
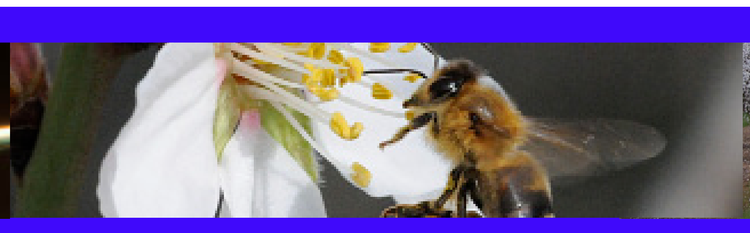
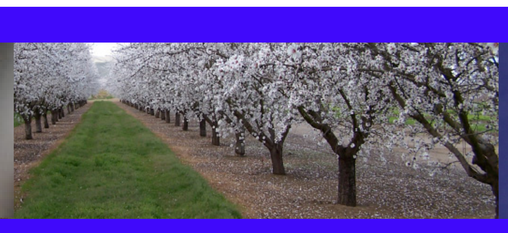
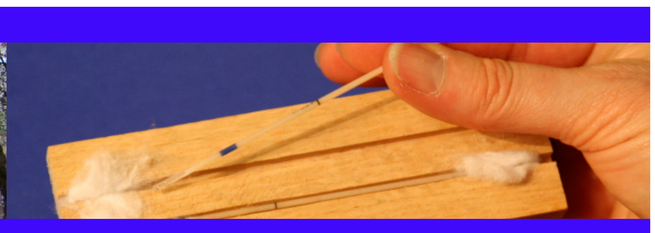

Honey Bee Stock Improvement Program

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Project Cooperators

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Objectives

- **Develop and test protocols for the international exchange of honey bee germplasm.**
- **Enhance domestic honey bee breeding stocks and genetic diversity through importation of honey bee germplasm from Europe.**
- **Technology transfer of skills required for honey bee stock improvement.**

Background

A healthy and sustainable honey bee industry is essential to provide pollination for California almonds and other key crops. The continuing annual loss of about 30% of colonies is concerning (vanEnglesdorp et. al. 2010). The resource limitation of the U.S honey bee gene pool may inhibit the ability to select for resistance to Varroa and other pests and diseases.

Genetic diversity of breeding populations, and intra-colony diversity has clearly been shown to enhance colony fitness, survival, and to reduce the severity of honey bee pests and diseases (Mattila & Seeley, 2007 and Seeley & Tarpy, 2007). Historically, U.S. beekeepers have not had access to long-range breeding programs as is common for other economically important non-native livestock species. These programs depend upon routine and systematic importation of genetic material from within the original ranges of the species.

Project Summary

Our on-going cooperative project has developed and tested protocol for the international exchange of honey bee germplasm and gained access to European bee breeding programs. We have successfully imported honey bee semen of three subspecies from Europe and incorporated these stocks into domestic commercial bee breeding programs. An essential aspect of this program is working closely with the California queen producers to evaluate and maintain these stocks.

Apiary in Mestia, Rep. of Georgia, Collecting Drones of A.m. caucasica

Roadside Apiary, Rep.of Georgia

Importation of Honey Bee Germplasm

Our USDA-APHIS (U.S. Dept. of Agriculture -Animal Plant Health Inspection Service) permit to import honey bee semen was renewed for an additional three years, 2011-2013. This summer S. Cobey, W. Sheppard and B. Hopkins traveled to Europe and collected bee semen of Apis mellifera carnica from three regions in Slovenia and semen of Apis mellifera caucasica from three regions in the Republic of Georgia.

Trailer of Traditional Colonies in Slovenia

Inside a Slovenian Bee House, Looking for Drones

The fresh imported semen was instrumentally inseminated to Carniolan and Caucasian virgin queens. These queens were reared from proven domestic stocks and from progeny of the previous European importations. Queens inseminated with the imported semen have been released from the USDA-APHIS quarantine station in WA and have been established in colonies in WA and CA for spring propagation. With the introduction of A. m. caucasica, we plan re-establish this winter hardy subspecies known for its use of propolis. Propolis has antimicrobial properties that reduce the impact of pathogens and quiet the honey bee immune system (Simone-Finstrom & Spivak, 2010).

Traditional Smoker in Slovenia, attests to the gentle temperament of the bees.

Stock Evaluation & Maintenance Program

Our goal is to enhance the honey bee gene pool through the safe international exchange of honey bee germplasm. An essential aspect includes the establishment of a practical and long term stock maintenance program with the US honey bee queen producers. In cooperation with the California Bee Breeders Association, we are evaluating, selecting and maintaining various lines of domestic x imported stocks. The evaluation process is on-going to determine the productivity, prevalence of pests and diseases and value of the various stocks to the beekeeping industry. Cooperating queen producers are selecting colonies to be used as breeding material and will be responsible for the large-scale production and distribution of queens to beekeepers nationwide.

Collecting Semen of A.m. carnica in Slovenia

Specialized Beekeeping Short Courses

To enhance the skills required to develop and maintain honey bee stocks, we continue to offer and have increased the number of specialized beekeeping short courses in queen rearing and instrumental insemination. This year, due to overwhelming demand, we held 4 classes at UCD and 2 classes at WSU.

Queen Rearing Class at UCD. Pulling brood to set up cell builders.

Literature Cited

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