



Catch the Buzz

Newsletter of the Arkansas Beekeepers Association

January 2012

arbeekeepers.org

Note From the President:

I would like to wish you a happy new year. 2012 will be an exciting time for the ABA. I am pleased to let you know that our website (arbeekeepers.org) has been updated and looks great. Jon Zawislak has done a great job on the website. Thanks Jon.

As I am writing this newsletter, I have to remind myself this is January. The temperatures remind me of late February and early March. I believe the bees feel the same. While moving and inspecting hives that will be sent to California, we are finding larva and sealed brood. Some hives have sealed brood on 3 frames. This is very unusual for the first week in January. Hives can consume food very quickly when they are raising brood, so you may want to check them soon.

The ABA Spring Beekeeping Conference will be held in Little Rock on March 2nd and 3rd. It will be held at the UofA Cooperative Extension Service building which is located at 2301 S. University Ave. We will have the privilege using the auditorium, classrooms, and the vending area.

The program will include the following speakers: Audrey Sheridan-Mississippi State University, Paul Jackson-Texas A&M, Dr. Szalanski, Dr. Steinkraus, and Jon Zawislak-University of Arkansas. Along with these great speakers we will have Apiary Beekeeping Supply from Crossett, and Central Beekeeping Supply from Russellville as vendors. Other surprises are in the works. This is an event you will not want to miss. I hope to see you there.

ABA PRESIDENT,
Richard Coy

Zombie Flies: A Potential New Threat to Beekeeping?

As though parasitic mites, hive beetles, a new strain of nosema, and a legion of microbes were not enough for beekeepers to contend with, scientists recently announced a potentially devastating new honey bee parasite in North America. The so-called “zombie” fly parasite, *Apocephalus borealis*, is a native species of phorid fly known to attack bumble bees and paper wasps, but not honey bees. Researchers in California caused a bit of a buzz when they suggested the case is changing.

Dr. John Hafernik, a biology professor at San Francisco State University, had collected a few honey bees to feed a captive praying mantis. After few days in a jar, fly larvae began to emerge from the bees’ bodies. The discovery prompted him to identify the fly, which led to further investigations with other scientists.

Genetic tests confirmed that the flies emerging from captured bumble bees and honey bees were the same species of parasite. Its ability to attack honey bees was previously unknown, and is believed to be a recent adaptation to a new host.

Normally, dying honey bees remain in one place with little or no movement. Bees attacked by the fly parasite remained alive, but disoriented. They walked in circles or were unable stand. Researchers who observed the bees compared their uncoordinated movements to those of movie zombies.

The researchers noted that bees which left their hive at night, attracted to nearby lights, were more likely to contain the parasites than those foraging during daylight hours. The scientists studying the fly-bee interactions are hoping to shed light on similar hive-abandonment behaviors associated with Colony Collapse Disorder. While some have been quick to associate this discovery as a significant culprit behind CCD, there is no evidence that the fly is a major contributing factor.

So what does it all mean for beekeepers? Is this the dawn of the next major catastrophe for a struggling industry? Will it reach the epidemic scale of varroa mites, or remain a minor pest like the bee louse, *Braula coeca*? None of us can predict the future, but the problem is far from epidemic. So far.

The presence of *A. borealis* is nothing new. Since the 1920’s, specimens have been collected by entomologists from diverse habitats across the United States and Canada. It was not until 2008 that it was found killing honey bees in the San Francisco area. Some parasitized bees were also confirmed in samples from South Dakota, but so far, no other data concerning honey bee attacks have been confirmed. The fly itself is a widely distributed native species whose natural hosts include bumble bees and paper wasps. While the fly has presumably been here for ages, honey bees are relative newcomers in the new world.

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As *Apis mellifera* is among the most closely studied animals on the planet, if this relationship with the fly was not novel, it's reasonable to expect it would have been observed in hives before now.

Beekeepers may view the discovery of another hive pest with trepidation. After all, many are still learning how to cope with small hive beetles. This time, though, a native species threatens our little honey bees, who are really the invaders in this part of the world.

Among insects, parasitism is a common strategy. Cuckoo bees, for instance, are cleptoparasites that lay their eggs in the nest of other solitary bees. Their larvae emerge quickly, kill the egg of the host bee, and consume its food provisions. Many insects among the wasps and flies are endoparasitoids, whose young develop inside another insect, feeding on and killing the host before they emerge. Many are considered beneficial in agriculture. These armies of tiny raiders go virtually unnoticed by most people, but play an effective role at reducing numbers of aphids, caterpillars, and other pests in our gardens and on our farms.

The genus *Apocephalus* is perhaps best known for a group of “decapitating flies”, that parasitize many ant species. Other members of the genus may attack beetles, stingless bees, bumble bees, wasps and spiders, and can be found throughout the new world. *A. borealis* is far from the only species that preys on honeybees. In South and Central America, many species of bee-killing flies will attack honeybees, although none are generally considered great threats to beekeeping.

Another related group of flies in the genus *Pseudacteon* have been enlisted to combat imported fire ants in the United States. Six species of these flies were brought from South America and purposely released into southern states as a hopeful control of the red imported fire ant (*Solenopsis invicta*) and the black imported fire ant (*Solenopsis richteri*). *Pseudacteon* phorid flies are natural enemies of fire ants in their native habitat where they help keep ant populations low. The species released by the USDA were extensively studied and tested for their host specificity, and pose absolutely no risk to honey bees or to humans.

Endoparasitoids generally have a limited host range because they must be specially adapted to developing inside of their hosts while overcoming their internal defenses. The tendency to change from one host to another is uncommon for such specialized organisms.

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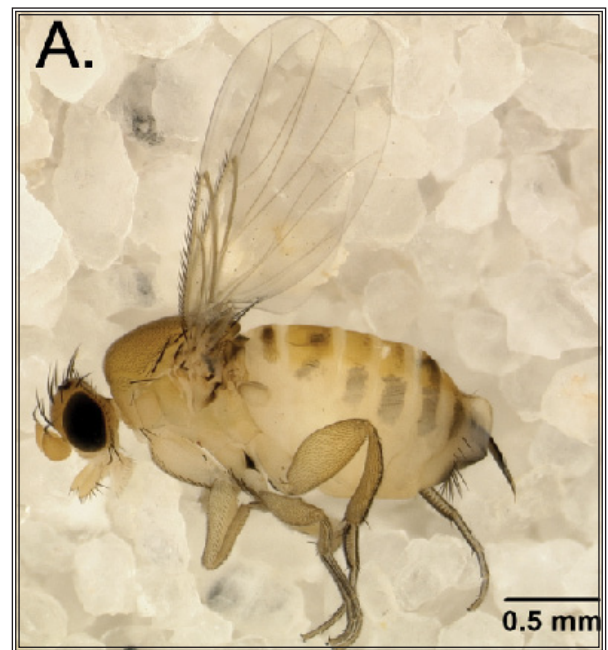


Photo of an *Apocephalus borealis*
Courtesy of Wikipedia

A. borealis already has the ability to successfully attack multiple species of hymenoptera, while honey bees do not have especially complicated immune systems. Individual honey bees are short-lived, with behaviors that compensate for their lack of immunities. A bee hive is a meticulously clean environment, and the bees fly, rather than crawl along the ground, among any number of soil-borne pathogens. If honey bees become sick, they often leave the hive voluntarily or may be forcibly expelled by nest mates. This behavior sounds harsh, but effectively protects the rest of the hive from contamination.

Bumble bees live in relatively small nests with just a few hundred members. Colonies die out each winter except for new queens, which hibernate and start new colonies in the spring. Paper wasps, the other known host group for *A. borealis*, follow a similar season pattern. Perhaps this is why the researchers in California detected higher numbers of parasitic flies in the fall. Population growth of parasites necessarily follows that of their hosts. We see the same trend with varroa mites, which are more numerous in the hive after a long period of brood rearing than they are in the early spring. As bumble bee and paper wasp populations decline in the fall, the fly parasites may be looking harder for suitable hosts, such as honey bees. Perhaps their meeting was inevitable.

Setting beekeeper concerns aside for a moment, this apparent host-switching is a fascinating phenomenon from a biologist's perspective. It's truly example of evolution while-you-wait.

Many species of bees are in decline, both in terms of population numbers and in diversity. *A. borealis*, as a species, depends on locating suitable hosts. Perhaps a few individuals have begun expanding their host range to ensure the survival of their own kind. Who can blame them?

The "zombie" flies have captured the spotlight for a moment, but should not be a cause for alarm. These flies have been among us all along without our noticing. Beekeepers should continue caring for their colonies as before, but should be aware and remain vigilant for strange bee behavior.

A team of researchers behind the website www.phoridproject.org is gathering the latest information on new fly-bee interactions. They hope to expand our knowledge of *Apocephalus borealis* parasitism on bees by enlisting citizen scientists to collect data on its distribution. They plan to publish information and sampling protocols on their website as soon as it becomes available.

UPCOMING EVENTS

ABA Spring Conference
Little Rock, AR March 2-3

ABA State Conference
Mt. View, AR Oct. 12-13

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