# Importation and Preservation of Germplasm for U.S. Honey Bee Breeding and Stock Improvement

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## PROJECT SUMMARY

### Objectives for current year:

- Continue collection of germplasm from endemic populations of European honey bees and import them 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 ongoing honey bee stock improvement at UCD (11-POLL4-Cobey) and the tech transfer program to improve honey bee genetics and stocks (11-POLL5-Spivak/Donohue).

- **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 almost 90 years following the passage of the 1922 Honey Bee Act. In addition, the arrival of Varroa mites to the US caused major decline in feral European honey bee populations

The most practical means of allowing germplasm entry to US is through collection of honey bee semen under permit and using instrumental insemination for subsequent propagation and screening of the genetic material

Recent success of this laboratory in developing cryopreservation of bee semen along with the establishment of a USDA-APHIS approved quarantine apiary at Washington State University for germplasm introduction and collaboration with California cooperators (UC Davis honey bee program and the Tech-Transfer Team) provides new opportunities. Strides can now be made to collect, import, preserve and utilize desirable honey bee germplasm. With cryopreservation, the semen can be preserved, stored and used over a matter of weeks, months or years via artificial insemination of queens.

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 *A. m. caucasica* (Republic of Georgia). Currently, cryopreserved semen from a 2011 collection of *Apis m. carnica* and *A. m. caucasica* is being maintained. 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, UCD and collaborating commercial queen producers. Lines developed will be evaluated in Washington and California.

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**Project Cooperators and Personnel:** Sue Cobey, UC Davis; Marla Spivak, University of Minnesota; Katie Lee, UCCE - Butte County; Judy Chen, USDA – Beltsville, MD; Brandon Hopkins, Washington State University

**For More Details, Visit**

- Poster location 46, Pollination Pavilion, Session 3; or on the web (after January 2012) at AlmondBoard.com/AICposters
- 2010 - 2011 Annual Report CD (10-POLL7-Sheppard); or on the web (after January 2012) at AlmondBoard.com/ResearchReports
- Related Projects: 11-POLL4-Cobey; 11-POLL5-Spivak/Donohue