

2009 Great Plains Vegetable Growers Conference
January 9, 2009
St. Joseph, MO




Colony Collapse Disorder Update


Raymond A. Cloyd
 Associate Professor, Extension Specialist in Ornamental
 Entomology/Integrated Pest Management
 Kansas State University, Manhattan, KS




Phone: 785-532-4750 Email: rclloyd@ksu.edu

Overview of Presentation



- **Introduction**
- **What Is Colony Collapse Disorder (CCD)?**
- **Possible Causes Of CCD**
- **Questions?**





Importance of Honey Bees

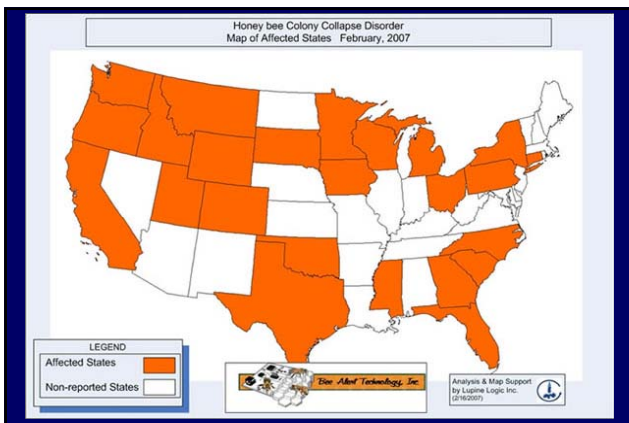
- **Honey bees pollinate >130 crops within the USA and add 15 billion dollars in crop value (annually).**



Colony Collapse Disorder (CCD)

- Problem in 2006-2007 with 30% to 90% losses.
- Other Names:
 - Spring dwindle disease
 - **Fall dwindle disease**
 - Autumn collapse
 - **May disease**
 - Disappearing disease





Importation of honey bees from Australia (2004) coincided with early reports of CCD.

Symptoms of CCD

- Interferes with honey bees' ability to process sensory input. This results in disorientation of bees. When bees leave the hive to scout and forage they are unable to find their way back to the colony or hive.
- **Adult honey bees simply disappear leaving behind honey, pollen, queens, capped brood, and few worker bees. In addition, immatures are present.**
- **Adjacent honey bees (hives) ignore empty hives.**
- **No dead honey bees are present.**

"Possible" Causes of CCD

- Traditional bee pests and diseases (American foulbrood, Nosema, and Trachea mites)
 - No history of promoting CCD-like symptoms.
- **Type of bee food**
 - **Don't feed bees high fructose corn syrup since by-products may be harmful to honey bees.**
- Bee management
- **Queen source**
 - **Lack of genetic diversity [genetic bottleneck] may increase susceptibility to pests and diseases.**
- Chemicals used in bee colonies
 - Sub-lethal effects of pesticides on honey bees.
- **Chemical toxicants in the environment**
 - **Non-target effects of pesticides on honey bees.**
- Genetically modified crops
 - **Seeds: dipped in systemic insecticides may eventually appear in plants nectar and pollen.**



"Possible" Causes of CCD

- Varroa mites and pathogens
 - Mites may transmit viruses to bees or increase stress.
- **Nutritional fitness**
 - **Malnutrition.**
- New pests and diseases
 - ***Nosema apis* (microsporidia that lives in the digestive tract of honey bees).**
 - ***Nosema ceranae* causes honey bees to leave colonies (hives) and they fail to return.**
- **Combination of all or certain factors**

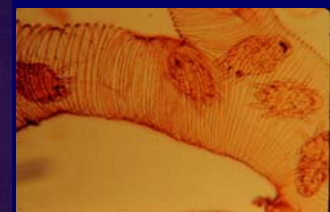


Varroa and Trachea Mites

Varroa Mite



Tracheal Mites



What Is Causing Colony Collapse Disorder?

Where are the die-offs occurring?

Western Hemisphere

What's causing colony collapse?

Pathogens

Pesticides

Mites


Management

Four "Possible" Causes Of CCD

1. Pathogens (new and re-emerging)
 2. **New honey bee parasites and pests**
 3. Nutritional and/or environmental stress
 4. **Pesticides**
- * Cell phone towers and global warming=NO!



Effects of Imidacloprid

- Neonicotinoid-based insecticides may negatively affect honey bee learning and disrupt their homing abilities. 
- It has been documented that the active ingredient of these systemic insecticides, when applied as a drench to the soil, may be present in flowers, which could either directly or indirectly affect honeybees.

Effects of Imidacloprid

- Systemic insecticides coating the surface of seeds may eventually appear in the nectar or pollen of certain plant types.
- Laboratory studies have demonstrated that imidacloprid impairs the “mushroom body,” which is responsible for olfactory memory. As a result, honey bees exposed to imidacloprid are not able to find their way back to the colony or hive.

Effects of Imidacloprid

- It is unlikely that systemic insecticides such as imidacloprid are solely responsible for colony collapse disorder since plants may not take up sufficient concentrations of the active ingredient that are lethal to honeybees.
- Flower morphology may also impact the ability of systemic insecticides to reach the floral parts such as the petals and sepals.
- Weeds that are flowering or other flowering plants visited by honeybees such as goldenrod (*Solidago* spp.) are typically not treated with a systemic insecticide.



Israeli Acute Paralysis Virus (IAPV) and Habitat Destruction!



Suburbanization or Suburban Sprawl



What is the impact of transporting honey bees across the United States of America?



Decline in Health of Environment: Are Honey Bees Biological Indicators?



Impact of CCD or Consequences of Honey Bee Decline

• Increase in food prices and/or decrease in food availability.



What Is The "Real" Cause Of Colony Collapse Disorder?



Will We Really Know?

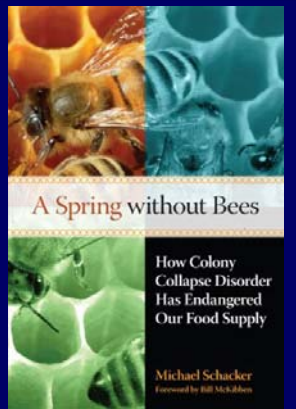


October 28, 2007

PBS Special

Silence of the Bees

A Spring Without Bees: How Colony Collapse Disorder Has Endangered Our Food Supply





**Thank You For Your
Attention!**



Contact Information



Raymond A. Cloyd



**Kansas State University
Department of Entomology
Manhattan, KS 66506-4004**



Phone: 785-532-4750



Email: rcloyd@ksu.edu

Questions??

