Mid-Atlantic Apiculture Research and Extension Consortium

Delaware, Maryland, New Jersey, Pennsylvania and West Virginia cooperating

MAAREC

Bee AWARE

Notes and News on Bees and Beekeeping

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Focus on: THE SMALL HIVE BEETLE

The small hive beetle (*Aethina tumida*), our newest exotic beekeeping pest, was first identified in Florida in the spring of 1998. Before its discovery in the U.S., the beetle was known to exist only in tropical or sub-tropical areas of Africa. It is not certain how they found there way to North America.

While the small hive beetle is not considered a serious pest in South Africa, some Florida beekeepers experiencing heavy infestations have seen the quick collapse of strong colonies which they blame on the small hive beetle. As of late 2000, the beetle has been widely found in apiaries in Florida, Georgia, and North and South Carolina and also in more limited instances in the states of Maine, Massachusetts Minnesota, Ohio, Tennessee and the MAAREC states of New Jersey and Pennsylvania. So far, the areas where it has successfully established itself appear to be restricted to regions along the East Coast of the U.S. This is probably due to the sandy soil conditions in these areas which allow the beetle to successfully complete its life cycle.

DESCRIPTION

The adult beetle is small (about 1/3 the size of a bee), reddish brown to black in color and covered with fine hair. The larvae are small, cream colored and similar in appearance to young wax moth larvae. You can differentiate the beetle larvae from wax moth larvae by examining their legs. Beetle larvae have only three sets of short segmented legs just behind the head unlike wax moth larvae which also have six paired fleshy prolegs which run the length of the body.

LIFE CYCLE

Adult small hive beetle females lay large egg masses on or near beeswax combs. In South Africa the eggs hatch in a few days, producing a great number of small larvae. The larvae consume pollen and wax but are also reported to eat honey bee eggs and young larvae. The larval stage is completed in 10 to 16 days and then the mature larvae leave the bee colony and drop to the ground where they pupate in

the soil. Adults emerge from the soil in approximately 3-4 weeks. The females are capable of laying eggs approximately one week after emerging from the soil. They are good flyers and easily disperse to new colonies where they deposit eggs to begin a new generation. The beetles do not reproduce during colder seasons but adults apparently live several months.

DAMAGE

While this beetle is considered a minor pest in South Africa, U.S. experience to date would suggest that it has the potential to be a pest of significant economic importance, at least in some areas. Whether or not it can successfully establish itself in temperate regions or in areas without sandy soil is unknown. This information will be the key to determining its importance as a pest in the northeast.

In North America beetles appear to be able to readily take over even strong colonies with little resistance by the bees. A few beetles can produce masses of larvae. In addition to consuming the resources of the colony, the adult beetles defecate in the honey causing it to ferment and run out of the combs. Full honey supers stored in the honey house or on hives above bee escapes and weak and/or queeenless hives with honey but few bees, seem most vulnerable to attack.

DETECTION & CONTROL

All MAAREC region beekeepers should perform spring and subsequent hive inspections with an eye open for this pest. When opening a hive beetles run from the daylight to find hiding places. Adults may be detected under top covers or on bottom boards. If an infestation is heavy, both adults and masses of larvae may be seen on the comb and bottom board.

Small hive beetle larvae do not produce silken tunnels, webbing or cocoons in the hive (as wax moth larvae do). Varroa mite sticky boards are ineffective for use in detecting adult beetles. Corrugated cardboard with the paper removed from one side, placed on the bottom board at the rear of the hive, has been successfully used to detect adult beetles. Fermented honey exuding from supers in storage, in supers waiting to be extracted, or on active, especially weak colonies, is a sign that hive beetles may be present.

If you find evidence of, or are concerned about the possibility of a hive beetle infestation, you should contact your state apiary inspector immediately. If possible capture a couple of specimens. MAAREC states have received section 18 (emergency use) registrations for the chemical coumaphos, in the form of Bayer Bee Strips®, to control this pest but positive beetle ID should be made before control measures are applied. If colonies are to be moved from areas of beetle infestations, a soil drench insecticide (Y-Tex Gardstar® 40% EC Livestock and Premise Insecticide) can be applied to the new apiary site 24-48 hours before hive placement. Read and follow the label directions when using these or any other pesticide.

For more information, please visit the Mid-Atlantic Apiculture Research and Extension Consortium website: http://maarec.cas.psu.edu. or APIS website: http://www.ifas.ufl.edu/~mts/apishtm/apis98/apjul98.HTM or Florida State Collection of Arthropods at http://www.ifas.ufl.edu/~entweb/aethina.html

An Overview of Foulbrood in the United States: the Past 45 Years

NOTE: Bill Wilson before he retired this fall from USDA prepared an excellent retrospective on AFB. This is a summary - see original for more detail.

American and European foulbrood (AFB & EFB) are bacterial diseases of honey bees that are highly contagious and spread rapidly between bee colonies and apiaries. Before the mid-1940's, the only reliable means of limiting the spread of AFB (*Paenibacillus larvae*) was to shake adult bees onto wax foundation or kill the colonies and burn or boil all of the combs and wooden equipment. These practices were somewhat beneficial in slowing the spread, but they were expensive in terms of labor and destruction of equipment.

Discovery in the mid-1940's that sulfa drugs could control European foulbrood (*Melissococcus pluton*) disease ushered in a new era. Some bee inspectors did not initially accept sulfa treatment as valid, but eventually most beekeepers and inspectors realized the economic value of protecting colonies with this chemical treatment. It wasn't long before the practice became widespread, making large-scale commercial beekeeping viable and profitable. The use of sodium sulfathiazole was eventually discontinued however because it didn't work against EFB, and when used for AFB, it left persistent residues in extracted honey.

Beekeepers experienced heavy outbreaks of EFB in several parts of the U.S. in the 1950's before bee researchers in Canada and in the U.S. reported effective control of both foulbroods with oxytetracycline HCL (Terramycin® or TM) and other antibiotics. Some of the antibiotics not only controlled foulbrood but they also had a stimulatory effect and the bees reared more brood and produced more honey when it was utilized.

Studies demonstrated that Terramycin needed to be present continuously for 5-6 weeks or longer in the spring while worker bees cleaned out dead larvae, pupae and dark scales laden with *P. larvae* spores. If the supply of Terramycin was used up before the diseased brood had been removed, the workers would spread the bacterial spores to healthy larvae starting the disease cycle all over again.

Research in the 70's found AFB and other honey bee disease pathogens could be destroyed by use of ethylene oxide (ETO) fumigation or exposure to gamma radiation. Several states (WV, MD, NJ, DE for example) obtained approval to use ETO to sterilize bee equipment, but currently only WV, MD and NC have active ETO programs. Both methods require trained personnel, equipment and utilization of safe fumigation or radiation chambers.

In 1961 Bill Wilson developed the antibiotic patty method for applying chemical treatments to bee colonies. The patty consisted of heated honey, powdered sugar plus an antibiotic. The mix was kneaded to form stiff queen-cage candy before being made into a pancake-sized patty. These patties slowed consumption of the treatment material to 7-10 days, beneficially extending the time the antibiotic was in the hive. In 1970, a longer lasting patty was developed, containing 1/3 lb. (151 gm) of vegetable shortening (Crisco®), 2/3 lb. (303 gm) of granulated table sugar (surcrose) and 2 tablespoons (ca. 18 gm) of soluble Terramycin powder. The patty mix could also be made with petroleum jelly (Vaseline®) and powdered sugar, but the consistency was often too sticky. The patties were called antibiotic extender patties or Terramycin extender patties.

When used properly, antibiotic extender patties offered the best method of applying an antibiotic such as Terramycin since they render a uniform dose of treatment chemical over an extended period while the therapeutic integrity or stability of Terramycin is protected for several weeks by the shortening. Many

beekeepers used one or two Terramycin extender patties (Terra-Patties) per year with excellent results. Unfortunately changes not based on research results were made to the patties over the years resulting in formula change. Some patties ended up with very small quantities of Terramycin. Under dosing results in ineffective AFB treatment and poor disease control.

After nearly 45 years of excellent foulbrood control, a few cases of AFB that did not respond to Terramycin were reported in the U.S. in 1996. In 1997, several honey bee colonies in Wisconsin were given heavy dustings of Terramycin and powdered sugar multiple times with no obvious reduction in the amount of AFB-diseased brood. The first reported cases were apparently in small bee operations in the northern Mid-Western states that were buying nucs in the spring and exchanging brood combs. Recently, resistance has been found in large migratory beekeeping operations in other places.

Some individuals have claimed that Terramycin extender patties caused *P. larvae* to become resistant to Terramycin. This is not correct since resistance first showed up in Argentina in the early 1990's where they were not using extender patties. Terramycin resistance also appeared in Canada in the late 1990's where they do not have a history of using Terramycin extender patties. Long-term exposure to Terramycin or improper dosage levels apparently created the bacterial resistance. Leaving treatment materials in a hive longer than the label recommends or under dosing is not a good idea since it represents a violation of the label and can contribute to the development of bacterial resistance to Terramycin.

Tylosin and other antibiotic compounds are currently being evaluated by USDA for use in foulbrood control, and especially for control of the strain of *P. larvae* that is resistant to Terramycin. Finding new chemotherapeutic controls is critical for the short-term future of commercial beekeeping. Treatments must also include AFB-resistant bee stocks developed from a hygienic-behavior breeding program. (See review of hygienic behavior in honey bees was published recently by Spivak and Gilliam (1998) in Bee World.) In the meantime, beekeepers should inspect the health of the brood in their own colonies at least once per year. Heavily infested AFB colonies or those that fail to respond to chemical treatments should be destroyed. Combs from diseased hives should be burned or the wax recovered by melting at a high temperature, and the resulting spore-contaminated honey destroyed.

What does the future hold for AFB control? The U.S. beekeeping industry could be faced with a widespread epidemic of American foulbrood disease that would be just as destructive as uncontrolled infestation of varroa mites. This scenario could take place if beekeepers fail to control Terramycin-resistant AFB and scientists fail to develop an effective substitute for Terramycin within the next year or two. Although Terramycin can clean up AFB-diseased colonies if enough treatments are made over a long period of time, the best use of Terramycin is still prevention of AFB, especially in an apiary where an AFB colony had been identified. A combination of control measures known as integrated pest management (IPM) will be the best approach for future foulbrood control (See Bee World, Nasr and Kevan 1999 article for review).

References

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Wilson, W.T., J.R. Elliot and J.D. Hitchcock. 1971. Antibiotic extender patties for control of American foulbrood. J. Econ. Entomol. 35:327-330.

Wilson, W.T. 2000. An overview of foulbrood in the United States: the past 45 years. Bee Culture: 128(10): 24-28 (also in Texas Bk. Assoc. Oct/Nov 2000 Newsletter).

The Benefits of Watershed Preservation to Bees

Grass filter strips, riparian buffer zones, and streamside management zones are all environmental buzz words commonly used these days to describe methods that help protect our streams, rivers and bays from pollution and runoff. These words can also mean opportunities for native wild bee species and honey bees by enhancing the natural environment and providing more forage areas.

The most effective tools currently being used to cope with non-point source pollution from yards, roads, cities, forests and agricultural lands are grass filter strips, riparian buffers and streamside management zones. They aid via filtering and removing chemicals, sediments, and nutrients before they enter streams and rivers.

Grass filter strips, the oldest method, are man made strips that are used to disperse water flowing off agricultural lands, flat surfaces and roads to control pollutants and sediments by trapping them before they can enter waterways. These grass strips are designed and managed for low volume water run-off control. Although the major plants in these filter strips are grasses, plants such as Dutch clover, dandelions, henbit, smartweed and chickweed can inhabit or be incorporated into these strips so bees might take advantage of this forage. Grass filters also provide undisturbed nesting habitat for ground nesting bees that would otherwise be destroyed.

Riparian Buffer Zones are broken down into four categories: forest, agricultural, suburban development, and urban. Streamside management zones are forest areas nearest to water that become oriented away from timber production and towards water quality protection. They vary in size according to the slope of the land. These zones benefit bees by allowing natural diversity to remain intact. When the entire forest becomes one dominant commercial tree species it generally is a poorer environment for the majority of animals.

Agricultural buffers are areas of trees, plants, and grasses separating croplands or pastures from water bodies. These buffers are designed to trap and remove nutrients, sediment, pesticides, and other chemicals. They are being developed from and re-established in areas that have been used as pastures or cropland for many years. Suburban and urban buffers can be made from the remains of forested or agricultural land cleared for development. They can also be green corridors around parks, ballfields, roadways, landscaped commercial structures and backyards..

Certain guidelines have been developed by federal and state governments that must be adhered to when these methods are implemented by the landowner, whether it's a municipal government, a developer, a business, or a home owner. These guidelines clarify such things as how big the zones need to be and what types and number of the varying plants that will be used in them. Plants advantageous to game animals and birds are listed, but they don't describe which plants would be beneficial specifically for insects such as butterflies or bees.

If you are considering developing a buffer zone on your land, or have bee colonies on a farm that's going to implement buffers, or sit on/advise a planning board overseeing such plans, you have a opportunity to suggest or use plants and trees from these recommendations that would benefit bees especially at times when honey flows are weak or help establish new nesting/foraging areas. It should be noted that these lists are not complete and can be amended to include more native vegetation from your local area.
Mike Embrey, Wye Research and Education Center

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Know What to do in an Interview

When the media comes to call, view it as an opportunity to advance beekeeping, not a threat

Beekeepers should not fear being interviewed by the media — **if prepared**! Media interviews should be viewed as an opportunity to advance positive messages about bees and beekeeping. The absolute key to a successful media interview, however, is advance work — knowing the reporter's line of questioning and having your key talking points in place for the interview. In most cases, you will be contacted by telephone. You should:

- Determine the nature of the reporter's **request**. Listen actively and ask questions to help you better understand the information he or she is seeking.
- Determine the reporter's **deadline**. You don't have to speak to the reporter at the moment he or she calls, *no matter how persistent the request or how tight the deadline*. Choose a time that is convenient for both of you. Oftentimes, a reporter is on an immediate deadline. Don't be intimidated by this. Remember that you need time to prepare. Forgoing an interview is better than conducting one unprepared.
- **Confirm** the reporter's name and the name of the media outlet (newspaper, television or radio station) he or she represents, and agree upon a time to talk, and who will call whom.
- Next, prepare for the interview by determining your **key talking points**. Talking points are sentences that contain the message you wish to deliver to the media. For example: "*What are the major points you want to cover? How will you handle pesky bee questions (they are yellow jackets), mite control or possible negative points?*
- During the interview **use your talking points throughout your interview**. Inject them into the conversation. The more frequently you deliver your talking points, the better chance you will have in getting them to appear in ink or over the airwaves. Rehearse them before talking to the media representative.
- There are certain media situations, such as on-camera interviews or questions on complex subjects such as mites and product safety issues, that require careful consideration. Try to prepare for such questions. **Don't answer if you are unprepared**.
- Finally don't ever assume what you say will not be used. **If not comfortable, don't say it**. You can refuse to answer if the question is not suitable or phrased in such a way that you will have to be negative. **It is always better to not answer than give wrong information**.

Prepared for MAAREC by Dewey M. Caron

MAAREC INFORMATION LEAFLETS

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1.3 What is the Africanized Honey Bee?

2. Starting With Bees

2.1 Tips on How to Handle Bees
2.2 Beekeeping Equipment & Supplies
2.3 Queen & Package Bee Suppliers (not included - under revison)
2.4 Sources of Information/Assistance for Beekeepers
2.5 Agricultural Alternatives - Beekeeping
2.6 Beekeeping for Beginners
2.7 Keeping Bees in Populated Areas/Tips for Suburban Beekeepers

3. Bee Management

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3.3 Dividing Honey Bee Colonies
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5. Pollination

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5.3 Moving Bees
5.4 Pollination Contracts

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http://MAAREC.cas.psu.edu

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Managing 1500 Hives With Only a Pick-up Truck

James E. Tew, Ohio State University, Wooster, OH

Oliver Collins and his wife, Cheryl manage 1500 hives — with no outside help. They move these hives many times beginning in Spring through late Summer. And they do it all with only a pickup truck. Short of working themselves to death, how is that possible? With trailers — lots of trailers. Though Oliver uses only that heavy-duty pickup, he has 51 trailers, each capable of holding twenty colonies and about 500 hives that are not trailered.

Obviously, moving 1000+ colonies in loads of twenty colonies each can take a long time if the distances traveled are very far. Operating on the Eastern Shore of Maryland, near Salisbury, Oliver has developed a specialty pollination business based predominantly on local watermelon, cucumber, cantaloupe, and apple contracts. He rarely gets out of his Zip Code to fulfill these pollination contracts, and most of his customers are his neighbors.

The upfront cost of the trailers is expensive. Oliver builds his own trailers and they are deluxe. No short cuts taken anywhere. All Welds are clean and ground smooth. New tires and new axles are used to assist with the "hitch and go" concept. The trailer beds are capable of being removed and left sitting on jacks, but normally, the axle is left under the trailer bed. The trailers are all alike. If a problem arises, it arises fifty-one times, but it's the same problem — not fifty-one different problems on different styled trailers. A single jack is used to remove the trailers from the truck and can then be used on the next trailer.

Except for a central walkway for working bees from the trailer, there is no trailer floor. Individual hives sit in metal brackets and are lashed down with a continuous looped rope. After a few years service, the trailer is sandblasted and repainted. The trailer design is the epitome of practicality — nothing extra, but everything that is needed is strong, well maintained, and painted. The trailers obviate the need for other human labor other than the assistance of Cheryl (and his dog that goes along, too). Oliver feels that, though the initial cost of the trailers is significant, it's upfront and one time, whereas labor costs are erratic and continually rising.

Oliver has a specialized operation of pollination only. Honey production is minimal. Oliver does not produce any queens but buys them from commercial queen producing operations, and he requeens on schedule. Colonies are worked on the trailers on a seasonal basis. For the most part, colonies are kept strong and are housed in two deeps. There are no tall colonies. Partial trailers are not rented out. If the grower request is a few hives short, Oliver just sends in a full trailer. It's not worth taking extra hives from the trailer to cater to individual pollination orders. Oliver uses written contracts.

Like a general overseeing battlefield conditions, Oliver uses a large "whiteboard book" on which he lists grower names, all the trailer locations, number of trailers needed, and dates of move in and out. By using such a large board, he can see the big picture and determine where to shift trailers in response to upcoming pollination requests.

Like all of us, Oliver is not as young as he once was. He said that he has made every effort to keep everything at least nineteen inches off the ground (even his smoker bucket). The 500 hives that I mentioned earlier are put onto custom-built stands — Collins designed. The

stands are lightweight, well made, and collapsible. Another development of Oliver's is the entrance closing/reducer device. He uses a zinc-coated, metal grid, which is held in place by clips on either side of the entrance. It can be used to either close or, by reversing, can be used to reduce the entrance. For a fully open entrance, the metal grid is simply removed. Due to his minimalization of human labor, Oliver also has designed a hand truck-type hive mover as well as a hive carrier that two people can use to move individual hives.

The Collins' bee operation is neat, clean, freshly painted, organized, and well maintained. It was a joy to visit his facility. His narrow focus on a specific aspect of commercial beekeeping — pollination — has resulted in a finely tuned, modern operation. He has used his mechanical skills to devise some clever labor saving devices that could be useful to many beekeepers — pollinators or not. Our industry would profit greatly if we had more beekeepers like him.

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Upcoming Events

Maryland MSBA Spring Meeting
Feb 17, Howard Co Fairgrounds, Friendship, MD
Contact Dean Burroughs 410 546-2910
Adburroughs@ssu.edu
Feb 24, Wye Res & Educ Ctr
Contact Mike Embrey 410-827-8056

EAS Annual Meeting & Short Course
Aug 6-10, 2001 Cape Cod Mass
Contact Jay Bathelmeus
Capebees@capecod.net

WV Spring Meeting
Contact John Campbell 304 478-3675

NJBA Meeting & Short Course
Feb 7, Charlies Other Brother Rest, Mt Holly
SC Feb 16 & 17, Rutgers
Contact Ray Markley 609 261-1638 or
PatHender@aol.com

Delaware Short Course & Spring Meeting
SC Feb 17 & Apr 14, W. Seavers Dover
Spr Mtg March 17 Georgetown, DE
Contact Warren Seaver 302 674-8969

Pennsylvania Newsletter (Co meetings)
Contact Yvonne Crimbring
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MAAREC, the Mid-Atlantic Apiculture Research and Extension Consortium, is an official activity of five state beekeeper associations, the state Departments of Agriculture, land grant universities and the U.S. Department of Agriculture. The following are cooperating members:

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