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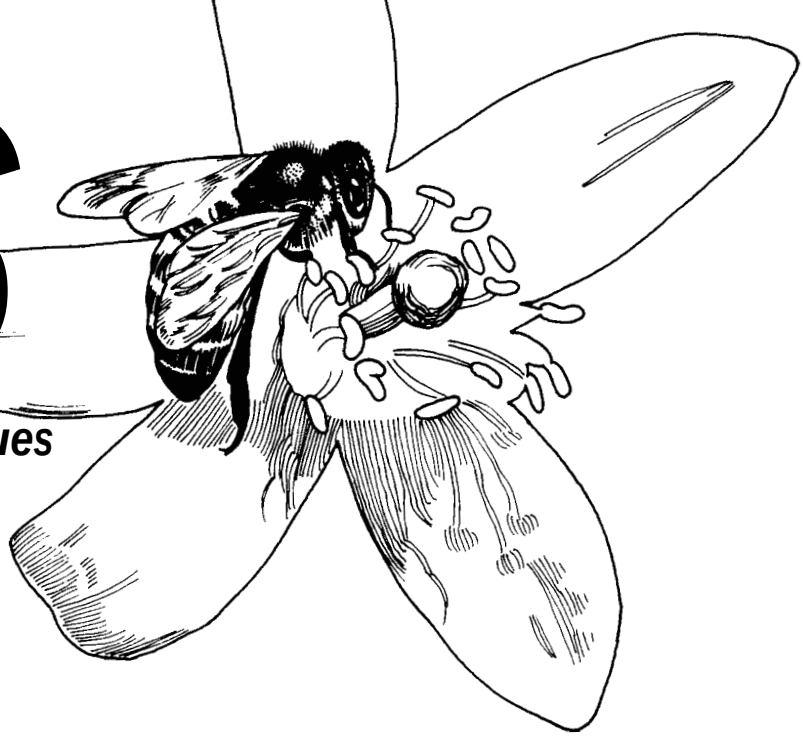

Inside APIS:

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Movement Regulation Lifted On the Small Hive Beetle

THE FLORIDA COMMISSIONER OF AGRICULTURE has written a letter to Florida beekeepers (September 8, 1998) stating that all restrictions on movement associated with the South African small hive beetle (SHB) have been lifted. This action was taken in concurrence with the recommendation of the Honeybee Technical Council[1]. This does not, however, mean that the beetle is any less of a threat than previously thought, and the commissioner urges beekeepers to continue to exercise diligence in detecting and controlling this pest where found.

For a fuller treatment of biology of the SHB, see the July 1998 *APIS*[2]. New pictures have also been added to the Entomology department's website[3], along with the Pest Alert, which is available in .pdf format[4], and photos I put up in conjunction with the above-mentioned *APIS* article[5].

The following are recommended based on the commissioner's letter:

1. Monitor your colonies for weak hives. If beetle larvae are present in the colony, that colony is beyond recovery. Either fumigate the colony or burn the contents on the spot. DO NOT TRANSPORT BEETLES. DO NOT ALLOW THE LARVAE TO PUPATE.

   Colonies can tolerate a few beetles, but the population explosion from one weak colony can cause an infestation that will be able to overcome strong, healthy colonies. Any Environmental Protection Agency (EPA) registered fumigant that is labeled to control wax moth and for fumigation of beehives may be used to control SHB.
2. DO NOT STACK any beetle-infested combs until fumigated and washed to remove all beetle slime. Beetle slime is repellent to bees.
3. Although fire ants and armadillos eat some larvae as they enter the ground, their impact on the population is minimal. Some pesticides may assist in the control of the SHB. Because pesticides are site-specific, the product used must be labeled for use on the target sites listed on the label (e.g. citrus groves, beehives, pastures, etc.). However, some pesticides have additional *Continued next page*

[1] http://www.ifas.ufl.edu/~mts/apishtm/apis98/apaug98.htm#1
[2] http://www.ifas.ufl.edu/~mts/apishtm/apis98/apjul98.htm#1
[3] http://gnv.ifas.ufl.edu/~entweb/aethina.html
[4] http://gnv.ifas.ufl.edu/~entweb/aethina.pdf
[5] http://www.ifas.ufl.edu/~mts/apishtm/apis98/aethina/aethina1.htm

The Threatened African Honey Bee

TO THOSE IN THE WESTERN HEMISPHERE, the idea that the African honey bee (AHB), *Apis mellifera scutellata*, is a threatened species may seem to be an oxymoron. Could this be the same insect that has taken much of South and Central America by storm? One that not only is extremely defensive in deterring predation, but also tolerates the Varroa mite without chemical treatment in the New World. The answer is yes, but in the same breath it must be said that so far this is only occurring in its South African homeland. The bizarre tale is eloquently told by Sue Cobey in *Bee Biz* (Issue 8, July 1998, pp. 7–10), who recently visited South Africa on invitation from those beekeepers interested in learning instrumental insemination to help them confront this dilemma.[6]

It turns out the AHB is being overrun by its own version of a Trojan Horse, the hollow wooden statue that hid the Greek army as a ruse, and was given to the Trojans leading to the fall of their fair city[7]. The honey bee rendition of this is territorial incursion by *Apis mellifera capensis*, the native bee of the South African Cape of Good Hope, into AHB country. Unlike other honey bees, the Cape bee has a high degree of thelytoky. This is the capacity for laying workers to produce fully functional queens from unfertilized eggs. Although rare, it is present in other stocks as noted by G. DeGrandi-Hoffman and colleagues (*Bee Science*, Vol. 1, No. 3, pp. 166–171, May 1991).

This characteristic apparently developed in response to the windy conditions prevalent on the Cape of Good Hope, according to Ms. Cobey, where virgin queens may have to wait long times before being mated and often can be lost. The latter would normally result in laying worker colonies, which under most circumstances could produce only drones and be doomed. Ms. Cobey, however, explains that Cape bee laying workers emit queen-like pheromones and thus exert reproductive control over their sisters. Hives with these so-called "false queens" can survive for long periods, eventually reverting to the normal queenright situation. Although those in the Cape manage their bees like beekeepers elsewhere, colonies of Cape bees are notoriously difficult to requeen, according to Ms. Cobey. Thus, beekeepers routinely make increases by simply splitting colonies and allowing them to do what comes naturally, raise their own queens.

> "Could this be the same insect that has taken much of South and Central America by storm?"

Ironically, the Cape bee, not isolated geographically from other areas, was first thought to be endangered by gene flow from outside its natural range, Ms. Cobey says. But the situation turned topsy-turvy when the insect was moved northward by migratory beekeepers about 1992. In relatively few months it was observed that AHB queens disappeared or were rejected, brood patterns became irregular and scattered, multiple eggs appeared in cells, and fighting increased while foraging decreased. In addition, minor beekeeping problems became serious, brood was abandoned, and housekeeping and hygienic behavior ceased[8]. Half the commercial AHB colonies (estimated at 50,000) were dead within a year, and the losses continue to this date.

Cape worker bees, according to Ms. Cobey, use their queen like pheromones to control both AHB workers and queens. They are treated like queens and quickly assume a colony's reproduction, ousting AHB queens. Worse, they invade nearby colonies and the phenomenon quickly spreads. Colonies taken over by Cape bees, Ms. Cobey concludes, will not accept AHB queens, dwindle and die. Management practice has also unknowingly helped the problem as most beekeepers split colonies and/or hive the

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Small Hive Beetle continued

secondary benefits in that they control additional pests not found on the product label. For instance, a pesticide labeled for use to control fire ants in citrus groves may also assist in the control of the SHB. Keep in mind that the effects these treatments have on bees has not been fully researched so USE WITH CAUTION and at your own risk. The higher off the ground the hive is, the less risk. Also, do not use a pesticide that contains precautions for use around foraging bees.

4. Moving colonies breaks the beetle life cycle. Ground treatments can be applied to the new location a week or two before movement to reduce risk to the bees. The old location can be treated after the bees are moved. Make sure the pesticide contains label directions for use on the site(s) being treated. Dursban, Diazinon and GardStar are examples of products that may be beneficial in the control of the SHB under these conditions.

If there are questions, please call your local inspector or the Gainesville office, (352) 372-3505, extension 114. ■

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[6] http://IRIS.biosci.ohio-state.edu:80/honeybee/breeding/class.html
[7] http://www.temple.edu/departments/classics/troyimages.html
[8] http://www.ifas.ufl.edu/~mts/apishtm/apis98/apsep98.htm#1
[9] http://www.ifas.ufl.edu/~mts/apishtm/apis94/apjul94.htm#2
[10] http://www.ifas.ufl.edu/~mts/apishtm/apis93/apdec93.htm#4
[11] http://www.ifas.ufl.edu/~mts/apishtm/apis95/apjan95.htm#B
[12] http://www.ifas.ufl.edu/~mts/apishtm/apis93/apapr93.htm#7
[13] http://www.ifas.ufl.edu/~mts/apishtm/apis97/apmay97.htm#2
[14] http://www.ifas.ufl.edu/~mts/apishtm/apis95/apnov95.htm#T1
[15] http://www.ifas.ufl.edu/~mts/apishtm/apis89/apapr89.htm#2
[16] http://www.airoot.com/beeculture/98sep/98sep4.html
[17] http://www.ifas.ufl.edu/~mts/apishtm/apis97/apapr97.htm#4
[18] http://www.ifas.ufl.edu/~mts/apishtm/apis97/apjul97.htm#5

plentiful swarms in the region, allowing them to simply requeen themselves. There is no queen-rearing industry in South Africa, Ms. Cobey says, a major reason she was invited to share her considerable skills in that area. Thus, the managed and feral populations are essentially the same, and this allows continued flow of Cape honey bee genes into the AHB population.

Governmental programs dedicated to eradicating the Cape bee have not been successful, according to Ms Cobey. Quarantines did not work. There is no beekeeper registration, and numerous hobby and sideliner operations exist. These small-scale operators were not easy to educate about the problem. A governmental subsidy to help rebuild affected operations was established, but has since been rescinded. The problem is not easy to diagnose as the two bee races look very much alike, something reminiscent of problems seen elsewere in trying to distinguish African and European races in the New World[9]. The only way to tell them apart is by counting ovarioles after dissection.

THE SEARCH for solutions to this complex problem continues, Ms. Cobey says. Research is needed on a wide variety of topics, including the cytological basis of inheritance, role of odor in regulating colonies, and the effects and consequences of hybridization. The latter has also been a focus of research in the New World with reference to AHB[10].

Because maintaining both stocks is critical to finding a solution, Ms. Cobey says, stock reservoirs are being established. The Kruger National Game Preserve has been selected for AHB and the Cape Point Nature Preserve for *capensis*. Beekeepers are also modifying their methods, including minimizing contact between apiaries, restricting the number of supers given to colonies during a honey flow, and sensitizing themselves to possible situations that might favor the spread of the phenomenon. The situation also cries for developing a viable controlled queen-breeding program, Ms. Cobey says, along with new techniques such as instrumental insemination[11].

A complicating factor in South Africa is the introduction of both tracheal (1996) and Varroa (1997) mites, according to Ms. Cobey. And American foulbrood has recently been detected for the first time. Knowledge that tracheal mite resistance has developed elsewhere[12] and AHB tolerates Varroa well in some parts of the New World[13] is encouraging. However, colonies weakened by mite infestation or other stresses may be less able to resist Cape bee takeovers.

The South African situation is ironic, Ms. Cobey concludes, when compared with that in the United States, where the AHB is considered less than desirable for many reasons[14]. In its homeland, the AHB is prized as a good honey producer thriving on erratic, marginal flows and is otherwise well adapted to a semi-desert climate with periodic severe droughts. The phenomenon is yet another piece of evidence that purposeful introduction of honey bee stock is fraught with unknown consequences[15]. ■

Still More on Transgenic Plants

KENN TUCKEY, provincial apiarist for Alberta Agriculture, has written a well-researched paper about his concerns with reference to canola. As he characterizes it, those yellow fields are rapidly changing. *Bee Culture*, Vol. 126, No. 9, September, 1998, pp. 21–23[16]. And the change is complex, considering all the potential varieties of this plant that are now being grown. For example, some fields might be hybrid, synthetic, htc, transgenic or any combination thereof.

Some markets are resisting the purchase of any honey that may originate from transgenic plants, according to Mr. Tuckey. Unfortunately, beekeepers continue to have less and less opportunity to certify that a specific drum of honey meets the criterion for **no** honey from transgenic plants. In fact, Mr. Tuckey concludes that in Alberta it is now impossible to certify nontransgenic honey, and this will soon be the case over most of Canada and the United States.

Mr. Tuckey asks why the flap about transgenic plants? Generally scientists say honey is straight carbohydrate, and there is no genetic material in the honey that can have any possible effect on anyone. However, he concludes, this is also an emotional issue and the customers' wishes must be considered. For example, the following article recently appeared on the Internet:

"Police Close Circle Around Illegal Cultivation of Soybeans," *Correio Braziliense*, January 31, 1998.

"Federal police in Passo Fundo in the state of Rio Grande do Sul charge that illegal genetically engineered soybeans have been planted in the municipality of Getulio Vargas. The planting allegedly came from a truckload of 200 bags of soy seeds illegally brought in from Argentina. Farmers in nearby municipalities are also under investigation by federal police and agriculture ministry technicians, after a call for investigation by the Brazilian Seed Association.

"Police believe that the sources of the soy include an Argentine subsidiary of Monsanto. Genetically altered seeds are allowed in Brazil only after testing and quarantine, which has not happened with the seeds in question. Officials fear that Japanese and European buyers, who refuse to accept genetically engineered soy, will reject Brazilian soy if they believe it has been contaminated by mixture of soy grown from these seeds."

There is also concern about how transgenic plants might affect honey bee foraging activity[17]. Also there are questions about how effective they might be, given the inevitable result that insect pests will become resistant to those implanted with genes designed to ward off or kill would-be consumers[18].

The bottom line, according to Mr. Tuckey, is that transgenic plants meet the needs of modern farmers. They will not, he concludes, give up these plants just to please either the honey consumer or the beekeeper. ■

Pollen Bees Revisited: Wasps Too?

DR. PETER HALLETT, professor of zoology, University of Toronto, and vice president of the Toronto and District Beekeepers Association, writes that pollen bees, wasps and other "nonentities" may be the coming way to diversify beekeeping (*Bee Biz*, No. 8, July, 1998, pp. 14–15). Though useless for honey, pollen bees are beginning to meet the needs of some farmers and growers, according to Dr. Hallett. Although the principal motivation is profit in increased pollination, another underlying factor is progressive impoverishment of the natural environment by land transformation and human activity. He gives three examples:

1. Shrunken populations of native bumble bees improves profitability of culturing these insects for greenhouse pollination[19].
2. Reduced populations of native pollen bees caused by tilling large fields, reducing so-called wasteland in Canada's prairie provinces, results in rearing of introduced leafcutter bees for alfalfa pollination[20].
3. Decreased populations of pollinators in British Columbia, Canada and the United States is beginning to make nest boxes for native and Japanese Blue Orchard Bees (*Osmia* sp.) economically attractive[21].

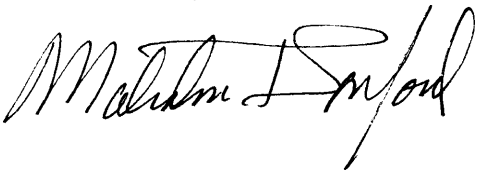
Besides the above, Dr. Hallett says, there are potentially many more opportunities in pollen bees. This is especially true given their numbers. Globally, there are a huge number of species that have seen little commercial exploitation or conservation. Locally, they could be in the tens to hundreds. Fourteen species of megachilid bees have been found in southern Ontario alone, and 94 long-tongued bees have been identified in Michigan, the number rising to 224 for the eastern United States.

The time is ripe, according to Dr. Hallett, to include native pollen bees and the environment as part of any beekeeping business. As an example, he describes a show farm in Kent, United Kingdom, which has not used a honey bee pollinator for several years due to Varroa depredations of nearby beekeepers. In spite of this, the nearby orchards are fine. Visitors can enjoy a cup of coffee or restaurant meal and/or pick their own fruit. That's because an unspoiled, steep hillside is being used as a capital asset. It is a nesting place for all kinds of insects, lying safely above the valley and the pesticide applied there.

Bee gardening, Dr. Hallett says, is not that difficult. He suggests simply providing nest sites such as a modified leaf cutter bee hive. All that is required is that materials be sterilized yearly against chalkbrood, and unwanted species (parasites) be culled by hand, keeping them to a low population. The latter is suggested because if not followed, pollen beekeepers' thoughtless actions can play God with the local environment, threatening it even more. Trapnesting without multiplication and propagation, Dr. Hallett concludes, is similar to unregulated commercial fishing. For a fuller discussion of bee conservation, I noted in the August 1998 APIS that a new publication from the University of Georgia has just been published on this issue.[22] The American Association of Professional Apiculturists also sells a pollination pamphlet, published in Canada, which contains information on alternative pollinators[23].

Dr. Hallett does not stop with bees. He even suggests encouraging wasps to take up residence. These insects are the natural pest control in any garden because they prey on caterpillars and aphids. And "garden" is the operative word, according to Dr. Hallett. Gardening enriches the environment by creating nesting sites for beneficial insects, whereas farming typically involves selection and monoculture. This practice all too often ends in failure due to disease, insect damage or pollination failure. Besides producing a honey crop in a rich gardening environment, the beekeeper may also take advantage of a nearby grower's pollen bees and hunting wasps. Thus, he envisions a roadside sign of the future beekeeper: "For Sale: Honey, gentle pollen bees and docile hunting wasps." ■

Sincerely,



[19]http://www.ifas.ufl.edu/~mts/apishtm/letters/aix6_7.htm
[20]http://www.pollination.com/currstat.htm
[21]http://www.wvu.edu/~agexten/ipm/insects/pollinat/solitary.htm
[22]http://www.ifas.ufl.edu/~mts/apishtm/apis98/apaug98.htm#6
[23]http://ianrwww.unl.edu/ianr/entomol/aapa/aapapubs.htm#Item1

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