COOPERATIVE EXTENSION UNIVERSITY OF CALIFORNIA

Nov/Dec 2008

Newsletter E-mailed to You

The newsletter is published bimonthly, in February, April, June, August, October and December. If you wish to have this newsletter sent directly to your e-mail address, when it is published, please follow the instructions below.

Send an e-mail addressed to **listproc@ucdavis.edu**. Leave the Subject line empty. In the body of your message put in the following: sub ucdavisbeenews <your first name (without these "brackets" around it)> <your last name>. On the next line, insert two hyphens, not underscores (underlines). If I were subscribing, it would be:
sub ucdavisbeenews Eric Mussen
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The hyphens are there to tell the subscription software on the server not to be confused by any following information that occurs, such as a "signature frame" (or signature block, as I call it).

If you wish to be removed from the list, then you do the same thing, but instead of **sub**, you use **unsub** or **signoff**, then the name of the list and your first and last names followed on the next line by hyphens.

Fungicides Toxic to Bees?

California beekeepers seem to observe more problems with fungicide toxicity to their bees than beekeepers around the rest of the country. Perhaps that is because California beekeepers devote significant time to "lifting lids" in spring (actually, late winter by the calendar). As early as the late 1950's beekeepers noted brood loss, in some apiaries, following the use of captan. Later, they noted brood loss following the use of Rovral®. Now, they report seeing brood loss following Pristine® applications. These are not immediate losses, such as one might see with Monitor® or other insecticides that are toxic to bee brood. These losses are noted, usually, about seventeen days after exposure. Counting backwards, that means exposure of one-day-old larvae that interfered with immature develop-

ment. Pupae and newly emerged bees are seen with anatomical malformations, like undeveloped wings.

These losses are very similar to exposure of colonies to California buckeye bloom. Depending upon the amount of buckeye pollen in the food chain, larvae can die at various ages, pupae can die at various stages, and adults can die during their last molt or emerge as individuals with non-extended wings.

With buckeye poisoning, the damage continues until other pollens become abundant enough to make up the larger portion of the bees' diet. Buckeye pollen can be stored. If a pollen dearth develops later in the season, use of stored buckeye pollen as a significant part of the diet can lead to a "second round" of brood loss. Usually, the second occurrence does not persist very long. Only in a relatively few cases has buckeye poisoning been suspected of causing colony death.

Damage to honey bee colonies by the three previously named fungicides is very similar to buckeye poisoning. Brood is lost and damaged individuals can bee seen on the ground in front of the hive entrances. But, how bad is this?

Beekeepers are very unhappy to see even one bee on the ground in front of a hive, if the bee is there for a reason for which the beekeeper was not responsible. Despite the statements made by some individuals that beekeepers are only in the business for the money, a little investigating into the finances of beekeeping would put that idea to rest, quickly. Beekeepers are most concerned about the health of their bees, whether they operate one colony in the backyard or thousands of colonies throughout the country. Money is important, because it costs nearly $150 to keep a commercial colony alive and productive over a year. Without that income the bees would be lost and the beekeeper would be out of business.

Returning to fungicide poisoning – Apparently, some beekeepers are telling growers to look for someone else with bees if one of the three previously mentioned fungicides is going to be used during bloom. I think that might be an over-reaction. If we return to the buckeye comparison, the fungicides may be contaminating pollen foragers and pollen loads for only one or a few days. Buckeye bloom can last for many weeks. In almonds, the bees are eating most of the incoming pollen, so not very much is being stored to cause problems, later. And, finally, as we know from buckeye poisoning, honey bee colonies have a marvelous resiliency. By increasing egg laying and brood production, a colony can "make up" for reasonable brood losses in a relatively short period of time.

Does this mean that beekeepers can dismiss concerns over certain fungicides? No, not all beekeepers. If beekeeper observations are correct, Pristine-contaminated pollen, if consumed by colonies in the process of rearing queens, will decrease the number of queens reared to adults. The best bet for the queen breeders is to keep some of their colonies and hives out of areas where any pesticides, including fungicides, are being applied. The best queens should come from the cleanest comb environments.

If your grower can be cooperative, have fungicide applications applied late enough in the day that there is no exposed pollen left in the blossoms. At that time the pollen foragers will not be visiting the flowers, anymore, so they will not be contaminated by flying through the spray.

There are published articles that report fungicides being synergistic with some pyrethroid insecticides, making the combination more toxic to bees than just the insecticide alone. However, I still believe that exposure to almond and early season orchard sprays, containing fungicides, will be no worse on the bees than a light case of buckeye poisoning.

Bee Damage Data Lacking

A group of forward-looking commercial beekeepers took it upon themselves to contact administrators from EPA and asked to discuss their concerns about honey bee-pesticide interactions. Given the history of previous, explosive exchanges, both sides had to take a deep breath and approach the concerns cautiously.

One detail that really caught the attention of the beekeepers was the fact that, at their reporting level, EPA lists only two reports of bee kills in 2006 and none between 2003 and 2005. Therefore, it seemed a bit odd to EPA representatives that the beekeepers felt so strongly about this issue.

In theory, there should be a mechanism by which any person, who believes that an application of pesticide caused a problem, can file an official state document detailing the purported loss. That document should become part of the state's permanent record and should be transmitted to the federal office on an annual basis.

In California, that form is called "Report of Loss, Nonperformance or Damage" (PR-ENF-008). The form can be obtained at the office of any of the county agricultural commissioners or on the Web, if you search long enough. I have included a copy in this newsletter to save you some time.

In California, the Reports of Loss are usually taken in to the ag commissioner's office, to become part of the permanent file for that year. The last thing a commissioner wants is a drawer full of loss reports. It suggests that things are not being handled well in the county. It is likely that you will meet resistance to submitting a bunch of loss reports, but this is the ONLY WAY beekeepers can document how much loss actually is being encountered. When asked, I tell anyone that California beekeepers lose, or have severely damaged, an average of 10% of the state's bee colonies. Not everyone suffers losses each year, but some of the losses are very large.

You may have to explain to the ag commissioner that you do not believe that these losses were misuses of the products, but the data is essential to document how much bee loss actually is occurring.

To prove the sincerity of the EPA to collect this data, the following two individuals wish to see copies of the all loss reports as they are being filed in the states:

F. Nicholas Mastrota
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 7507P
Washington, DC 20460
703-305-5247
Mastrota.nicholas@epa.gov

Norman Spurling
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 7502P
Washington, DC 20460
703-305-5835
Spurling.norman@epa.gov

STATE OF CALIFORNIA

REPORT OF LOSS, NONPERFORMANCE OR DAMAGE

PR-ENF-008 (EST. 9/94)

DEPARTMENT OF PESTICIDE REGULATION
ENFORCEMENT BRANCH

	FILE NUMBER *(For County Use Only*
TO: (AGRICULTURAL COMMISSIONER)	COUNTY

In accordance with Sections 11761 through 11765 of the Food and Agricultural Code, the following **Report of Loss** is submitted:

CLAIMANTS NAME		TELEPHONE NUMBER	
ADDRESS OR POST OFFICE BOX NO.	CITY	STATE	ZIP CODE

TYPE OF PROPERTY ALLEGEDLY INJURED OR DAMAGED

ACRES OR UNITS

FULLY DESCRIBE ALLEGED INJURY OR DAMAGE (Include symptoms, when first noticed, etc.)

LOCATION OF PROPERTY ALLEGEDLY INJURED OR DAMAGED

	SECTION	TOWNSHIP	RANGE	BASE & MERIDIAN
DATE THE ALLEGED INJURY OR DAMAGE OCCURRED	TIME			

NAME OF PERSON OR FIRM ALLEGEDLY RESPONSIBLE FOR LOSS OR DAMAGE

NAME OF OWNER OR OCCUPANT OF PROPERTY FOR WHOM SUCH PERSON OR FIRM WAS RENDERING LABOR OR SERVICES

LOCATION OF SUCH PROPERTY

ADDITIONAL INFORMATION

I declare under penalty of perjury that the above is true and correct

CLAIMANT'S SIGNATURE	DATE

Filing Information on Reverse Side of Form

A third person is interested in keeping track of any possible problems with fungicide applications. If you believe that you have encountered bee problems following a fungicide application next year, report that to your state and to:

Tony Kish
USEPA Headquarters
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 7505P
Washington, DC 20460
703-308-9443
Kish.tony@epa.gov

Next year is going to be an opportunity of a lifetime for beekeepers to "prove" their concern over pesticide-related bee losses. While it may take time to find the forms for each of the counties or states where losses are encountered, the only way to determine if the county records get out of the state and to the federal offices is to submit the forms locally, and then send a copy to one of the EPA representatives listed above. Then, EPA can audit the system.

Document Apiary Rejections

This past year, the California legislature came very close to passing a bill that would have opened more "agency managed" lands to beekeepers. Unfortunately, the sum total of agency requests for funds to manage registration of the potential apiary locations exceeded the amount that our Governor would accept.

Agency administrators were a bit surprised to learn that restrictions on apiary locations were so tight on their properties. In fact, they wanted some documentation to prove that restrictions were in place. Thus, we have another request for documentation and a person who wishes to compile the data.

If you have located what appears to be a reasonable place to establish an apiary (pay attention to human and vehicular traffic as well as environmental degradation), please request use of the location in writing, even if you have been refused in the past. If you are refused (again), ask that the rejection be put in writing. Then, send a copy of the refusal to:

Steve Park
Steve Park Apiaries, Inc.
11226 Deschutes Road
Palo Cedro, CA 96073.

Steve will accumulate the documenttation, then return to the agencies and report on problems in various regions of the state.

Nutrition – Another Look

After a few decades of limited investigation, honey bee nutrition is gaining interest, again. What little we know suggests that honey bees will collect and store spring pollens as "bee bread."

Bee bread remains moist and the nutrients remain relatively stable, due to the acidic condition of the stored pollens. The acid is a by-product of bacterial, and perhaps fungal, growth. The predominant microbes are lactic acid producing bacteria, such as *Lactobacillus*. This type of bacterium is considered a probiotic in mammalian nutrition. The researchers at the USDA bee lab in Tucson are going to look into this phenomenon from the standpoint of honey bee nutrition.

Once the bees have their early pollens converted to bee bread, they tend not

to use that pollen very soon, even if they encounter prolonged pollen dearths. The bees tend to feed the brood on incoming pollens during the summer. If pollens are lacking, brood rearing is tapered way back, or even halted temporarily, as sometimes is observed on the west side of the Central Valley in northern California during the summer.

During the late summer/fall brood rearing period, if pollen resources exceed brood demand, fall pollens will be stored as bee bread, as well.

Pollen consumption continues through the winter, whether there is reduced brood rearing or a break in brood rearing. The queen has to be maintained, and the bees have to stay fit. However, the lengthening days at the end of December coincide with the innate response of the bees to begin or increase brood rearing for the coming season. As the temperatures warm and fresh pollens become available, brood rearing kicks into high gear. Soon, the stored pollens are pretty well consumed and next winter's pollens need to be collected and stored.

As stated previously, many Central Valley colonies will just about stop rearing brood in the summer if they are not placed near good sources of mixed pollens. Those colonies recover later in the year to survive the winter, but they might average around four frames of bees. When I arrived in California in 1976, that was the minimum colony strength acceptable for almond pollination. After Dr. Thorp's studies, funded by the Almond Board, the standard hive strength in most contracts moved to six and then eight frames of bees. That hive strength is not "normal" for many places in California, so beekeepers have to feed their bees to keep the populations up.

Our pollen substitutes and supplements, and in fact even trapped bee-collected pollen, do not match the success of bee bread when it comes to rearing brood. However, that does not mean that feeding bees is not worthwhile.

Many tests being conducted by researchers from USDA bee labs suggest that feeding extra protein, regardless of the source, helps significantly with keeping adult bee populations up over winter. The results suggest that we can't force the bees to rear many extra frames of brood, but the bees that are reared have longer lives and a better ability to respond to the stimuli of early season brood rearing. Years ago Dr. Christine Peng demonstrated that feeding bees in August resulted in better colonies, and the results could still be seen in May of the following year.

If your bees are going to be located in regions where there is not a good mix of pollens available for a period of time, and you wish to maintain the population level, consider feeding the bees. Some California beekeepers begin as early as July and don't stop until the bees head for almonds.

HONEYBEENET

Have you ever wished to be part of the Big Picture? There is a group of mostly Eastern U.S. (at this time) beekeepers who are participating in an exercise designed to follow the changes, if any, in nectar flow timing of various plants, in relation to a warming environment.

Participants place a hive on a scale and periodically record (in Excel) the weight of the hive. The data eventually is sent in to NASA (Yes, the rocket people).

Joining in requires a sort of registration, where a participant fills in some information on the hive, its GPS location, a description of the environment, and list of principal honey plants. As a member, the beekeeper gets to see the data from various places, as well as satellite data for the regions.

To take a look at this project, go to: (no www) honeybeenet.gsfc.nasa.gov.

Short-term Formic for *Varroa*

In most cases, we try to formulate fumigants used for *Varroa* control so that there is a mite-toxic level of fumigant in the hives over prolonged periods of time. Researchers at Penn State found that a 17-hour, 75 ml application of 50% formic acid on a fume board knocked the mites off worker bees and killed more than 60% of the mites under capped brood. There appeared to be no loss of bees. Acetic acid, alone and in conjunction with formic acid, did not enhance mite control. Interestingly, despite the mite control, the proportion of deformed wings on emerging adult bees did not improve. The authors suggested this treatment for times when mites were high, but honey flows still may be going on. Honey supers must be removed during the time of treatments.

To read more, see vanEngelsdorp, D., R. Underwood, and D. Cox-Foster. 2008. Short-term fumigation of honey bee (Hymenoptera: Apidae) colonies with formic and acetic acids for the control of *Varroa destructor* (Acari: Varroidae). J. Econ. Entomol. 101(2): 256-264.

Kids and Honey

Looking for a booklet to teach some bee biology to kids and keep them busy for a while? "Kids and Honey: An Introduction to Honey for Children" is a 12-page, 8.5 X 11 inch booklet with a bright front cover showing a girl eating a slice of bread slathered with honey. Inside is The Story of Betty the Bee. She is chewing out from behind a capping when we meet her. Betty is introduced to the jobs of hive bees, then becomes a forager. Betty wears out by the end of the story.

The booklet also contains some bee trivia, a word search, a maze, and a bear ("Pierre") that needs to be colored. The back cover contains a number of honey recipes for kids' favorites.

The booklet has a spot for a beekeeper stamp (name, address, etc.) and appears to be something meant to be given away as advertising. They would be very nice to donate to grade schools. Until they are gone, it appears that they can be purchased from the Canadian Honey Council for $2.00 each. Price per copy goes down with bulk orders, but shipping starts at $2.00 for the first copy and goes up with increased numbers (largest single order listed: 500 copies for $625 plus $36 shipping = $661).

You can contact the Canadian Honey Council by calling Geoff Todd, Office Manager, Canadian Honey Council, Suite 236, 234-5149 Country Hills Boulevard N.W., Calgary, Alberta, Canada T3A 5K8. Phone: (403) 208-7141.

Beekeeping on the Web

The University of Delaware offers a college-level course in beekeeping titled "Apiology and Apiculture" (ENWC 214) online. The current course instructor is Dr. Dewey Caron, who soon will be coming to Oregon as a permanent resident. The course includes hands-on, practical activities and is

offered through UD Online, the University of Delaware's distance learning program.

The course is constructed around Dr. Caron's textbook, Honey Bee Biology and Beekeeping. It is a self-paced course (only if non-credit) and access to someone's bee colony is desirable. The course can be taken for credit or just for interest.

"Tuition" for the course, if taken for credit can be found at: www.continuingstudies.udel.edu/udonline/registration/. Tuition for the non-credit, more leisurely approach is $295 per person and enrollment is available at any time.

If you and your computer don't seem to get along with the University of Delaware computer program, try calling UD Online Program Manager, Melanie Rehberg, at: (302) 831-1079, Ext. 5, (800) 597-1444 Ext. 5, or e-mail Melanie at: melanier@udel.edu.

Sincerely,

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