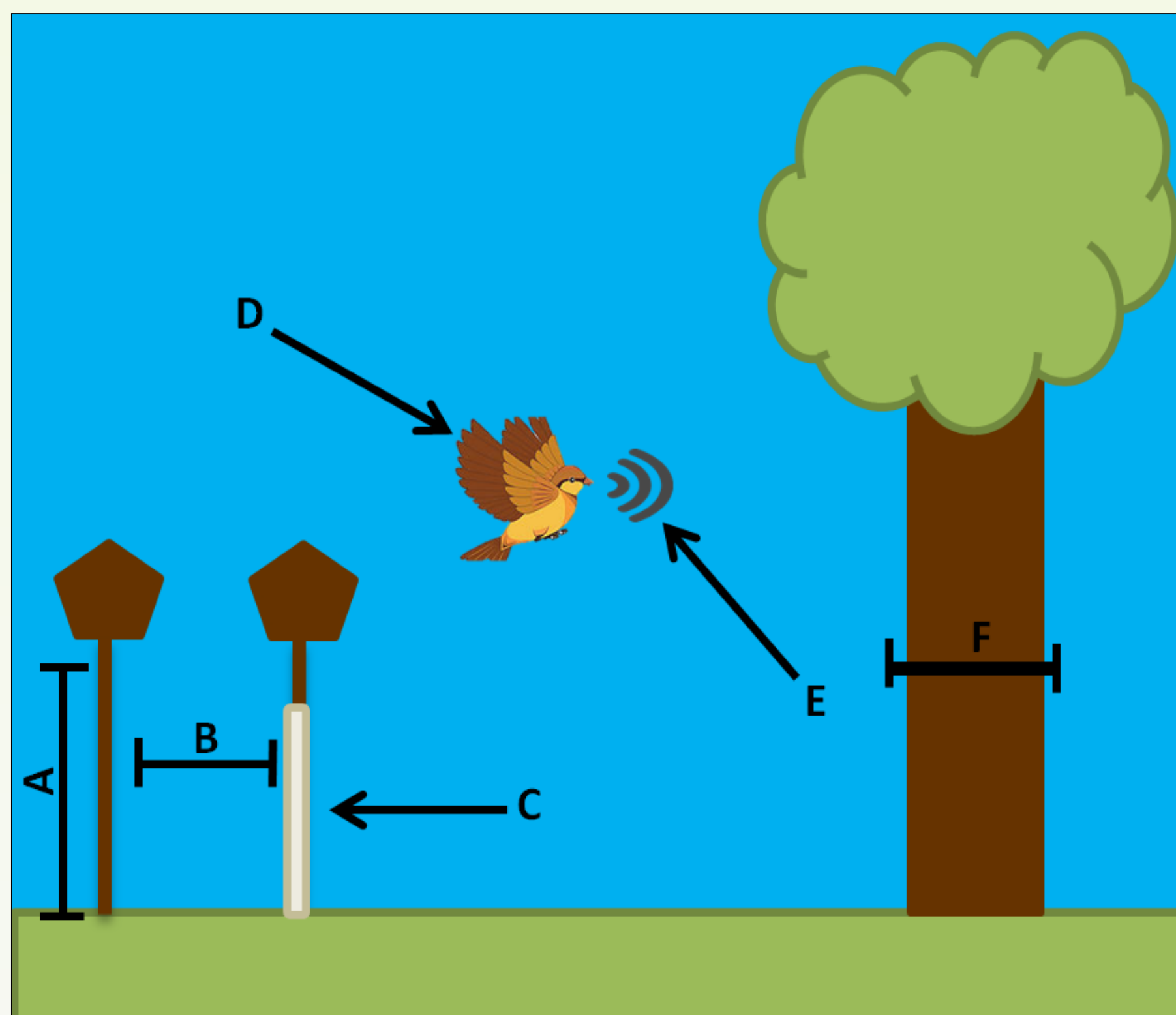


Figure 1. Location Characteristics. (A) height from ground. (B) distance to nearest box. (C) predator guard presence. (D) maternal health.* (E) vocal aggression.** (F) diameter at breast height of largest woody stem in random habitat edge sample.

*Maternal condition index determined: (interaction term of mass regressed on condition residuals (x) feather . mite s) Healthier birds have higher indices
**Averaged aggressiveness of 1st vocal. Most aggressive vocalization (tick call) was ranked highest.

Results

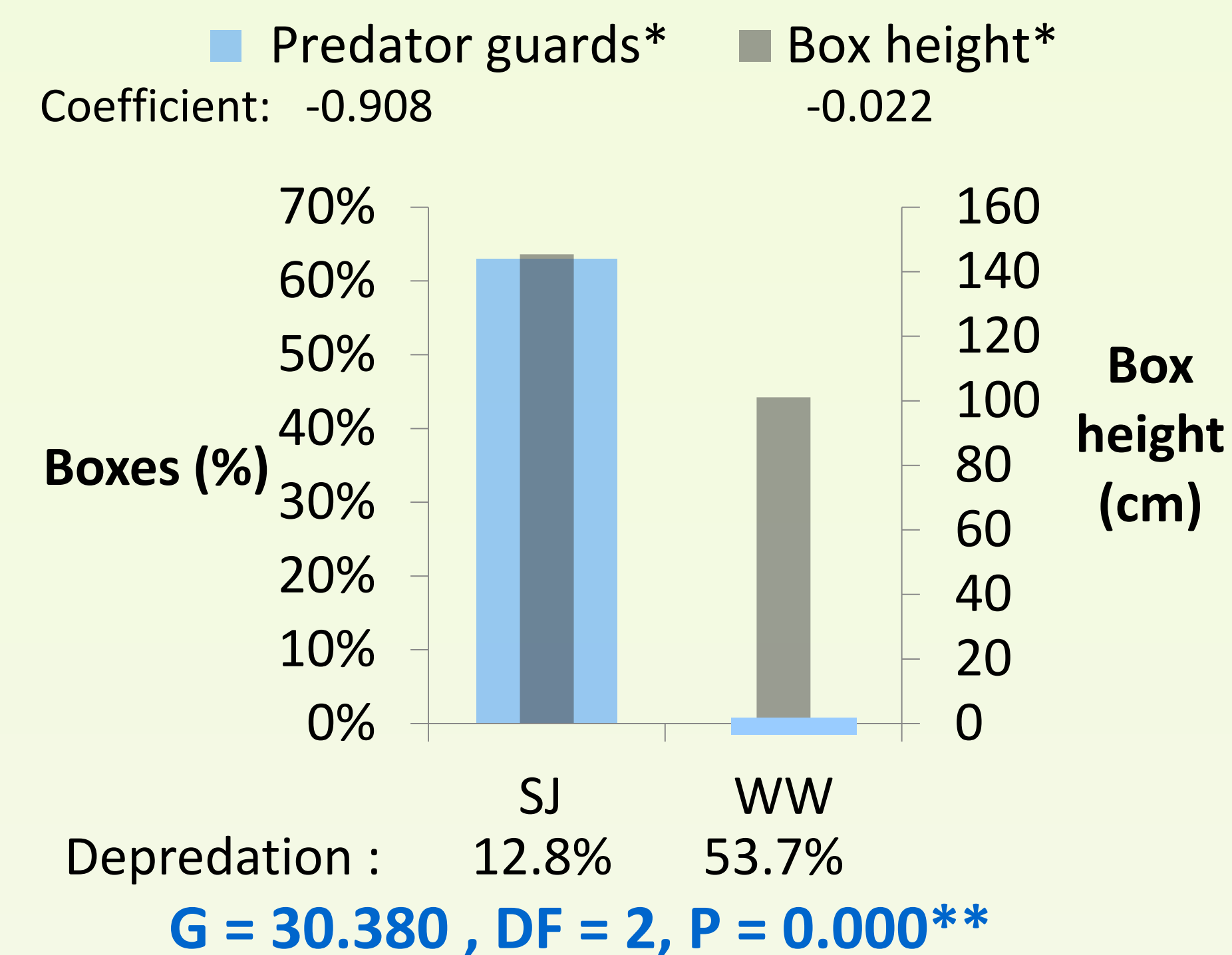


Figure 2. Significant predictors of depredation .

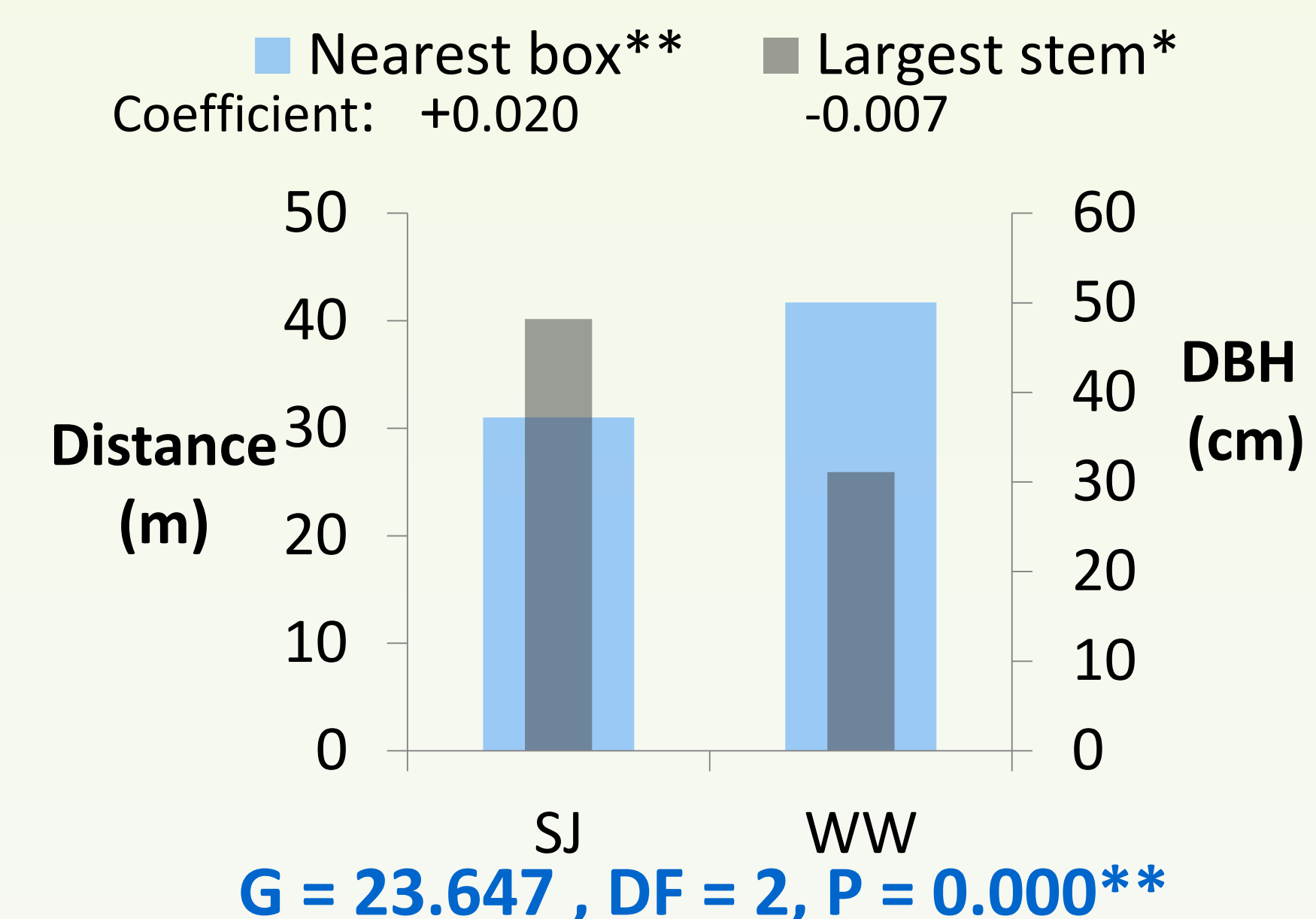


Figure 3. Significant predictors of *T. bicolor* occupancy.

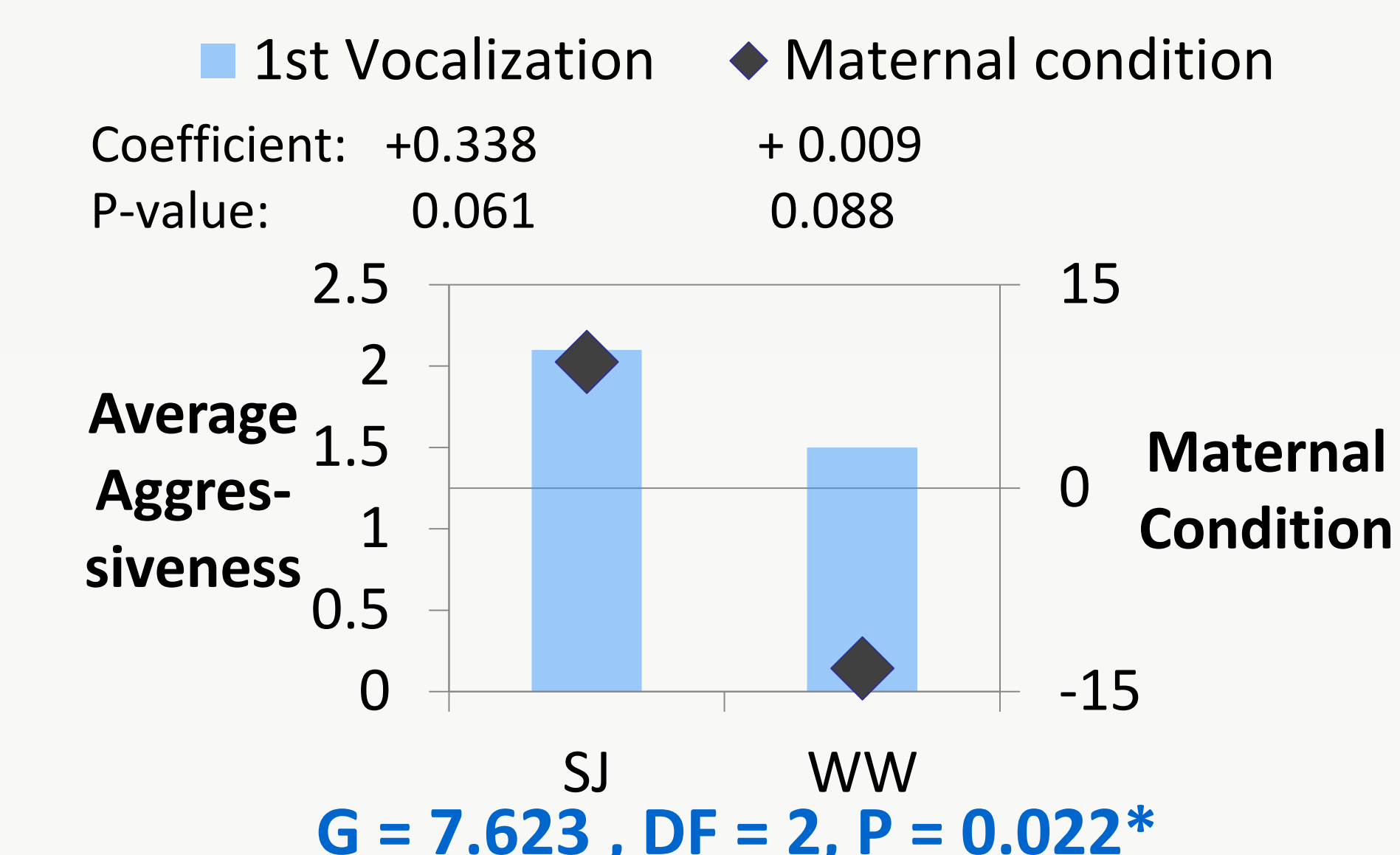


Figure 4. Maternal *T. bicolor* characteristics.

*Significance at $\alpha = 0.05$
**Significance at $\alpha = 0.01$

Conclusion

- Nest boxes lacking predator guards and those close to the ground were likely to be depredated.
- Tree Swallows favored nesting sites where nest boxes are spread apart and have younger woods.
- Maternal health and temperament had an effect on nesting site selection. A larger sample size is needed or an unidentified variable might be missing.

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