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 European honey bees and import into the US.
- Implement cryopreservation of all collected honey bee germplasm for both immediate and long term breeding use.
- Continue a selective breeding program to evaluate and improve introduced stocks and hybrids under US conditions, screening especially for resistance to pests and diseases.
- Continue to cooperate with the California Queen Producers and the Tech Transfer program to improve honey bee genetics and stocks (13-POLL5-Spivak).

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, including Colony Collapse Disorder (CCD), 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 these producers continue to have limited access to novel genetic diversity. There has been little effort to introduce additional honey bee genetic material for over 90 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 subsequent propagation of the genetic material.

In 2011-2013, we collected honey bee semen for both immediate use in the breeding program and for cryopreservation. We maintained and screened stocks within our USDA-APHIS approved quarantine apiary at Washington State University. We will 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 preserved, stored, and used over a matter of weeks, months or years via artificial insemination of queens. In addition to imported germplasm, one of the proposed uses for cryopreservation will be to conserve and sustain existing “top tier” honey bee stocks currently available in the US.

Importation of germplasm from three subspecies of endemic Old World 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 2012 and 2013, we collected both fresh and cryopreserved semen from the Italian honey bee, *Apis m. ligustica.* Queens were inseminated with the imported germplasm and then moved into our overwintering apiaries for evaluation. Future germplasm collections will continue to follow quarantine protocols (including virus screening) and will be preserved and used for breeding in a program coordinated among WSU and collaborating commercial queen producers. Lines developed will be evaluated in Washington and California.

Project Cooperators and Personnel: Marla Spivak, University of Minnesota; Elizabeth Frost, Tech Team–Butte County; Judy Chen, USDA – Beltsville, MD; Brandon Hopkins, Washington State University

For More Details, Visit

- Poster location 4, Exhibit Hall A and B during conference; or on the web (after January 2014) at www.almondboard.com/researchreports
- 2012.2013 Annual Report CD (12-POLL7-Sheppard); or on the web (after January 2014) at www.almondboard.com/researchreports
- Related Project: 13-POLL5-Spivak