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Longitudinal Evaluation of Honey Bee Colonies on Different Forage Regimes

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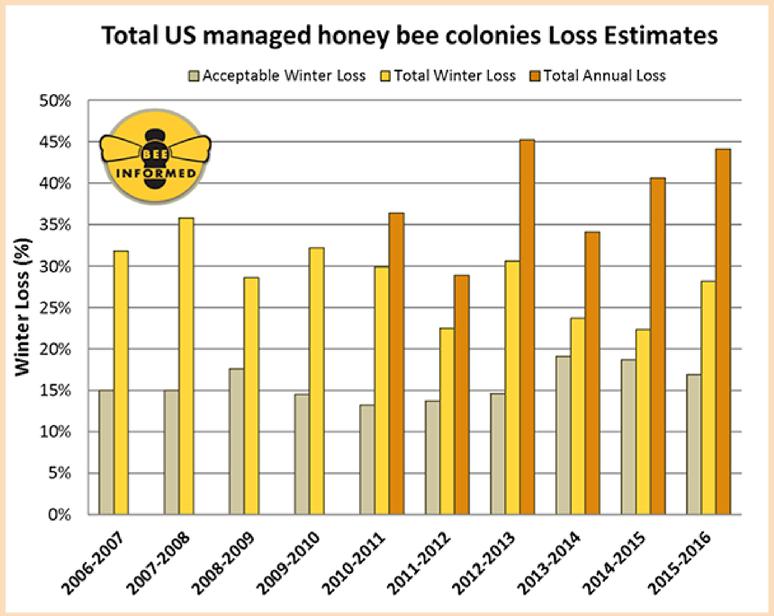
ABSTRACT

Agricultural pollination of almonds and many other fruits, nuts and vegetables is highly dependent on commercial honey bee colonies. However, annual honey bee colony losses of approximately 45% have been reported by beekeepers. Honey bees are affected by many different biotic and abiotic factors including pests (such as varroa mites), pathogens (e.g., viruses), pesticides, as well as lack of access to proper nutrition. Studies thus far have demonstrated that honey bee health can be improved by providing better nutrition. Adult workers exhibit longer survival and better immune response when fed protein and multisource pollen. In our study we will evaluate both short- and long-term potential benefits of supplemental forage in almond orchards. Moreover, we will determine whether rapini or wildflower forage confer different benefits to honey bee colony health and survival. Improving honey bee health via supplemental floral provisions could not only improve colony survival but could also have economic benefits for all.

Honey Bee Colony Losses



Winter and annual losses for the past ten years as reported by the US backyard, sideliner and commercial beekeepers (Bee Informed Partnership 2016).

- **Annual honey bee losses have reached 45% in the past few years.**
- **Losses are due to a variety of factors some of which could potentially be rectified via access to better nutrition in agricultural settings during pollination cycle.**
- **Studies thus far have shown that workers provisioned with abundant, high-quality pollen were better able to withstand exposure to pesticides (Wahl and Ulm 1983; Schmehl et al. 2014).**
- **Polyfloral diet can also improve bee immunocompetence (Alaux et al. 2010), as well as mitigate the effects of parasites (Di Pasquale et al. 2013).**

Materials and Methods

- **Prior to predicted almond bloom in 2017 we will place honey bee colonies at each of the experimental and control locations.**
- **Two colonies each will be placed at four sites per location for a total of eight colonies per treatment (rapini and matching control sites, and wildflower and matching control sites)**
- **Colonies will be tracked for growth and strength (colony weight, adult worker population, brood area), as well as for varroa mite infestation, viral loads and pollen type collected.**
- **Upon end of almond bloom colonies will be moved to a common location, managed per standard beekeeping practices and tracked for colony growth, health and survival.**

During the experiment, colonies will be tracked for growth and strength. Increased colony size and larger worker population have been found to increase colony annual survival (Doke et al. personal communication).

Providing additional forage to colonies before, during and after almond bloom might help improve their ability to withstand various maladies including what beekeepers consider the current #1 pest – the varroa mite.

Project Apis m.

california almonds Almond Board of California