Keeping our bees alive - the challenges

Oregon Sustainable Beekeepers

Introduction

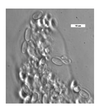
Colony collapse came to the attention of beekeepers and the media in 2005. Since then there has been a flurry of research searching for the cause. No single culprit has emerged. Instead we find a multitude of stressors interacting with one another and with natural honeybee behavior that can weaken the colony and can lead to sudden colony collapse. Studies have shown:

- Invertebrate Iridescent Virus (IIV) present with nosema ceranae observed in collapsed colonies. (1)
- Neonicotinoid insecticides and nosema infection is a deadly combination. (7,10)
- Oxytetracycline antibiotic makes miticides more toxic to bees. (3,4)
- Dozens of toxin compounds are found in typical commercial bee hives. (6)
- Some fungicides have significant drug interaction effects that make miticides significantly more toxic to bees.

Pathogens and Parasites New and Old

Varroa Mite – Changes U.S. beekeeping in1988; ushers in the age of chemical beekeeping.

Tracheal Mite – Arrived c.a.1984 in U.S. Worst problems seem behind us as resistant bees emerge.

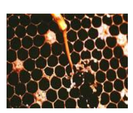


Nosema Ceranea – Recognized in 2007 as distinct from *nosema apis*. Now most common.

Deformed Wing Virus (DWV)– first just associated with varroa infection, now more common.

Acute Bee Paralysis Virus (ABPV)
Israel Acute Paralysis Virus (IAPV)
Invertebrate Iridescent Virus (IIV)

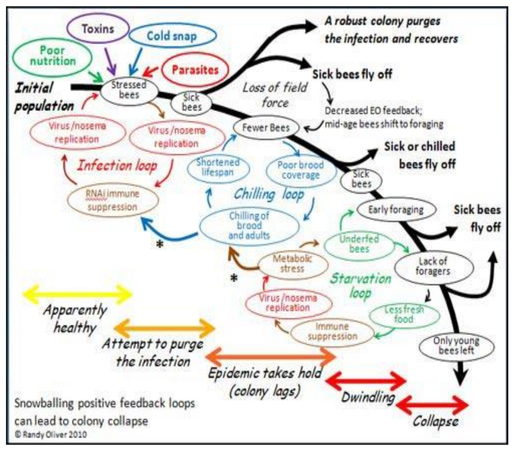
An alphabet soup of viruses, often associated with collapsing colonies.



American Foul Brood (AFB) – Ignored because varroa has taken the limelight, AFB is still a major problem, especially for urban beekeepers.

Parasitic Phorid Fly *(Apocephalus borealis)* Discovered infesting honeybees in 2011 – consequences still largely unknown. (2)

One day you have this…



… then suddenly you discover…

Colony Collapse
- Rapidly dwindling population
- Spotty uneven age brood pattern
- Remaining bees can't cover brood

U.S. winter losses >30% for last 6 years. Beekeepers respond by splitting colonies every year.

Chemicals and Toxics

The bees are being forced to live with chemicals they never have encountered before. Many of these substances are provided by beekeepers to control bees diseases and parasites.

Miticide residue commonly found in beeswax:

Fluvalinate (Apistan) - pyrethroid
Coumaphos (Checkmite) - phosphorothioate
Known to cause queen morality and lack of vitality. (3,6)

Medications

Oxytetracycline (OTC) (Terramycin) - antibiotic
Tylosin – broad spectrum antibiotic
OTC increases toxicity to bees of Fluvalinate and Coumaphos miticides. Unknown interaction with hive micro flora. (4,6)

Pesticides, especially Neonicotinoids

Clothianidin, Thiametoxam, Acetamiprid, Imidacloprid and Fipronil
Extremely toxic to bees. Systemic, long lived. Found in stored pollen. DON'T USE THESE! (5, 6,8,10)

Fungicides

Captan, Pristine, propiconazole, ziram and chlorothalonil.
Pollen containing fungicides kill brood. Fungicides may interfere with normal microbial hive fauna that are needed to process pollen into "bee bread". (6,9)

Nutrition and Forage

This year, the California almond crop will bring together 1,500,000 beehives from across the country to pollinate 1300 square miles of almonds, share their diseases and parasites, and enjoy the single-source almond diet.

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OSU Prof. Ramesh Sagili - "With a single-source pollen the colony didn't grow as well, and honey bees' immune systems were much better in the multipollen situation."

- Monoculture cropping to the fence-rows presents bees with green deserts, contaminated by pesticides, with very few honey plants.
- A variety of pollen and nectar sources are required to provide a complete nutritional diet for the bees.

Conclusions

Multiple stresses from toxic chemicals, pathogens, and nutritional deficiencies lead to larger negative effects than with single stressors alone. The growing list of ubiquitous chemicals and pathogens means multiple insults are evermore likely to cause problems for our bees.

How to Help

Beekeepers

- Minimize the use of mediations and miticides.
- Help improve our local honeybee gene pool by requeening with local survivor stock and disease resistant lines. Avoid southern packages and queens.
- Minimize hive stress by providing adequate and diverse forage, a sheltered location, and structurally sound, disease and chemical free equipment.

Homeowners and Gardeners

- Provide a diverse selection of floral sources for honeybees and native pollinators.
- Eschew neonicotinnoid insecticides. Grow organic!
- Consider your transition out of the corporate food system.

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