

Welcome to the second issue of The Northeast Beekeeper, our biannual newsletter servicing beekeepers throughout the northeastern US. Despite our ambitious workshop schedule and frequent trips to local beekeeping associations, we know that we cannot visit all of the regions' beekeepers. We hope that this newsletter will help fill that gap and keep those of you we miss up to date on important issues affecting beekeeping.



NEW PEOPLE IN THE PROGRAM

We have a number of new faces at Dyce Lab. David Ostermann comes from the Dept. of Entomology at the University of Manitoba where he received a MS degree in apiculture. David is working with the new breeding program and brings a great deal of valuable experience with him. Linda Fazzary is our graphics design and web page specialist, and Katrina Thomas provides administrative support for all aspects of the Master Beekeeper Program.

THE NEW DYCE LAB

The last two years have seen a lot of changes at Dyce Lab. We have been spending a great deal of time setting up the honey bee breeding program. This has involved a number of steps. First, we had part of the existing Dyce Lab renovated to accommodate a modern honey processing plant (Fig. 1). The heart of this plant is the Cowen Silver Queen Uncapper, a Cowen 60-frame parallel radial extractor and a cappings spinner. It's more than large enough to accommodate our expanded beekeeping operation, and it will also serve as a model processing facility for an upcoming Master Beekeeper Workshop.



Fig. 1



Fig.2

The final step was the construction of a 2,000 square foot addition to the east end of Dyce Lab to accommodate the new beekeeping equipment for the breeding program (Fig. 2). The addition has just been completed. The addition will also serve as the home of the Master Beekeeper Program.



BIOTERRORISM ACT OF 2002

You have probably heard about the impact of the Bioterrorism Act of 2002 on beekeepers. The act was passed by congress in response to threats to the nation's food, drug and water supplies.

"To improve the ability of the United States to prevent, prepare for, and respond to bioterrorism and other public health emergencies.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, ... the Public Health Security and Bioterrorism Preparedness and Response Act of 2002." - BIOTERRORISM ACT OF 2002.

You may need to register with the FDA. If you do, you will need to:

1. submit a completed registration form to the FDA;
2. establish and maintain records on purchases and sales of honey, additives and flavorings;
3. make your records available to the FDA on short notice;
4. understand the detention rules;
5. give prior notice of imported shipments.

The National Honey Board has done a nice job of putting together a brief explanation of the act in so far as it affects beekeepers. You may access this information at <http://www.masterbeekeeper.org/>, or <http://www.nhb.org/> or <http://www.fda.gov/oc/bioterrorism/bioact.html>

WHAT'S NEW FOR VARROA CONTROL?

The long term goal shared by beekeepers and researchers alike is the development of a number of effective and economically viable methods for controlling parasitic mites that minimize the use of chemical treatments, especially the more toxic chemicals like coumaphos. This may mean radically different management protocols for different beekeepers, depending on the size of your operation and the specific markets you serve (natural food or commercial). Unfortunately, at this time, the best advice for most beekeepers is to conduct the Pettis Test for pesticide resistance prior to treating their colonies in the spring and fall, and then to treat with the appropriate pesticide (Apistan or CheckMite+) according to label directions.

Section 18's: With the help of the CU Pesticide Management and Education Program (PMEP), I have submitted a request for a renewal of the Section 18 status (emergency use) for CheckMite+ for 2004. I have also included requests for Section 18 Status for Mite-Away II, a formic acid based product manufactured by NOD Apiary Products USA Inc. (a subsidiary of NOD Apiary Products in Canada) and for Api-Life VAR, a thymol based product manufactured by Chemicals LAIF in Italy. CheckMite+ is suitable for most beekeepers producing for the commercial market. Api-Life VAR and Mite-Away II, while not as reliable or effective, may work well in combination with other non-chemical control methods and are well-suited those supplying the natural foods market. If all of these requests are approved, beekeepers will have four miticides with which to build an IPM program. The goal is to have beekeepers evaluate these new products in their operations as part of a pesticide rotation scheme to prevent the development of pesticide resistant mites. Both thymol and formic acid can have adverse effects on colonies if the dose is too high; so, be sure to follow label directions.

New Miticides: Api-Life VAR: This product is based on thymol, a major component of thyme oil. In this product, thymol is formulated with menthol and eucalyptus oil (Fig. 3). Thymol has been shown to be somewhat effective in controlling *Varroa*. However, the response to Api-Life VAR is considerably more variable than that seen with CheckMite+; and adequate, long-term control is unlikely using this product by itself. This is partially due to the fact that Api-Life VAR is a fumigant and is affected by ambient weather conditions.



Fig. 3



Fig. 4

New Miticides: Mite-Away II: This product is a formic acid product based on research done by a number of researchers, including CU (Fig 4). We were able to identify an effective dose and release rate and these findings have been incorporated into the new Mite-Away II product. Basically, it consists of approximately 250 ml of 65% formic acid absorbed into a fiberboard (wood fiber, paraffin and starch). The fiberboard is enclosed in a perforated plastic bag which serves to regulate the rate at which the formic acid is released. The entire product is enclosed in a non-perforated plastic bag.

Coumaphos Safety Issues: CheckMite+ contains coumaphos, and it is highly effective in colonies infected by Varroa mites that are not resistant to the product. Whereas Apistan was relatively 'user-friendly', the organophosphate coumaphos is extremely toxic to humans. Remember! Organophosphates are closely related to a number of highly toxic nerve agents developed between the 1930's and 1960's. Coumaphos is an ACE inhibitor (that means it blocks the action of acetylcholine esterase at nerve junctions), and its effects are cumulative.

Repeated exposure can result in an individual experiencing a number of unpleasant symptoms, including death if the exposure is great enough. This is very unlikely with CheckMite+. However, to minimize your risk, you must wear NITRILE RUBBER gloves (Fig. 5) whenever you handle these strips (nitrile rubber protects against both CheckMite+ and Apistan, whereas latex gloves do not protect you against CheckMite+). Check with your pesticide supplier for a supply of these gloves. Also, store your strips in a dark, cool place away from other pesticides, and be sure to secure your strips to prevent accidental exposure to children and others who may not be aware of the potential danger. If you hire people to treat your colonies, make sure that they adhere to these safety practices.



Fig. 5

Coumaphos Residues: It is essential that you follow the label instructions for the use of all pesticides, including CheckMite+. The label for coumaphos allows for a tolerance not to exceed 0.1 ppm in honey and 100 ppm in wax. Honey and wax with coumaphos levels that exceed these levels will be considered contaminated and will be seized and condemned. If contamination is found on a wide scale, EPA may pull the Section 18 approval, leaving beekeepers without an effective method for mite control. Other sources of coumaphos: It is extremely important that you use only EPA approved formulations of coumaphos for control of *Varroa* and the small hive beetle. Right now, that means CheckMite+ strips. Use of other formulations is illegal and likely to result in contamination of hive products and to promote chemical resistance in the pest populations.

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FORMIC ACID RESEARCH REVIEW

In the fall of 1997, Dyce Lab started working with formic acid for *Varroa* control. Our initial efforts were

unfulfilling, achieving a control rate of only 50-60%. We determined the causes for that low rate, adjusted our delivery system, and in the fall of 1998, we achieved 95% mite control. We repeated this study in the fall of 1999, and confirmed our findings. Our current delivery system consists of a natural fiber board (20.3 x 24.1 x 1.3 cm) placed inside an inner plastic bag which has 20, ½” holes punched into each side. The board and inner-bag are placed in an outer plastic bag. We add formic acid to the outer bag, seal it, turn it on its side, and place it in a square, plastic storage pail. The formic acid diffuses throughout the fiber board over a period of a few days. The device is delivered by removing it from the outer bag and placing it on top of a two-story colony that has already been prepared for winter. We use a ½” wooden riser on the top super to provide more room for the board. We also elevate the board off the top bars using four, small ½” wooden spacer. The key is in the dose and the delivery rate. We use 300 ml of 65% formic acid. This is about twice the dose used in the gel pack. The large number of holes in the inner bag results in rapid evaporation, with 75% of the material having evaporated after two weeks. The device is not registered for use in the US, so I can't recommend it to you. The results from these studies and others have been incorporated into the Mite-Away II pad.

AMERICAN FOULBROOD

A number of changes sweeping through the bee industry will soon have serious ramifications for AFB management (Fig. 6). One is the widespread use of plastic foundation and plastic frames. Traditionally, AFB infected colonies would simply be burned (Fig. 7). Now, with a significant percentage of plastic in the colony, burning may no longer be an option due to environmental regulations. Effective and economically viable methods for sterilizing plastic combs have not been developed. The second development is that of Terramycin (TM) resistance in the AFB population. TM resistant AFB has been found throughout the US and throughout New York. Why is this a big deal? The answer to that question requires a basic understanding of the biology of *Paenobacillus larvae*, the causative agent of AFB. *P. larvae* exists in both the vegetative stage and the spore stage. While the vegetative stage is susceptible to TM, the spore stage is resistant. A colony with active AFB will

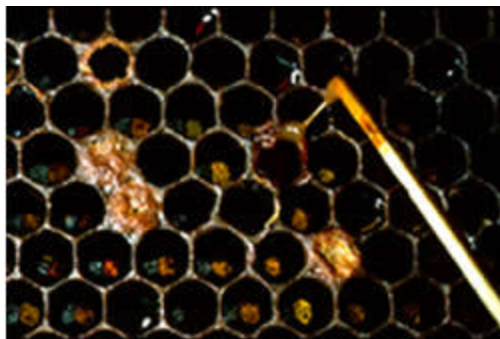


Fig. 6



Fig. 7

respond to antibiotic treatment, but since the spores remain viable in the colony, the disease usually reappears when the antibiotic activity wears off. If you have transferred combs among colonies during this period, you have probably spread the disease. As a result of this biology, TM should only be used as a prophylactic. That means treating healthy colonies at two times of the year – in the early spring at least 45 days before the first marketable flow, and in the fall after the crop has been removed. These are typically dearth periods and the times when the number of dead or dying hives - possibly infected with AFB - is also greatest. Consequently, these are the times when your bees are at greatest risk.

Your bees are also at risk during dearth periods during the summer, but you must rely on good management and an effective inspection program during those periods because label restrictions require that you stop treating with TM at least 45 days before a marketable nectar flow. This is not usually possible during the summer. With the emergence of TM resistant AFB, beekeepers have no way to protect themselves from AFB. The USDA-ARS Bee Research Laboratory in Beltsville, MD has done a great deal of work evaluating a number of other antibiotics for use in AFB management. The most promising is an antibiotic called TYLAN (a formulation of tylosin). It is very effective; however, the FDA is probably going to approve it for use as a treatment for active AFB, NOT as a preventative for use on healthy colonies. The results could be disastrous. Why? TYLAN, like TM, is only effective against the vegetative stage of AFB. The spores survive to germinate at a later date. If you suppress the disease, then transfer combs among colonies, all of your colonies will eventually have AFB. Then, you will need to keep all of your colonies medicated.

REPORT ON NEW ANTIBIOTICS FOR AFB CONTROL:

BY DR. MARK FEDLAUFER, RESEARCH LEADER, USDA-ARS BEE RESEARCH LABORATORY

[*ed. Note: Dr. Feldlaufer wrote this awhile back, so some of the material is dated.*]

We have undertaken the task of seeking FDA approval for two antibiotics to control resistant American fouldbrood disease (AFB). The antibiotics are tylosin (marketed as Tylan® by ELANCO) and lincomycin (marketed as Lincomix® by Pharmacia & Upjohn). These two antibiotics were chosen because (1) in laboratory test, they were both very active against a Terramycin-resistant strain of AFB; (2) they are structurally different from each other and from Terramycin® (so there shouldn't be cross-resistance); and (3) both Tylan® and Lincomix® have current agricultural uses (for poultry and swine). We are seeking approval for these antibiotics when used as a DUST (200 mg active ingredient in 20 g powdered sugar) for the CONTROL (not "prevention") of AFB. I'll explain the rationale for this decision later.

FDA requires that we address three issues: (1) Target animal safety – do the compounds harm bees? (2) Efficacy – do the compounds control AFB? and (3) Residues – what levels, if any, occur in honey? Target animal safety studies were completed in Beltsville for lincomycin and in Weslaco (by P. Elzen) for tylosin. We found that neither antibiotic harmed larval or adult bees, when compared to sugar treated and untreated controls. Both of these studies were quite lengthy (about 68 days) and detailed, and FDA is currently reviewing the results. One field efficacy study using lincomycin was completed last fall at a quarantine apiary in NJ, and the results were very promising. Eighteen colonies, with varying degrees of Terramycin-resistant AFB, were dusted three times, one week apart, with lincomycin. Forty-five days after the last treatment, there were no signs of AFB. Additional field efficacy studies in different geographic areas need to be completed with lincomycin and tylosin. We have asked beekeepers to inform us if they have colonies with Terramycin-resistant AFB that we could use for these studies.

The Beltsville lab initiated residue studies on Feb. 22, 2001 at the USDA-ARS location in Ft. Pierce FL. We chose this location to take advantage of the intense citrus nectar flow. Honey bee colonies were dusted three times (one week apart) with either lincomycin or tylosin, and honey from the brood box and surplus are being collected weekly for later analysis in Beltsville. The field aspects of this study should end on March 30.

While a large amount of work has been completed, we are not done. FDA must review all material submitted, and everything dealing with antibiotic use in agriculture is being scrutinized. The January 6, 2001 issue of the N.Y. Times pointed to the (over) use of antibiotics in farm animals merely for the prevention of disease. A Jan. 19th editorial in the prestigious journal SCIENCE stated that "Using the same antibiotics in people and animals is a bad idea." and a Feb. 19th article in Chemical & Engineering News was titled "Furor over animal antibiotic use". Faced with this intense scrutiny, FDA has indicated the shortest route to approval is as a "dust" and for the "control" of AFB. Syrup with antibiotic poses a greater residue risk, while "preventative" treatments for AFB amount to using an antibiotic in the absence of disease, a policy being reviewed by FDA. Even with "dusting" for the "control" of AFB, I'm guessing approval for lincomycin and/or tylosin is at least a year away.

So, what can a beekeeper do when faced with Terramycin-resistant AFB in the interim? There is something known as "AMDUCA". This stands for the "Animal Medicinal Drug Use Clarification Act of 1994", and it allows for the extralabel use of certain approved antibiotics. "Extralabel use" means using an antibiotic approved for let's say chickens and swine, for honey bees. The key is that the antibiotic needs to be prescribed by a veterinarian! More information on AMDUCA can be found at: <http://www.avma.org/scienact/amduca/amduca1.asp>. Also, try an internet search engine and type in "AMDUCA".

I hope this information answers most of the questions concerning our effort seeking FDA approval for antibiotics to control AFB. If I can be of any help, please contact me at feldlaum@ba.ars.usda.gov.



MASTERBEEKEEPER UPDATES:

The loss of our Extension Associate, the addition of full-time teaching duties to my University responsibilities and the initiation of the honey bee breeding program at Dyce Lab have made for an extremely busy time. However, after a lull in the Master Beekeeper Program, things are coming back to life. This past year, I conducted both Apprentice Level Spring and Fall Workshops. The schedule for next year is looking a bit more ambitious. I am planning on delivering both the Apprentice Level Spring and Fall Workshops, the Journey Level Integrated Pest Management (IPM) Workshop, and two Journey Level Inspecting Colonies Field Days. Dates, locations and additional information are available on the Dyce Lab website at masterbeekeeper.org.

NEW WEBSITE– www.masterbeekeeper.org - *check it out!*

Speaking of websites, the CU website is now up and running. The site is designed and managed by Linda Fazzary, our Graphics and Media Specialist. You can find a variety of useful information at the site, including directions for performing the Pettis Test for determination of pesticide resistance in your mite populations.



COLONIES FOR HIRE?

Do you have colonies you want to rent for pollination? I would be happy to post a page with listings of any New York Beekeepers interested in renting bees for pollination.

TALKS TO BEE GROUPS

Currently, I have three talks ready to present at local beekeeper meetings. One is on the proper use of pesticides and antibiotics in the hive. The motivation for this talk comes from a recent decision in New Jersey that required beekeepers to become Certified Pesticide Applicators. I am hoping we can avoid a similar situation in New York by taking a pro-active stance that demonstrates that New York Beekeepers are familiar with the proper use of chemicals in the hive. The second talk is on identification and management of American Foulbrood. This talk covers the history of AFB in the US, the development and limitations of antibiotics, the development of antibiotic resistant strains of AFB, identification and prevention of AFB, and changes in the beekeeping industry that may affect the future management of AFB. The third talk is on effective spring and summer management.

RESEARCH UPDATE

BREEDING PROGRAM UPDATE: We initiated a breeding program for mite resistance, hygienic behavior and overall good wintering, temper and honey production. We established about 120 colonies with queens from all around the country. It has been, to put it mildly, a trying experience. We thought we would get off to an early start, as the past few winters have been so mild. We picked up 130 packages in KY on April 3 and had them all introduced by April 6, in the snow (Fig. 8). Within a month, half of the queens were drone layers, superceding or otherwise failing. Cold weather gave way to non-stop rain. Buildup was negligible and chalkbrood was rampant, the worst I have ever seen. The breeding stock began arriving in early June, but it

continued raining and the colonies into which we were going to introduce these queens were barely mediocre.



Fig. 8

We plodded on, losing many queens due to their being introduced during extremely bad weather. We ordered replacements, and by the end of July, we had managed to establish about 120 colonies. Many of the queens that were initially accepted were eventually superseded for unknown reasons. The fall was no picnic either. Rather than building up into nice strong colonies for the winter, they all shut down brood rearing just before mid-September. We did manage to obtain brood from about half of them which we will use to evaluate for SMR trait. Anyway, we have readied the colonies for winter and will pick-up the project next spring. On the bright side, we pulled our first really big honey crop this year – about 400 deeps which we hope to sell wholesale to help support the program.

SCREENED BOTTOM BOARDS: We conducted a third year of our screen bottom board study. We are only looking at the effect of screen bottom boards on mite levels and honey production, not on wintering success. We should have this year's data analyzed by the spring. So far, we have nothing positive to report with this technique.

DRONE TRAPS: We conducted a second year of the drone trap study (Fig. 9). Again, we should have the data analyzed by spring. The results from year 1 were very positive. The colonies receiving the drone trap treatment had twice the fall worker populations compared to those without the treatment. I am very hopeful that this technique will prove useful to beekeepers as a means of keeping mite levels low throughout the summer so you have healthy colonies to treat in the fall. The drone trap method may also work well in conjunction with formic acid or Api-Life VAR, but more work is needed on that. We plan to conduct a third year of the drone trap study next season.



Fig. 9



HONEY SHOWS

Participation in honey shows at the State Fair and at the Empire State Honey Producers Annual Fall Meeting has been rather disappointing lately. CU would like to help stimulate interest by offering a free Master Beekeeper Workshop to the first place winners in each category with five or more entrants.

ACADEMIC CLASSES

I now teach two classes in the Entomology Department. One is ENT 260: Biology of the Honey Bee. The other is ENT 264: Practical Beekeeping. Jon Ryan, long-time New York beekeeper and Cornell graduate, takes the lead in the ENT 264 class and does an outstanding job (Fig. 10). In the lecture class, I emphasize the importance of agriculture to the US economy and the importance of honey bees to agriculture.



Fig. 10



NEED HELP IN YOUR OPERATION?

Certification as a Journey or Master Beekeeper requires that students complete three, one-day internships with three different cooperating beekeepers. Each of the internships must focus on a different aspect of beekeeping, such as making splits, swarm control, pulling honey, extracting and processing honey, and so forth. If you would like to help participants in the Master Beekeeper Program earn certification and get some volunteer help in your operation for a day, please contact me directly to discuss the possibilities.

ADOPT A LEGISLATOR

Because so many New York beekeepers have taken the time to write to their local legislators and to the chairs of the Senate and Assembly Agriculture Committees, we have been successful in obtaining and sustaining funding for the apiary research and extension program at Cornell over the past several years. Because of your efforts, we have been able to build up Dyce Lab's research capacity to better serve beekeepers throughout the region and the US, and, we have been able to put together a comprehensive Master Beekeeper Program. I want to thank each and every one of you who have helped in this effort, and I want to encourage you to continue your efforts.

Unfortunately, funding for the last 2 years has been mired in the bureaucracy and that has made it impossible to maintain the extension program at its former level. This problem seems to be resolved, but your support in continuing this funding is critical.

If you have not been involved before, there is no time like the present to let your elected representatives know that you would like to see the state continue its support of honey bee research and extension in New York. It only takes 30 minutes once a year to write a few letters expressing your support. You should write to the people listed below and refer to the specific program – **Cornell University Apiary Research Program**. A few kind words for past support always helps, as does an occasional case of your finest honey to give your legislators a visible reminder of the industry that makes so many important contributions to agriculture in New York.

The leaders of the Senate and Assembly Agriculture committees are:

Senator Nancy Lorraine Hoffmann
Senate Agriculture Committee
606 Legislative Office Building
Albany, NY 12247
518-455-2665

Assemblyman William Magee
Assembly Agriculture Committee
641 Legislative Office Building
Albany, NY 12248
518-455-4807

The leaders of the senate and assembly are:

Senator Joseph L. Bruno
909 Legislative Office Building
Albany, NY 12247
518-455-3191

Assemblyman Sheldon Silver
932 Legislative Office Building
Albany, NY 12248
518-455-3791

You can locate the names and addresses of your local senator and assembly representative through Senate Information (518-455-3216) and Assembly Information (518-455-4218).

Governor Pataki can be reached at:

Governor George Pataki
Governor's Office - Executive Chamber
State Capital
Albany, NY 12224

FARM BUREAU

NYS Farm Bureau has been extremely helpful in securing legislative support for bee research. If you are not a member, give them a call, check them out, and see what you have to do to join. Membership brings many benefits, including access to group health insurance.



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