

Honey Bee Stock Improvement Program: Importation, Preservation, and Utilization of Honey Bee Germplasm

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PROJECT SUMMARY

Objectives:

- Continue collection of germplasm from endemic populations of Old World honey bees and importation into the US.
- Implement cryopreservation of collected honey bee germplasm and existing “top-tier” US genetic lines for both immediate and long term breeding use.
- Continue a selective breeding program to evaluate and improve honey bee stocks suitable for Almond pollination under US conditions, concurrently screening for resistance to pests and diseases.
- Continue to cooperate with the California Queen Producers and the Tech Transfer program to improve and disseminate honey bee genetics and stocks.

Background and Discussion:

Recent declines in honey bee populations and the difficulties in reliably maintaining colony health are of concern to both beekeepers and crops needing pollination services. Amid widespread research directed to honey bee health issues, there remains a notable lack of research directed toward genetic improvement of honey bees.

There is a strong queen production industry in the US, but queen producers have limited access to novel genetic diversity. There has been very limited additional introduction of honey bee genetic material in the 93 years following the passage of the 1922 Honey Bee Act. The most sustainable means to allow germplasm entry to the US is through collection of honey bee semen under permit and use of instrumental insemination for propagation of the genetic material.

From 2011 to 2015, we have collected honey bee semen both for immediate use in the breeding program and for cryopreservation. We maintain and screen stocks within our USDA-APHIS approved quarantine apiary at Washington State University. We continue to work with California cooperators (bee breeders and the Tech Transfer Team) to facilitate industry access to and utilization of the new germplasm. With cryopreservation, semen can be stored and used over a matter of weeks, months or years via artificial insemination of queens. An increasingly important use for cryopreservation is to conserve and sustain existing “top tier” honey bee stocks currently available in the US.

Importation of germplasm from subspecies of European honey bees will continue. This includes semen from: *Apis mellifera carnica* (Slovenia); *Apis m. ligustica* (Italy); and *Apis m. caucasica* (Republic of Georgia). In 2015, we collected semen of the Tien Shan Mountain honey bee (*Apis m. pomonella*) US queens were inseminated with the imported germplasm and then moved into our overwintering apiaries for evaluation. Both Carniolan and Caucasian honey bee stocks from the program were provided to California queen producers in 2014-2015 and are now widely available to US beekeepers. As part of our existing “top-tier” lines program, we arranged to collect and cryopreserve semen from collaborating US commercial queen producers in 2015. We are currently working with the National Center for Germplasm Resources Preservation, the USDA, California pollinators and queen producers to establish a “species group” for the honey bee to set priorities and procedures for germplasm distribution. In summary, funding provided by the Almond Board has been instrumental in acquiring the honey bee genetic resources needed for both current and future breeding efforts.

Project Cooperators and Personnel: Dr. Brandon Hopkins, Washington State University

For More Details, Visit

- Poster location 5, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2016) at Almonds.com/ResearchDatabase
- 2014 - 2015 Annual Reports CD (14-POLL7-Sheppard); or on the web (after January 2016) at Almonds.com/ResearchDatabase
- Related project: 15-POLL5-Sagili/vanEngelsdorp