Supporting Integrated Honey Bee Pollination in Orchards through Increased Forage

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PROJECT SUMMARY

Objectives for current year:

This study has four primary research objectives related to supporting bee forage to achieve high quality pollination of almond.

- Assess the performance of flowering plant mixes including their establishment, multi-season persistence and bloom timing in northern, central and southern regions of almond production.
- Quantify *honey bee* use of the flower plantings.
- Quantify potential competition between forage plantings and almond orchards for pollinator visits through monitoring visitation rates of *honey bees* and *wild bees* to blooming almond orchards with and without plantings.
- Coordinate with other research teams collecting hive health data, to integrate results from multiple projects.

Background and Discussion:

Almond pollination relies on healthy honeybees. Recent research also suggests that wild bees may increase the pollination effectiveness of honey bees through synergistic interactions that cause honey bees to move more frequently between varieties (Brittain et al. 2013). Bee keepers and researchers have identified lack of diverse nutrient sources as a primary threat to honey bees and wild bees alike. Although almond pollen and nectar are important resources, alternative pollen and nectar sources immediately preceding and following the bloom of almond will likely benefit honey bee health through increased nutritional diversity. These same forage resources can also help bolster wild bee populations. Wildflower habitat plantings are increasingly used to boost forage for honey bees and with informed selection of plant species. The same flower mixtures designed to support honey bee nutrition can also extend forage resources for wild bee populations within the landscapes.

Our preliminary trials in the southern and central growing region, compared the plant performance of native wildflowers and Project Apis m. mustard mixes and assessed bee visitation to them before during and after bloom. All mixes grew well and were used by honey bees and wild bee species. Despite overlap with flowering of the neighboring almond orchard, flower mixes of the size tested (~1 acre) did not reduce bee visitation to the orchard. Although strong progress has been made in central and southern regions, little testing has occurred in northern regions, other than with Project Apis m. mixes.

In the coming season we will extend studies to include sites in the northern part of the growing region (Colusa County) where we will monitor establishment, species- specific bloom timing of flower mixes. These will be compared to ongoing trials of plantings in the central (Modesto) and southern (Lost Hills) regions. To independently assess potential competitive impacts between orchards and different types of flower mix, we will compare wildflower sites with separate ongoing Project Apis m. mustard sites in the different regions. At all of these sites we will simultaneously monitor honey bee and wild bee visitation to almond orchards and flower plantings throughout the orchard bloom period.

This research will be coordinated with other research teams assessing pollen use and colony health of managed honey bee hives in each location.

Project Cooperators and Personnel: Kimiora Ward, UC Davis; Gordon Wardell, Wonderful Orchards, Thomas Robinson, AgPollen, Christi Heinz, Project Apis m

For More Details, Visit

- Poster location 1, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2016) at Almonds.com/ResearchDatabase
- Related projects: 15-POLL14-McFrederick/Meikle/Carroll; 15-POLL15-Sagili; 13-POLL1-DeGrandi-Hoffman