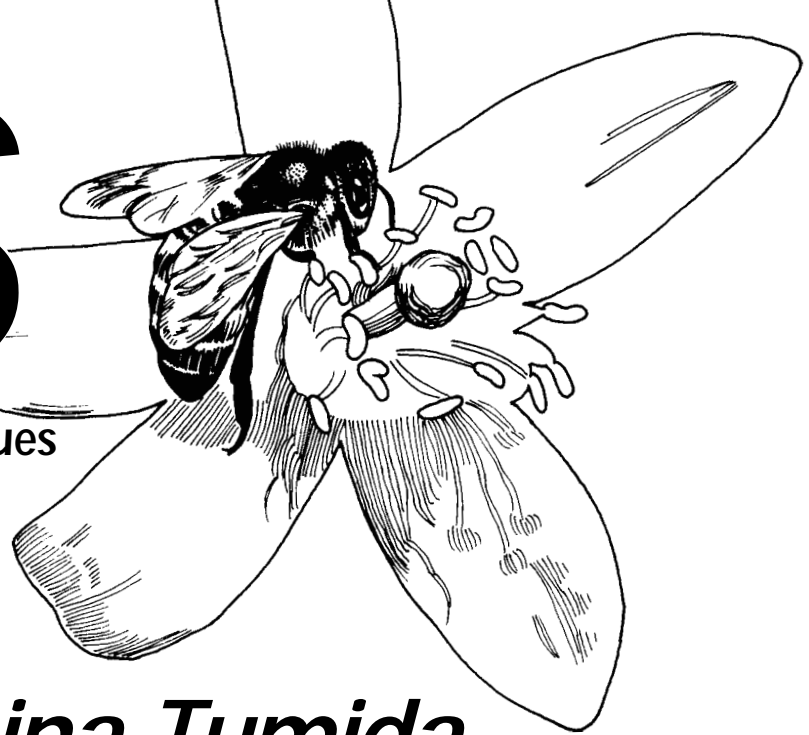


# APIS



## Apicultural Information and Issues

From IFAS/University of Florida

Department of Entomology and Nematology

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Beekeepers should be on the lookout for the South African small hive beetle. Stored, honey laden supers are prime targets for this aggressive scavenger. *Page 1.*

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## Aethina Tumida

### New Beehive Pest in the Western Hemisphere

THE MANTRA of free global trade continues to be heard around the world. As part of this philosophy, acronyms have sprung up like weeds across a cultivated field. These include the likes of the North American Free Trade Agreement (NAFTA)<sup>1</sup> and the General Agreement on Tariff and Trade (GATT)<sup>2</sup>. Although globalization is considered by most pundits to be "good," there is often a price to pay. One is the possible loss of jobs in a region or industry as shifts in labor costs create opportunities for some at the expense of others. Another is the impact of world movement of biological material around the globe. Examples are legion, from humans and mosquitoes to moths and mussels.

Beekeeping is no stranger to this phenomenon. The honey bee itself is an introduced species in North America as are many of the crop plants it pollinates. In France, an introduced plant from the eastern part of the United States is one of that country's most important nectar sources<sup>3</sup>. In Florida, the melaleuca tree (*Melaleuca quinquenervia*), a relative of eucalyptus introduced from Australia, was originally thought to be potentially harmful to beekeeping. The tree's strong-tasting nectar, it was feared, would contaminate the citrus and palmetto honey crops. The concern was unfounded. Instead, the plant became extremely useful to beekeepers as a prime nectar source for buildup and maintenance in the fall of the year. However, it has also been blamed for everything from being a fire hazard in urban areas to drying up fragile wetlands like the Everglades. Thus, a widespread campaign is underway to rid the state of as much of this "noxious weed" as possible<sup>4</sup>.

**B**OTH the tracheal<sup>5</sup> and Varroa mites<sup>6</sup> are recently introduced species that have greatly affected North American beekeeping. Most certainly their coming was the result of increased movement across the world by ships and airplanes. After introductions of these extremely damaging parasites, it was anticipated that perhaps only a few other organisms might be introduced that would greatly affect North America's beekeeping industry, the Asiatic bee mites, *Tropilaelaps clareae* and *Euvarroa sinhai*. These remain on the Animal Plant Health Inspections Service's (APHIS) list of potentially damaging organisms. Not present on the APHIS list is *Aethina tumida*, the small hive beetle from South Africa. This organism merited only a few paragraphs in the second and third editions of *Honey Bee Pests, Predators, and Diseases*

*Continued next page*

<sup>1</sup> <http://uls.tradecompass.com/ecs/demo/ftas/nafta/trtytxt/chap1.htm>

<sup>2</sup> <http://cerebalaw.com/gatt26.htm>

<sup>3</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis97/apjun97.htm#4>

<sup>4</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis97/apjan97.htm#2>

<sup>5</sup> <http://www.ifas.ufl.edu/~mts/apishtm/threads/tracheal.htm>

<sup>6</sup> <http://www.ifas.ufl.edu/~mts/apishtm/threads/varroa.htm>

(Cornell University Press, 1990, 1997). In his description of this insect in the second edition, Dewey M. Caron wrote, "One can only hope that the beetle will not be transported to other beekeeping areas." Hope springs eternal, but *Aethina tumida* showed up in southeastern Florida in the spring of 1998, and Florida Agriculture Commissioner Bob Crawford has formally asked the U.S. Secretary of Agriculture for assistance in determining appropriate regulatory action.

**H**OW THE SMALL hive beetle made the long trip from its African homeland remains an enigma. The first sign of its presence was a large number of larvae (worms) found in honey extracting rooms. The larvae superficially look like those of the wax moth (*Galleria mellonella*) and were considered so at first. Both wax moth and beetle larvae can occur together in the same bee colony. On closer inspection, however, it becomes clear these are not the growth stage of Lepidoptera (butterflies and moths) but are in fact that of Coleoptera (beetles). Beetles, like moths and bees, have the kind of insect development called "complete metamorphosis."

This characteristic life cycle begins with an egg, which hatches into a feeding larva (worm) that completes its development during a resting stage (pupa), and finally emerges as an adult, complete with six legs and two pairs of wings, the reproductive phase. While wax moth larvae have many uniform, small "prolegs," beetle larvae possess three pairs of larger, more pronounced legs near the head. Another difference is that the beetle larvae do not gain as great a size as do wax moth larvae before pupation. They also do not spin a cocoon in the hive, but must complete their development in the soil outside the beehive. The adult beetle is red just after pupation and then

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This larval army, along with its effect on stored honey, is a chilling sight indeed.

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turns black. It is fairly uniform in color, moves rapidly across the comb, and is extremely difficult to pick up by hand because it is covered with fine, hairlike spines. The beetle is visible to the naked eye and is about one-third the size of a worker honey bee.

So far, *A. tumida* has been found in only three Florida counties (St. Lucie, Indian River and Brevard). The Florida Apiary Inspection Service is combing the state for other infested hives. In the meantime, a movement moratorium has been implemented in Florida. Colonies can be relocated after being cleared for beetle presence by a Florida Department of Agriculture and Consumer Services inspector. This procedure will be revisited during a July 7, 1998, meeting of Florida's Honey Bee Technical Council. Most of the heavy honey bee movement has already occurred, as the citrus flow is concluded and colonies have been transported to other sources. It is hoped that those which have been removed were not contaminated, but this is yet to be established. Any beekeeper who sees either adult beetles or larvae in colonies should contact an apiary inspector for verification.

The good news is that the beetle is not considered a problem in South Africa and rarely actively destroys colonies. It is in the family named nitidulidae, a group known as "sap beetles." It is also a scavenger and, like the wax moth, must have pollen for protein to ensure its development; there is little evidence it attacks any stage of the honey bee life cycle. The bad news is that it is an introduced species and may be more damaging than in its homeland. After looking at heavy larval infestations in St. Lucie County, it is difficult to reconcile the rather benign reputation it holds in South Africa. Literally thousands of the larvae can be seen in heavily infested colonies. They crawl out of colony entrances or across honey house floors in an effort to reach soil, where they burrow to complete their development. This larval army, along with its effect on stored honey as described elsewhere, is a chilling sight indeed.

Published references and electronic communications from South African beekeepers and regulatory authorities indicate that beetle infestations in their country are not common and are generally the sign of sloppy beekeeping practice. This is because, like the wax moth, the beetle is a scavenger and must get a foothold in a

colony before it can reach population numbers sufficient to undermine a beehive. At this time, it is difficult to say how aggressive the beetles are in causing colony mortality in Florida. Suffice it to say that some experienced beekeepers have seen strong colonies quickly collapse, which they blame directly on the beetle.

Perhaps the best and most complete study done on the beetle is "The Small Hive Beetle, *Aethina tumida*," by A.E. Lundie (Union of South Africa, Science Bulletin 220, 1940, 30 pp.). It appears to be a tropical insect and not reported in temperate areas. This may mean fewer problems for colder portions of North America. According to Dr. Lundie, the most objectionable behavior of the larvae is that they defecate in honey. This, presumably in conjunction with secretion of other materials into the sweet, eventually results in fermentation and frothiness that has the characteristic odor of "decaying oranges." The fermented honey runs out of the comb and may pool on the bottom board or honey house floor. At that point, honey bees will ignore the mess and may even abscond. Larvae will heavily damage delicate, newly manufactured comb, causing honey to leak out. However, old brood comb reinforced with bee pupal skins can withstand heavy larval infestation without disintegrating. As a remediation technique, the objectionable, fermented honey can be washed off with a garden hose and the bees will often resume their activity to clean the comb.

Dr. Lundie says that the principal time beekeepers have trouble is when combs of honey stand for long periods in the honey house prior to extraction, especially those that contain pollen. Cappings set aside during the extracting process may also become "wormy." Honey left over after Porter bee escapes for a period is also at risk. All these lead to infestations because honey bees are not available to remove either larvae or adults from the colony. Thus, Dr. Lundie concludes, "Any factor which so reduces the ratio of the population of a colony of bees to its comb surface that the bees are no longer able to protect this comb surface adequately is a precursor to the ravages of both the wax moths and *Aethina tumida*."

This is good advice; it already is common beekeeping practice in both Africa and Florida. The bees in Africa, however, are different than those in most of North America. *Apis mellifera scutellata*, the African honey bee, has radically different

behavior from that found in the European *Apis mellifera* bee, managed by the beekeepers of North America. It is already known that African bees in the face of light predation or perturbation readily abscond. In doing so, they leave behind a nest heavily infested with all kinds of possible organisms. Dr. Lundie suggests that this behavior may be a reason why American foulbrood has never taken hold in South Africa. Scavengers like wax moths and *A. tumida* remove abandoned nests so quickly that the disease reservoir ceases to exist. European honey bees are not as likely to abscond as African bees; they also may not be as hygienic in the nest. Both are reasons that their relatives Africanized bees are thought to be more tolerant of the Varroa mite<sup>7</sup>. Another African honey bee, *Apis mellifera capensis*, is also affected by the beetle, but appears also to be withstanding its effects. What does inferior hygienic behavior and the lack of a tendency to abscond portend for North American bee colonies invaded by *A. tumida*? Dr. Lundie provides a hint of this in his publication, saying that when honey bees cannot eject the beetle easily, strong as well as weak colonies may be equally affected. In addition, even in South Africa, at rare times the beetle can heavily affect colonies.

**T**HE CRY for control measures has already reached a crescendo in affected parts of Florida. This is no surprise when one is confronted with colonies that appear to collapse overnight into a frothy mass correlated with high infestations of beetle larvae. *A. tumida* is at its most vulnerable when the larvae leave the hive to pupate in the soil, and this probably represents a good starting point for beekeepers to experiment with controlling this insect by cultural means. Perhaps the larvae can be trapped somehow before they reach the soil. Soil conditions also become important; the larvae may not pupate effectively in too dry, sandy or wet conditions. Dr. Lundie reports some indications that larvae infested with a soil-dwelling fungus died. Certain ants or other insects may prey on the larvae. The imported fire ant (*Solenopsis invicta*) in the southern United States comes to mind.

Dr. Lundie reports that stationary colonies are more vulnerable than those that are moved. Thus, relocating colonies may break the beetle's life cycle, a classic control measure used elsewhere in agriculture. Certainly the bees' self-cleaning behavior

itself should be used to the utmost. Colonies will probably vary in the ability to withstand infestation and should be monitored for the ability to do so. As part of this, beekeepers should be very careful not to provide more exposed comb than the bees can adequately cover, or purposefully infest a colony that doesn't already have beetles. The beetle's arrival could signal a paradigm shift in honey bee management. It is possible that standard practices like stacking empty or weak colonies on stronger ones, making weak splits, and/or liberally exchanging combs may no longer be good options.

Chemical control either in stored supers or live colonies for *A. tumida* appears to be problematic. There are no registered materials in South Africa, and there has been little research on this front. Beetles appear to be most damaging when supers are full of honey, which is contraindicated for any pesticide application due to possible product contamination. The possibility of killing large infestations of beetle adults and larvae by using pesticides inside a colony while not harming bees mirrors the current dilemma in Varroa control.

Researchers are now attempting to grapple with this new problem. In the meantime, the following is suggested:

1. Beekeepers should constantly monitor their operations for presence of the beetle. Detection is relatively easy. The larvae can be examined for the six rather large legs on their front end; wax moth larvae have uniform sized prolegs. The Florida Department of Agriculture and Consumer Services has mailed a pest alert along with photos to all registered beekeepers in Florida. It is also available on the World Wide Web in Adobe Acrobat format<sup>8</sup>. In contrast to those of the beetle, wax moth larvae do not usually move toward light, leave a colony nor burrow into the soil. Adult beetles are easy to spot, uniform in color and about one-third the size of an adult worker bee. They rapidly run across the combs and can often be found hiding in places that are not accessible to larger-bodied honey bees. Until more is known about the beetle in a particular area, it should be assumed that it is far more aggressive a scavenger than the wax moth and may overwhelm even strong, healthy colonies.

2. If *A. tumida* is suspected or detected, the following precautions are suggested:
  - A. Be scrupulously clean around the honey house. Leave filled supers standing only a short time before extraction. Beetles may rapidly build up in stored honey, especially where honey has been stored over pollen.
  - B. Be careful stacking infested equipment or extracted supers onto strong colonies. Beekeepers doing this before the beetle was identified may have inadvertently dealt a deathblow to uninfested, healthy colonies by providing space for the beetles to build up that the bees could not protect.
  - C. Pay close attention when supering colonies, making splits or exchanging combs; all these activities could provide room for the beetle to become established away from the cluster of protective bees.
  - D. Monitor colonies for hygienic behavior; are the bees actively attempting to rid themselves of both larval and adult *A. tumida*? If not, replace them.
  - E. Experiment with traps in an attempt to keep larvae from reaching the soil where they complete their development. Try moving bees from place to place. Adult beetles can fly, but their range is not known with certainty. Some areas may be much more hospitable to beetles due to local soil conditions than others.
  - F. Forget chemical control until research promises some answers. No materials are registered; no materials are legal. Most compounds that kill beetles will also kill honey bees.

The arrival of *Aethina tumida* is not good news for beekeeping in North America. This beetle adds to an already large litany of beekeeping challenges. It is everyone's hope that this insect will not be a significantly worse problem than in its homeland. Until this is known, however, it must be considered an aggressive scavenger that in many instances will overwhelm even relatively strong colonies of North American honey bees of European extraction. Finally, it is a wakeup call. Serious consideration continues to be given to the risk of moving biological material across international borders, and the beekeeping industry should not consider itself immune from this potentially harmful practice. ■

<sup>7</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis97/apmay97.htm#2>

<sup>8</sup> <http://gnv.ifas.ufl.edu/~entweb/aethina.pdf>

## Summer Meetings

MAKE PLANS TO ATTEND the summer meeting of the South Carolina Beekeepers Association at Clemson University, July 16 – 18, 1998. Featured speakers this year are Sherry Jennings of the National Honey Board; Sue Cobey, research apiculturist at the Ohio State University; John Ambrose, extension beekeeping specialist from North Carolina State University; Reg Wilbanks of Wilbanks Apiaries; and the author of this newsletter. Drs. John Ambrose and Mike Hood will also conduct an intermediate beekeeping short course, which is the journeyman level for the South Carolina Master Beekeeper Program.

Accommodations are available at a number of venues on and near the campus. This promises to be an excellent meeting, and registration costs are surprisingly low at \$8 for nonmembers of the Association, \$3 for members and \$5 for families. For more information, contact either Mike Hood, tel. 864/656-0346 (e-mail: mhood@clemson.edu) or the SCBA president, Ron Taylor, tel. 843/835-2482.

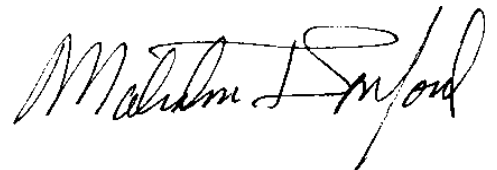
An extraordinary conference will be held in México August 17 through 21. It is a joint meeting of the Eleventh Mexican Beekeeping Seminar and the Sixth Ibero-American Beekeeping Congress. This event will take place in the prime honey-producing region in Mérida, Yucatán. Experts from many Latin American countries, Europe and Canada will attend to share their knowledge in apicultural technology, research, production and commercialization. I had the pleasure of attending one of the Mexican seminars in Toluca a few years back and was invited to speak at the Fifth Ibero-Latin American Apicultural Congress in Mercedes, Uruguay, in 1996<sup>9</sup>. For further information contact the Programa Nacional para el Control de la Abeja Africana, Recreo No. 14, Quinto Piso a la Norte, Col. Actipan, CP 03230, México, DF, tel. (01-5) 5-24-20-39, 5-24-59-26, Fax 5-24-59-24, or e-mail: salvador.cajero@mailers.sagar.gob.mx. ■

## National Honey Board Midyear Report '98

THE NATIONAL HONEY BOARD'S Midyear Report '98 has been released. This eight-page document contains a good deal of information, including a summary of many of the Board's programs and a profile of Mary Humann, who has been marketing director since 1987. Executive Director Bob Smith says the goal of the report is to inform the beekeeping industry of progress toward reaching Goal 400. This refers to facilitating industry growth to the 400 million-pound benchmark. In this effort, three key result areas (KRAs) have been selected. These are: 1) facilitate widespread use of honey to promote health, 2) enhance competitiveness of industry segments through partnerships, and 3) support existing, traditional (current) honey users.

The National Honey Board's program encompasses a long history of assistance to producers and marketers<sup>10</sup>. It has also become a significant presence on the World Wide Web with two sites, one oriented to the industry<sup>11</sup> and another to the honey consumer<sup>12</sup>. For further information, call the Board at 800/553-7162, or email: bob@nhb.org. ■

Sincerely,



<sup>9</sup> <http://www.ifas.ufl.edu/~mts/apishtm/papers/fifth.htm>  
<sup>10</sup> <http://www.ifas.ufl.edu/~mts/apishtm/threads/NHBOARD.HTM>  
<sup>11</sup> <http://www.nhb.org/>  
<sup>12</sup> <http://www.honey.com/>

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