Improving Honey Bee Health

Coordinated Areawide Program Is Under Way

The world's food supply depends on pollination by bees. So anything that causes a significant loss of honey bees would severely limit the foods available to us.

For example, in California alone, the almond crop requires the service of 1.2 million bee colonies—about half of all U.S. honey bee colonies. Overall, pollination is responsible for about $15 billion in added crop value—particularly for nuts, berries, fruits, and vegetables.

Now it appears that bees nationwide have been stricken with a fast-spreading, deadly syndrome called "colony collapse disorder." Some beekeepers have lost one-half to two-thirds of their colonies. In response, scientists at ARS bee laboratories across the country are uniting to search for answers to the question, What's causing the disappearance of honey bees?

"This is obviously something that we're all concerned about," says Jeffery S. Pettis, research leader at ARS's Bee Research Laboratory in Beltsville, Maryland. Pettis has been named a coordinator of the newly established 5-year Areawide Program To Improve Honey Bee Health, Survivorship, and Pollination Availability.

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At the ARS Bee Research Lab in Beltsville, Maryland, research leader and entomologist Jeffery Pettis uses a grid to measure adult honey bee population as a means to assess the overall health of the bee colonies.

"At the end of the 5-year cycle we'll have specific recommendations that the beekeeper could use on how to manage bees more efficiently during long-range transport for pollination. We want to be able to transfer that technology to be useful by the end user," says John Adamczyk. He's the acting research leader for ARS's Honey Bee Research Unit in Weslaco, Texas, and heads ARS's Beneficial Insects Research Unit, also in Weslaco. Adamczyk and research leaders representing all four ARS honey bee research laboratories serve as co-coordinators of the new areawide program—the first that involves all the different components of all the federal bee labs to solve problems that affect bee management.

For beekeepers to continue meeting growers' pollination demands, research must solve problems caused by parasitic mites and other pests, diseases, and colony collapse disorder. This areawide approach will bring together recent improvements in mite-resistant bee stocks, nutrition, and pest- and disease-management in a comprehensive management strategy.

It builds on a pilot project in California, funded by ARS in 2006, that field-tested several artificial diets and two bee stocks in an effort to increase colony size for almond pollination. The study was a successful collaboration between the four ARS honey bee labs and the beekeeping industry—a collaboration now being expanded.

At the Honey Bee Breeding, Genetics, and Physiology Research Unit in Baton Rouge, Louisiana, research leader Thomas Rinderer and colleagues will look into bee stock improvement and evaluations, with a goal to improve early spring buildup using genetic selection and colony size. Researchers at Beltsville will try to improve the longevity of honey bee queens, improve controls for *Nosema* protozoa and *Varroa* mites, and reduce the amount of migratory colony stress.

In Tucson, Arizona, at the Carl Hayden Bee Research Center, led by research leader Gloria DeGrandi-Hoffman, scientists will study carbohydrate and protein supplements, Africanized bee stock improvements, and *Varroa* controls. In Weslaco, others will work on *Varroa* and *Nosema* controls, migratory stress reduction, and disease-control measures.

These ARS laboratories form the core of the new bee-focused areawide program that includes university partners, apiculturists, and many others.—By **Alfredo Flores,** ARS.

This research is part of Crop Production, an ARS national program (#305) described on the World Wide Web at www.nps.ars.usda.gov.

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