

Understanding the role of Western Bluebirds & Tree Swallows in Winegrape Vineyards



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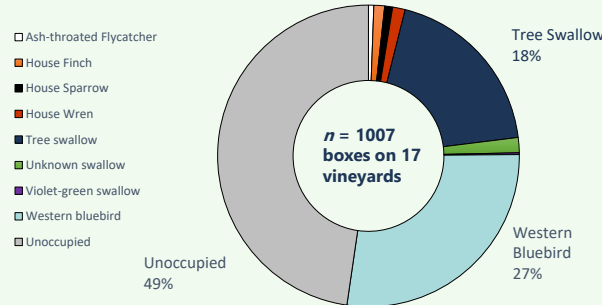
Collaborating Vineyards:
Grigich Hills Tres Sabores Joseph Phelps Honig Constellation
Chappallet Raymond Spring Mountain Matthiasson Hyde Schramsberg
To Kalon Inglenook Cain Napa Valley Reserve Hall

Background

Nest boxes for bluebirds & swallows are common in Napa Valley's vineyards, but whether these birds can actually help reduce insect pests remains uncertain.

Our project aims to determine:

- How farmers can optimize nest box use by birds on their vineyards
- Which insects the birds eat
- If the addition of nest boxes attracts birds & reduces pests



Bluebirds preferred nest boxes that:

- Had predator guards
- Had intermediate hole sizes (40-45 mm)
- With little riparian & other woodland nearby

Swallows preferred nest boxes that:

- Had predator guards
- Were mounted on their own poles @ end of rows
- Were close to farm roads
- With little riparian nearby

Both species prefer "open country" and appeared to select boxes to minimize predation risk.

Summary

1st Question

Which nest box attributes & local habitat conditions do bluebirds & swallows select?

3-min video about our work in Napa!

Interactive map of some tracked birds!

Methods

- Record bird occupancy (yes/no), by species
- Measure nest box attributes
 - Pole height & type
 - Box width, height, depth
 - Hole size
 - Hole northness
 - Position in vineyard
 - Presence/absence predator guard
- Measure habitat
 - Cover crop
 - Distance to tree, perch, powerline
 - Position in vineyard
 - Canopy cover
 - % cover w/ 50 m of:
 - Vineyard
 - Road
 - Grassland
 - Riparian
 - Shrub
 - Other woodland
- Statistical analysis
 - Generalized linear mixed effect models
 - Occupancy (0/1) ~ nest box attributes + habitat predictors
 - Vineyard as random effect
 - Evaluate models and predictors with AICc and 95% confidence intervals on coefficients
 - Examine model performance with ROC curves and % correct classification

Results

Future work will examine the prospecting behavior of bluebirds. Do they use social cues to select nest boxes? with **Fatime Jomaa Humboldt**

Test prediction that bluebirds will visit and occupy nests with experimentally enhanced social information (nestling begging calls) more than control nests

Which pests do the birds eat? Do they also eat any natural enemies?

Fecal samples from birds → DNA → Barcode

Blue-green sharpshooter, Three-cornered alfalfa hopper, Green lacewing, Western grape leafhopper

with **Erin Wilson-Rankin UC Riverside**

Does the addition of nest boxes increase birds & decrease pests?

Survey birds & insects on 20 vineyards before & after addition of nest boxes to 10 of them. *BACI-design experiment*

2023 vs 2024

with **Eleanor MacDonald Humboldt & S. Houston Wilson UC Riverside**

How do farm habitat complexity & landscape heterogeneity affect birds and the potential top-down ecosystem services they provide?

Use GPS trackers and avian point counts to examine bird behavioral & community-level responses to habitat.

with **Cody Pham & Danny Karp UC Davis**

Next Questions