

Honey Bee Stock Improvement Program

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PROJECT SUMMARY

Objectives:

- Continue to develop and test technologies and protocols for the international exchange of honey bee germplasm.
- Continue to enhance U.S. commercial honey bee breeding stocks and genetic diversity by importing stocks from Europe.
- Study the relationships between breeder queens and their embryos pathogen status as a basis for developing a protocol for safe importation of germplasm.
- Continue to provide technology transfer of the skills required for honey bee stock maintenance.

Background and Discussion:

California's production of almonds, as well as other key crops, requires pollination by a healthy and sustainable domestic beekeeping industry.

The impact of continuing dwindling colony numbers and the decreasing genetic diversity of the U.S. honey bee gene pool may limit the ability to select stocks expressing resistance to pests and diseases. As a result, there are various efforts under way to build up and strengthen domestic honey bee stocks.

This particular ongoing project focuses on promoting the diversification of the gene pool to enhance colony fitness and colony survival, and to reduce the adverse effects of pests and disease.

One of the project's aims is to develop a standardized protocol for the international exchange of honey bee germplasm, to provide

U.S. beekeepers with access to imported European stocks to enhance their breeding stocks.

Our goal is to facilitate the hybridization of domestic and foreign stocks and to assist in the selection of breeding stocks that are well adapted to U.S. beekeeping conditions and have an increased level of resistance to pests and disease.

Using the protocols developed, honey bee semen from 3 subspecies of European honey bees have been imported. These have been crossed with domestic breeding stocks and propagated. This includes the reestablishment of *Apis mellifera caucasica*, not currently recognizable in the U.S., until now.

One key factor in the protocol development is the incorporation of technologies to minimize the risk of transmission of pathogens, especially viruses.

Another essential aspect of the project is ongoing technology transfer support and the dissemination of information on stock selection, maintenance and improvement. Currently this project is working with members of the California Bee Breeders Association to develop a distribution and long term stock maintenance program. This aspect is partnered with the project led by Dr. Marla Spivak with Steve Sheppard. We are also conducting short courses on queen rearing and artificial insemination at UC Davis and have expanded these to include classes in Washington State.

Project Cooperators and Personnel: Steve Sheppard and Brandon Hopkins, Washington State University; Michelle Flenniken, University of California, San Francisco; Judy Chen, USDA-ARS, Beltsville, MD; Marla Spivak, University of Minnesota; Katie Lee, UCCE Butte County; Elizabeth Frost and Tylan Selby, UC Davis.

For More Details, Visit

- Poster location 47, Pollination Pavilion, Session 3; or on the web (after January 2012) at AlmondBoard.com/AICposters
- 2010 - 2011 Annual Report CD (10-POLL4-Cobey); or on the web (after January 2012) at AlmondBoard.com/ResearchReports
- Related Projects: 11-POLL5-Spivak/Donohue; 11-POLL7-Sheppard