COOPERATIVE EXTENSION UNIVERSITY OF CALIFORNIA

from the U. C. APIARIES University of California

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Newsletter Emailed to You

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Amitraz Application

Last year Amitraz (Apivar®) was granted Section 3 registration and now it can be sold and used in all the states. Since Varroa is still considered to be one of the top threats to the beekeeping industry, the beekeepers sighed a big sigh of relief when this product became legally available for use in the hives. However, there has been quite a bit of chatter questioning the potential effectiveness of Apivar® for Varroa control that I feel needs to be addressed.

Amitraz, the active ingredient in Apivar®, is a miticide that paralyzes the mites rendering them unable to perform any vital functions and they essentially starve to death. Apivar® is a slow release strip

formulation that mites have to come into contact with in order for it to be effective. These two terms "slow release" and "contact miticides" are very important to keep in mind as they are essential for the effectiveness of this product.

For the product to be effective, provided instructions should be followed. The double rigid strips should be separated and each strip should be hung from the comb in the brood chamber with at least two frames between strips. Strips should be suspended between frames to allow bee access to both sides of the strip (remember, it is a "contact miticide"). The appropriate dosage is one strip per five frames and the MINIMUM length of time that the strips need to be in the hive is 42 days (it is a "slow release" formulation). After use, properly discard the strips and DO NOT reuse them. This product should not be used for at least two weeks prior to the honey harvest. The manufacturer recommends two rounds of treatment during the year.

It seems like this should be quite effective, so what is the problem? Well, one of the virtues that some people possess is patience. For those of us who don't have it, it is very easy to quickly declare that something just doesn't work. It is also very satisfying to see a large mite drop after just a day or two of a product being in the hive. So when we don't see this happen with Apivar® it is a bit disappointing and, again, we tend to think this is just not working. That may have been the case for a few beekeepers who saw little to no effect from early-purchased strips, but they noted much better results from strips acquired later in the year. I've heard plenty of beekeepers who say that Apivar® works like a charm as long as you use it properly. So let's all make a New Year's resolution that we will be more patient if not with other people, then at least with this product.

Another problem that could be causing this product to appear ineffective is our desire to save some money. And let's face it, at about ~$10-15/20 frame hive this is not a very cheap treatment. Because of this, some beekeepers try to get away with applying fewer strips per hive than it is recommended. Again, if it is used at an appropriate dosage it should work very well.

And there you have it! While I am not specifically endorsing this or any other product for control of Varroa mites, I felt it was necessary to put this reminder out there for those who didn't have luck with this product or those who are thinking about using it but heard that it might not work.

For more information on the effectiveness of Apivar® and to learn more about it you can do so at http://apivar.net/

Residues and Wintering

There is little doubt that insecticide residues add additional stresses to wintering honey bee colonies. However, it is pretty difficult to design an experiment to demonstrate that fact. We will describe field observations and results from a few research studies that suggest there may be more of a problem than we realize.

Dr. Eric Erickson conducted many experiments on pesticides and honey bees during the 1980s and '90s when he was a USDA/ARS researcher at the Madison, Wis., honey bee laboratory. His studies included the insecticide permethrin, one of the earlier pyrethroids. The researchers

transported about half of the USDA honey bee colonies from their home apiary to a location adjacent to corn fields. They then applied permethrin when the corn was in tassel and when the bees were collecting corn pollen. Pyrethroid did not repel the bees, as was hoped, and for a few days many foragers died rapidly in the field.

The researchers returned the permethrin-exposed colonies to the USDA apiary location and began treating them and the rest of the colonies similarly for the winter. By late fall, the bee populations looked pretty similar in all hives.

As winter progressed and temperatures fell, the clusters in the permethrin-exposed colonies began to shrink. Dying bees fell from the clusters and accumulated on the bottom boards and the ground in front of the hives. If I remember correctly, none of the permethrin-exposed colonies survived the winter, while most of the unexposed colonies wintered successfully. They published the details of their observations and early results of the studies in 1997: Erickson EH, Erickson BH, Flottum PK, "Effects of Selected Insecticide Formulations, Phased Application and Colony Management Strategies on Honeybee Mortality in Processing Sweetcorn. *Journal of Apiculture Research*, 36(1): 3-13.

Dr. William Chaney offered an explanation for this phenomenon after studying the effects of exposures of adult honey bees by feeding sublethal doses of permethrin, flucythrinate, fenvalerate, and fluvalinate, listed here in decreasing innate toxicity, to honey bees.

In his studies, Bill dropped the temperature at which the bees were being held, from 25 degrees Celsius (76° Fahrenheit) to 18° C (64° F), and then to 12° C (54° F). He also combined sublethal mixtures of carbaryl (insecticide), paraquat (herbicide), and mancozeb (fungicide) with the above chemicals and noted neither agonistic (make things worse) nor antagonistic (make things better) synergism.

For the four pyrethroids, the percent mortality over six days was highest in the 18°C treatment, followed by the 12°C treatment. Since the bees were consuming the insecticides in contaminated syrup, Bill suggested that poisoning as well as failure to feed at 12°C may have contributed to their deaths. So, a likely cause of the loss of the USDA bees was the death of bees that ate permethrin-contaminated pollen; they died when their detoxification mechanisms could no longer keep up with the poisoning as the temperature dropped.

Bill's thesis work on this topic: "The Effect of Synthetic Pyrethroid Insecticides on Honey Bees in Indiana: Laboratory Studies and a Survey of Beekeepers and Pesticide Applicators," is at http://resistantbees.com/blog/?page_id=1053

Nearly everyone familiar with the neonicotinoids/honey bee controversy can cite the Harvard University papers on the topic and the myriad reason why those papers do not appear to be scientifically sound (especially due to unrealistic overdoses). However, viewed in a different light, they may have an element of truth.

I earlier described a watermelon-pollination incident in California that happened a couple of years ago. There is no analytical data to back up my interpretation, but this is what happened: A beekeeper

noted that he had more colony deaths (not CCD), and his surviving colonies were in much worse shape than they normally would have been, at the end of watermelon pollination. He trucked the surviving colonies to his usual build-up apiary location, next to a wildlife refuge, to provide them with an opportunity to build back up to normal size.

Instead of prospering, the colonies seemed to just sit there and accomplish very little. Not many died, but none of them built up as they usually would at that location.

The melon grower belatedly admitted that he had done something novel that season: he chemigated his watermelon fields with imidacloprid. Since chemigation systems frequently leak in the plumbing above ground, honey bees often can be seen visiting the tube connections, and in some cases, puddles that form where the equipment is leaking. It is extremely dry in those growing areas and bees go after the closest water source. So, it is quite likely that the bees in those colonies were exposed to imidacloprid at two different times: once, at a field-dose level with the leaky tubes, and again when the bees shared their nectar and pollen in the colonies.

Harsh winters do not occur in the San Joaquin Valley of California, and the damaged colonies survived for months in their suppressed condition. Only after the beekeeper moved his normal colonies to pollinate almonds, and then returned them to the same apiary, did the affected bees finally start to build up. There is no specific scientific explanation for what occurred, but it would not be difficult to suggest that exposures to imidacloprid had something to do with it.

Recently, University of Zurich researcher Christoph Sandrock and others published a paper in PLOS ONE titled "Impact of Chronic Exposure on Honeybee Colony Performance and Queen Supersedure." It will be very surprising if this study is not raked over the coals, as others have been.

In this case, the researchers kept their colonies in an apiary for two seasons. To reduce genetic differences, they used sister queens from two different stocks. After being left alone the first year, the colonies were divided into groups that served as controls or were fed thiamethoxam- or clothianidin-contaminated pollen. The researchers mixed insecticides into pollen at published field-appropriate levels and fed that to the colonies for six consecutive weeks (two brood cycles). They placed pollen traps on the hives to reduce the supply of incoming pollens and to increase the consumption of the contaminated pollen. Following exposure, the colonies were treated similarly the rest of the year.

The researchers collected many measurements of colony population parameters during the study. Exposure to the chemicals reduced brood rearing, colony adult population size, and honey production, but only temporarily. All the colonies were pretty equivalent going into winter and wintered equally well.

The next spring, differences between the treated and untreated colonies became very apparent. The treated colonies demonstrated "significantly decelerated growth." Most of this appeared to be related to queen problems, with 60 percent of the queens from the treated colonies being

superseded over the next season, while none of the control queens were lost. The propensity for swarming was much reduced in the treated colonies, and the genetics of the stocks differed enough to demonstrate that there can be genetic differences in responses to pesticide exposure.

Thus, these findings sound eerily similar to what was observed in the watermelon situation. Did the damaged watermelon colonies finally perk up when the bees superseded their old queens? If so, how does the exposure harm queens? Physically or genetically? We have a lot to learn.

You may review the Sandrock paper for yourself at http://bit.ly/1zIKYAP

Contributed by Eric Mussen, Extension Apiculturist Emeritus

In Memoriam: Bob Koehnen

I first heard about Bob Koehnen's illness in October when I attended my very first California Bee Breeders Association meeting in Glenn, CA. I could tell immediately that this group has been like a big family for many decades so it was wonderful that they warmly welcomed me, the newbie.

I was saddened to hear of Bob's illness and his passing. I never met him, but I sure wish I'd had the opportunity. Since then, I've spoken to several beekeepers and they all expressed their utmost respect for him. They admired his ingenuity and hard work and it is clear that he will be greatly missed in his community and among the beekeepers.

Please read more about Bob and his tremendously accomplished life at http://www.legacy.com/obituaries/chicoer/obituary.aspx?n=robert-koehnen&pid=173342087&fhid=6797

I also invite you to visit the C. F. Koehnen & Sons, Inc. website at http://www.koehnen.com/

Kids' Corner: 'Honeybee' or 'honey bee?'

Since starting my new job at UC Davis, I have been corrected a few times for spelling "honey bee" as two words rather than "honeybee," a single word. What do you think: which one is more appropriate? Well, I've always spelled it as "honey bee" and shortly I will explain why. But first let's look at the confusion.

As it turns out, if you look up a definition of the honey bee in the Merriam-Webster dictionary, "honey bee" is spelled "honeybee." Aha, there you have it! If it's in the dictionary, that must be the way to spell it, right? Well, not completely. Honey bees belong to an order of insects (a group of insects that have several similar features) named Hymenoptera which contains bees, wasps, sawflies and ants. You might even say they are "true" bees and therefore, should be spelled as two words.

Let's explore this further. The Entomological Society of America (ESA; http://www.entsoc.org/). Committee on Common Names of Insects and Related Organisms governs the rules for common names of insects. The ESA says it's "honey bee." Explains Richard Levine, communications manager for ESA: "The reason for the discrepancy is that

entomologists use two words if a common name accurately describes the order to which a particular insect belongs. For example, all true flies belong to the order Diptera, so true fly names will be spelled using two words by entomologists — house fly, horse fly, pigeon fly, or stable fly, for example. However, despite their names, dragonflies and butterflies are NOT true flies — their orders are Odonata and Lepidoptera, respectively — so they are spelled as one word." (See http://bit.ly/1hviPl0)

If you happen to discover a new insect species that you'd like to give a cool common name, make sure you follow the rules for proper insect naming: http://www.entsoc.org/use-and-submission-common-names. And, by the way, you can sponsor and name a new species of insect at the Bohart Museum of Entomology, UC Davis campus. Proceeds benefit the Bohart mission. Contact Lynn Kimsey, director of the Bohart Museum, lskimsey@ucdavis.edu for more information.

If you would like to test out your new word skills, enter the 2015 4-H Honey Bee Essay Contest. Topic – "Planting for **Bees from Backyards and Up"**. CA entries are due on February 20, 2015 and should be sent to elnino@ucdavis.edu. For more information: http://preservationofhoneybees.org/essays

Upcoming Events

There are several upcoming events that might be of interest so here they are:

North American Beekeeping Conference and Tradeshow (January 6-10, 2015) Anaheim, CA. Keynote Speaker: Dr. Jim Frazier. For more information: http://nabeekeepingconference.com/

American Honey Producers Association 46th Annual Convention (January 6-10, 2015) Manhattan Beach, CA. Keynote Speakers: Dr. Jonathan Lundgren and Ms. Julie Shapiro. For more information: http://www.ahpanet.com/

American Bee Research Conference and AIA Annual Meeting (January 22-23, 2015) Tucson, AZ. Keynote Speaker: Dr. Mark Winston. For more information: http://aapa.cyberbee.net/events/

I will also take this opportunity to shamelessly advertise our inaugural Queen Rearing Techniques Short Course to be held on March 28-29, 2015 at the Harry H. Laidlaw Jr. Honey Bee Research Facility, UC Davis. For more information see notice on page 7. The space is limited so contact us now to reserve your spot!

The UC Davis Apiculture Program wishes you safe and very happy holiday season

Sincerely,

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Queen Rearing Techniques Short Course

March 28-29, 2015

Instructors:

Elina L. Niño, Bernardo Niño and Billy Synk

Short Course Description:

We are very excited to be hosting our inaugural Queen Rearing Techniques Short Course at the Harry H. Laidlaw Jr. Honey Bee Research Facility at UC Davis. The course will include lectures, hands-on exercises and a tour of our beautiful Häagen-Dazs Honey Bee Haven. This course is perfect for those who have some beekeeping experience and would like to move on to the next step of rearing their own queens or maybe even trying their luck at bee breeding.

Multiple topics will be covered:

- Honey bee queen biology
- Basics of selective honey bee breeding programs
- Various queen rearing techniques
- Testing for hygienic behavior
- Assessing Varroa mite levels

Participants will have the opportunity to learn about and **practice** multiple methods for queen rearing. We will go through a step-by-step process for queen rearing via grafting including setting up cell builders and mating nucs. At the end of the course participants will be able to check their grafting success and local participants can can take queen cells, resulting from their grafting exercises, back to their apiaries. The participants will also learn techniques for assessing Varroa loads in colonies and for evaluating hygienic behavior.

Logistics:

The course size is limited to 14 participants that have basic beekeeping experience. Please bring your bee suit/veil! The $200 registration fee covers the cost of course materials (including a set of grafting equipment: grafting frame with bars, plastic queen cups and a grafting tool), breakfast, lunch and refreshments on the days of the short course. Participants are responsible for obtaining their own lodging. Short course will be held at the Harry H. Laidlaw Jr. Honey Bee Research Facility on UC Davis campus. For directions visit: http://elninobeelab.com/map.html

For more information on registering for the short course contact Bernardo Niño: elninobeelab@gmail.com.