bee care

Improving and Protecting Honey Bee Health

Factors Affecting Honey Bee Health:

Because of the essential pollination services honey bees provide to agriculture, it is critical that honey bees are healthy so commercial apiculture remains viable to provide those services. Honey bee health is a complex issue and most scientists agree that bees are suffering, not from a single toxin or disease, but rather from a variety of factors.

In its recent comprehensive assessment on honey bee health, the United States Department of Agriculture (USDA) and Environmental Protection Agency (EPA) supported the now generally accepted concept that bees are suffering from a complex set of stressors. Principle among these is the devastation brought on by the parasitic mite, *Varroa destructor*, which the report states "remains the single most detrimental pest of honey bees, and is closely associated with overwintering colony declines."

Varroa Mite *(Varroa destructor)*:
Although a small number of colony losses are typically expected over the winter season, bee researchers, government extension agents, consultants, beekeepers and other bee experts have attributed higher overwintering losses to an increased presence of Varroa mite and associated viruses. Such was the case in the spring of 2013, as reports of high populations of Varroa mite in late summer and early autumn of 2012, coupled with widespread summer drought and cold winter weather conditions, made the high winter losses entirely predictable. Finding solutions to address the threat of Varroa mite will be an ongoing research focus of Bayer's North American Bee Care Center, which will open in early 2014.

Scientists are focused on the interaction of many environmental, in-hive and management factors, including:

- Parasites (Varroa and tracheal mites)
- Nutrition deficiencies
- Diseases (microsporidians; bacteria; viruses; fungi)
- Extreme weather and weather-related events
- Beekeeping practices
- Pesticides (for bee protection and crop protection)
- Genetic characteristics
- Queen issues (poor mating; effects of viruses and Nosema; nutrition; bee protection product effects)

Leader in Research:

Bayer understands the necessity for healthy bees as pollinators for food production. For 25 years, Bayer has been actively involved in finding solutions to improve honey bee health by developing products and services that promote bee health, including:

- Developing products to control parasitic mites in honey bee hives
- Developing technology to extract pesticide residues in beeswax
- Designing tests to assess safety of crop protection products to bees
- Fostering significant improvement in stewardship measures and best management practices

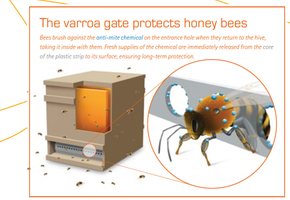
Bayer's two Bayer Bee Care Centers, one in Monheim, Germany and the other in Research Triangle Park, N.C. (to be completed by the beginning of 2014), will continue to further collaboration and research regarding the health of bees. The North American Center will feature:

- Full laboratory and research apiary;
- Honey extraction and workshop space;
- Interactive learning center; and
- Meeting, training and presentation facilities.

The objective of the Center is to conduct, stimulate and facilitate research projects directed toward bee health. Bayer's research priorities include:

- Honey bee Integrated Pest Management (IPM) including monitoring, thresholds, diagnosis and interpretation, tools and strategies
- Honey bee best management practices
- Healthy bees program (an integrated program relying on biological/temperature-based triggers for management, breaking life cycle of Varroa, forage and nutrition)
- *Varroa destructor* and Small Hive Beetle monitoring and management
- Testing and validating the process and benefits of purification of beeswax (pesticide residue removal) for reuse in hives
- Early warning and prediction systems (e.g. Sentinel hives program, remote monitoring systems, survival prediction analysis model)
- Honey bee (and pollinator) habitat and nutrition
- Screening new active ingredients for control of bee pests and pathogens particularly Varroa mite
- Developing an effective delivery system and resistance management approach for existing Varroa treatments through global development of "Varroagate" concept

Bayer's North American Bee Care Center (to be completed in 2014) dedicated to furthering collaboration and research regarding the health of bees.



Varroagate provides an effective delivery system and resistance management approach for the Varroa mite.