

APIARY INSPECTORS OF AMERICA

In the Fall of 2007, the Apiary Inspectors of America (AIA) in collaboration with the USDA-ARS Beltsville Bee Lab conducted a study to help determine the distribution of various bee parasites and pathogens. Preliminary results from this survey reveal¹:

- 1) Nosema levels tended to be higher in colonies collected from CCD-suspect apiaries
- 2) Mean varroa levels over all sampled colonies were approaching critical levels (9.5 mites/100 bees), but levels did not differ between colonies in CCD-suspect and non-CCD suspect apiaries.
- 3) Israeli Acute Paralysis Virus (IAPV) was found in 9 of the 11 states sampled, and in 47% of all sampled colonies.

The last of these finding begs the question, “What should beekeepers do who are or suspect their colonies are infected with IAPV?” To answer this question a review of both published and the most current data from multiple research efforts are in order.

What do we know about IAPV as of May, 2008?

1. *What is IAPV's linkage to CCD?*

- a. As published in September 2007 (Cox-Foster et al, Science, 2007)
 - i. Among pathogens, IAPV is the most consistent indicator of CCD
 - ii. KBV, *N. apis*, and *N. ceranae* are also indicators of CCD
 - iii. Additional “stress” factors may be needed to activate IAPV
 - iv. No cause and effect between IAPV and CCD was demonstrated

2. *How many strains of IAPV exist in the US?*

- a. At least two strains, or “families”, of IAPV are present in the United States (J. of Virology, in Press)
 - i. One lineage is most prevalent in apiaries from the eastern and northwestern U.S. and probably was present before importation of Australian bees into the US in 2005.
 - ii. The second strain is more frequent in sampled colonies from the western U.S.. This strain matches more closely to several isolates sequenced to date from Australian package bees.
 - iii. The strain of IAPV found in Israel that defined this newly described species, is distinct from those in the US and Australia.
 - iv. Extensive variation in the genetic sequence of the virus suggests that the virus is rapidly changing in the U.S. or has been present as multiple lineages for some time.

3. *What happens to IAPV infected colonies?*

- a. On-going research in Israel and the U.S. supports the assertion that IAPV can impact adult bee health and result in rapid mortality of infected bees.
- b. Not all colonies with IAPV are in poor health
- c. Some colonies that have IAPV can “clear” their infection to below detectable levels over time; this is perhaps due to resistance in these colonies to either varroa and/or viruses

¹ A final report will be prepared when all the analysis is complete.

4. *How can IAPV be transmitted?*

- a. IAPV can move from uninfected to infected colonies within an apiary
- b. While not demonstrated for IAPV, other bee viruses (DWV, SBV, BQCV) can be brought to colonies on forager pollen loads, suggesting an outside reservoir for some bee viruses (Singh, et al, poster at Eastern Branch ESA, 2008, from PSU)
- c. IAPV has been detected in non-apis bees in the vicinity of IAPV positive colonies in 2007. (Singh, et al, poster at Eastern Branch ESA, 2008, from PSU)

5. *How widespread is IAPV in the US?*

- a. As of Fall, 2007, IAPV was found in at least 19 states; and thus, the virus is widespread.
- b. IAPV has been present in the US since at least 2002 (Chen and Evans, 2007).
- c. IAPV seemed to have a more limited distribution in 2004 then at present (Cox-Foster et al 2007).

Considering all these factors, undue concern over IAPV detection is not warranted. While IAPV's role in colony losses remains a priority in ongoing research, we do know that high levels of other common bee viruses, such as KBV, DWV, and ABPV, have also been linked with certain incidences of high colony mortality or decline in worker numbers. We also know that nearly all bee colonies are infected with at least one type of virus and that all these viruses are potentially pathogenic.

Recommendations for beekeepers

If you have reason to believe that "virus" is negatively impacting your honey bee colonies some general recommendations are:

1) Practice hygienic practices

- a. Do **not** combine weak colonies with strong colonies without knowing the reason for the weakness as this may transfer disease.
- b. Do **not** combine or exchange colony hardware (with other beekeepers, or within an operation/apiary) as it may transfer disease.
- c. Where this is an option, irradiate dead out equipment before reusing. At a minimum, consider storing dead-out equipment as long as possible before re-use. Scientists are actively seeking new and economical methods for reducing the transmission risks of used comb and hive equipment.

2) Reduce colony stress

- a. Control Varroa: Varroa has been shown to activate virus that were quiescent in honey bee. Use labeled products such as Apiguard, ApiLifVar or Mite away II. Do **not** use home made chemical mixtures.
- b. Control Nosema: Use Fumagillin according to label directions to control *Nosema apis* and *N. ceranae* in honey bees.
- c. Control Bacterial Infections: Use labeled products such as Terramycin or Tylan for American or European Foulbrood. These chemicals do not control virus and must be used according to labeled directions to control bacterial infections in honey bees.
- d. Ensure colonies are well feed, especially with protein supplement, during time of dearth.

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