# Understanding Bird and Nut Tree Crop Interactions in the Central Valley of California

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## PROJECT SUMMARY

### Objectives for current year:

- Assess and summarize the body of knowledge on how nut tree crops, and specifically almonds, provide habitat to birds.
- Estimate the beneficial services provided by birds to almond orchards including pest management.
- Describe the potential damage by birds to almond orchards including nut consumption and food safety concerns.
- Based on identified need, design a field study to assess bird use of almond orchards in California's Central Valley. This study may address agronomic benefits of bird use and assess food safety risks.
- Identify priority regions for conservation and sustainability efforts of the Almond Board based on Audubon's Important Bird Area designation.

### Background & Discussion:

Almonds are an economically important crop in Mediterranean regions across the world; 99% of U.S. almonds are gown in California's Central Valley. The Central Valley is a year round home and a major destination along the pacific flyway for multiple bird species during all seasons (CVJV 2006). Understanding the trade-offs of bird and almond interactions will help inform sustainability efforts on almond orchards in California and potentially beyond.

Cultivated almond orchards throughout the world are occupied by birds during all seasons. Almond orchards and individual trees provide structural resources for nesting, roosting, perching, and cover from weather and predators. They are utilized during short and long distance migrations and dispersal, and contribute to avian diets. There are approximately 30 research studies that have directly or indirectly examined avian occupancy and habitat use in almonds.

The only published empirical examples of avian pest reduction services in almonds are those which quantify the bird consumption of mummy nuts, which can harbor the naval orangeworm and increased infestations of *asperigillus* mold and fungal pathogens. Though there are no published examples of birds as natural enemies of many other almond pests, there is a growing set of examples of birds reducing similar pest groups in other perennial tree crops.

The literature on bird damage to almond crops inconsistently reports damage inflicted by bird species, groups, or vertebrates (typically birds and rodents combined) and often lacks the pest species resolution necessary for the development of damage thresholds and a precise balancing of tradeoffs for individual growers.

Nut products have not historically been associated with high risk of foodborne illnesses in humans. Pathogenic *Salmonella* and *Escherichia coli* (E. coli) pose a risk yet birds have not yet been directly implicated in outbreaks involving almonds or other crops.

A study design for a field research project to address knowledge gaps as identified in this literature review is under development.

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**Project Cooperators and Personnel:** Sacha Heath, University of California, Davis

**For More Details, Visit**

- Poster location 54, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2017) at Almonds.com/ResearchDatabase
- 2015 - 2016 Annual Reports CD (15-STEWCROP6-Audubon); or on the web (after January 2017) at Almonds.com/ResearchDatabase