'THE BUZZ! *June 2007*

An electronic newsletter from the Kentucky Department of Agriculture's State Apiarist's Office

Uncooperative weather and nectar flows

If you think the weather is not cooperating with our beekeeping season in 2007, you're right, but then again we've been seeing a nectar flow. A warm early winter, very cold March, unbelievable April freeze (which wiped out most of this year's fruit crop and stopped all nectar flow for a period of time), one of the driest springs on record, and now what is shaping up to be a serious drought throughout Kentucky would not normally add up to good beekeeping conditions. Yet, with all of this occurring, I've been seeing lots of honey on apiary visits with beekeepers and hearing from other beekeepers around the state of a decent nectar flow – at least in most areas. However, that early cold weather prevented many beekeepers from taking full advantage of the flow due to a slow buildup of hives.

As we enter hot mid-summer weather, I hope you have honey to extract and healthy bees in your hives. I'm also hoping to see many of you from July 12-14 at the Heartland Apiculture Society Summer Conference in Frankfort. It looks like another great program, and in addition to increasing your beekeeping knowledge, there will be lots of good fellowship with beekeepers from Kentucky and surrounding states. More in this newsletter about the conference, and the internet link to the HAS Web site – just keep reading!

Heartland Apiculture Society Conference July 12-14 at Kentucky State University

Beekeeping experts from nine states, Canada and South Africa will address beekeepers from throughout the Midwest at the Heartland Apiculture Society's seventh annual conference July 12-14 at Kentucky State University in Frankfort.

The conference will consist of numerous classroom presentations by some of the country's leading apiculture researchers and scientists. Some of the out-of-state speakers will include: Dr. Clarence Collison from Mississippi State University, Dr. Dewey M. Caron from the University of Delaware, Dr James Tew from Ohio State University, and many more (go to the www.heartlandbees.com for a complete program and registration information). The conference also will include hands-on work with live honeybees. A temporary apiary with working bee hives is established at the conference each year so participants can learn beekeeping with actual bees. Spanish-language beekeeping classes will also be offered.

Kentucky speakers will include Thomas Webster, apiculture Extension specialist at KSU and co-founder of the society; Tammy Horn, Berea College, and Kent Williams of Wingo, president-elect of the Kentucky State Beekeepers Association.

The Heartland Apiculture Society is a multi-state organization for beekeeper education. Its annual conference will come to Kentucky for the second time. It was held in Midway in 2003.

Early pre-registration has been extended. See the Heartland Web page for details and get your registration forms in ASAP!

For more information or questions, contact Phil Craft at (502) 564-3956 or phil.craft@ky.gov or go to www.heartlandbees.com.

For new beekeepers with new hives from packages or nucs – some tips!

If you are a new beekeeper and installed your first package of bees in April or May, or installed a new nuc this spring, here is some advice. If you have not looked in your new hives recently, do so SOON! The first step in being a beekeeper is to know what is going on in your hive, and if you don't look, you don't know. Whenever I look in any hive, I'm always looking for three things: 1) Is the queen present and laying eggs? 2) Are there sufficient food stores in the hive? and 3) Are there any signs of disease or pests present?

Is my queen present and laying eggs?
The first thing you'll want to do is to verify that the queen is present and laying, but you do not need to see the queen to know that she is there. Most beginners have difficulty recognizing a queen in their first days as beekeepers, especially if she is not marked. Recognizing the queen will get easier with experience. With practice you will train your eyes to spot the queen. But you don't need to actually see her to know that she is present and laying eggs. Since an egg hatches about three days after being laid by the queen, if you see eggs you know that the queen was present within the last three days. This is good enough; there is no need to actually see her. The bees cap worker brood about eight days after the egg is laid, so if you see only uncapped larvae, you know that she was laying eggs within the last week or so. If you're seeing very small larvae (small larvae are easier to see than eggs), she has been present more recently than that.

Tip on seeing eggs: The queen will normally move progressively from one frame to another, laying eggs as she goes. So you can actually track her backwards, looking for her and eggs. First, look at frames containing uncapped larvae, or if you're not seeing uncapped larvae, first look at frames of capped larvae; you may see some on the same frame as the bees cap the cells over the larvae. Then go from adjacent frame to adjacent frame, looking for ever smaller larvae. Eventually, you should see eggs, and likely the queen will be in the area as well, laying more eggs. I often describe honeybee eggs as looking like grains of rice, but smaller. Honeybee eggs are about 1.5 mm in length (about 1/16th of an inch long), pretty small, but visible with good light and good vision. I find that I see eggs much more easily in good sunlight while holding the frame so that the natural light falls into the cells. I also try to get my eyes checked and glasses updated yearly. I, like many beekeepers with "older" eyes, wear bifocal lenses.

Are there sufficient food stores in the hive?
Normally at this time of year, sufficient food stores are not such a problem. In most of Kentucky we are or recently have been in a nectar flow. How much stored honey a hive needs will vary with the time of year and the local nectar flow situation. If your new hive has developed slowly, without a large number of bees present, it is possible that the hive could be low on food stores. More bees to forage equals more stored honey. At any time, hives should contain at least two deep frames of honey to get them through extended periods in which forager bees cannot fly (rainy days – remember those!). However, we will soon be in (or may have already entered) our mid-summer dearth, which is a time of the year where there is little or no blooming of plants and the bees will not have any nectar to bring in. We'll start to see the bees hanging on the front of the hive throughout the day. With no nectar to collect, many of the foragers remain in the hive all day. (And the bees may get cranky as well!) What foraging that goes on will be for water. Hopefully, our hives' brood boxes all contain at least several full deep frames of honey and additional stores on frames with brood and pollen. The bees will need these stores to see them through until our late summer/fall nectar flow begins in August or September. If you're not sure whether your hive has sufficient stored honey, consult a more experienced local beekeeper friend (this is the perfect reason to belong to a beekeeping club) or contact me.

Are their any signs of disease or pests present?
One reason I suggest that beekeepers start with package bees is that you most likely will not have disease or pest problems for the first few months or year. Your new bees, most of them young, healthy bees, are on new foundation, and your new hive has new, disease-free comb. Also, good package bee suppliers should be practicing mite control, so, though some mites will always be present and will increase with time, they should not be out of control at this time. However, most beekeeping diseases and pests spread from hive to hive through robbing. Your healthy hive can pick up diseases or pests by robbing a diseased or infested feral hive (and we are seeing more and more feral hives in Kentucky again) or a hive belonging to another beekeeper. So for beginners, the best tip is to learn to recognize what a healthy hive and brood look like. This can be done by attending beekeeping classes, such as the upcoming Heartland Apicultural Society conference in Frankfort, attending field days at local beekeeping meetings, or finding an experienced beekeeper and getting some hands-on guidance in your hives. Then if you see what appear to be abnormal conditions in your hive, you can attempt to diagnose the problem or seek assistance from more experienced beekeepers, or give me a call.

Nectar sources
In parts of Kentucky, sumac, which is a small tree or shrub, can be an important nectar source. The following is an article from the Memphis beekeepers association about sumac that I think you'll find interesting. (Note: My friends in

the Division of Forestry tell me that there are two common species of sumac in Kentucky, smooth sumac, which occurs throughout the state, and rough or staghorn sumac, which is less common and is mostly found in northern and central Kentucky.)

Sumac, Rhus sp. (From the June 2007 Memphis Area Beekeepers Association newsletter)
When sumac is in bloom in June and July, it can be found covered with honeybees and, because the nectar is unprotected, numerous other insects. Typically, we find two species of sumac in the Mid-South: smooth sumac, Rhus glabra, and winged sumac, Rhus copallina. Smooth sumac is our most common sumac. It is the only tree or shrub found in each of the 48 contiguous states. It usually occurs as a shrub in thickets. Stands of sumac are common along roadsides. Smooth sumac produces clusters of red fruit.

Winged sumac, also called dwarf sumac, can be identified by "wings" along the midrib of the leaf. Winged sumac produces a white fruit. Winged sumac blooms later than smooth sumac. As well as feeding honeybees, sumac provides food for songbirds. Sumac is also heavily browsed by deer.

Sumac blooms for about three weeks. The flowers secrete nectar freely on hot, clear days; but in cloudy, foggy, or cool weather, the flow ceases almost entirely. During hot weather in July, strong colonies may bring in 20 pounds of sumac honey per day. Sumac also produces a large amount of pollen. The bees will gather sumac pollen early in the morning before the sun has stimulated the plant's nectaries. Later in the day little pollen is brought in.

When sumac honey is fresh, it has a bitter taste. However, the bitterness is temporary: By winter the bitterness of the honey disappears. Pure sumac honey has a golden color. Sumac is surely a major honey plant. It is, by the way, in the same genus as poison ivy and poison oak, two lesser honey plants, which do make good, edible honey.

Sources: Trees, Shrubs, & Vines of Arkansas by Carl G. Hunter, 2004: Honey Plants of North America by John H. Lovell, 1926; Weeds of the Northeast by R. H. Uva, J. C. Neal, & J. M. DiTomaso, 1997; Plants and Beekeeping by F. N. Howes, 1979.

Stolen Hives
While not a great problem here in Kentucky, theft of bee hives does occur. Each year I get a call or an e-mail from a beekeeper reporting stolen hives. This is more of a problem for larger beekeeping operations with isolated out yards. I do suggest that when setting up bee yards away from your residence, you locate them where they are not visible from roadways. This will help prevent not only theft but vandalism as well. I recently had a call from a beekeeper in western Tennessee who has had a number of hives stolen. This beekeeper suspects that the hives may have been transported into Kentucky or Missouri for sale, and he requests that beekeepers be on the watch for his hives. His hive bodies (and many of the frames) are branded with his Tennessee registration number - TN8502. If you see hives for sale or have recently purchased hives bearing this registration number, please contact me.

Follow-up to Colony Collapse (CCD) Disorder
CCD continues to make national news, and apparently some of the affected beekeepers are still experiencing problems, but nothing as acute as last fall and winter. Here in Kentucky we still have not substantiated that any of our winter losses were due to CCD (see my March newsletter for more detailed CCD and Kentucky winter loss information). Research continues, and there is still much speculation as to what caused the heavy losses attributed to CCD, but there is still no confirmation of the cause of these lost colonies.

Dr. Eric Mussen, Extension Apiculturist at the University of California at Davis, produces a very nice newsletter (http://entomology.ucdavis.edu/faculty/mussen/news.cfm), and he addressed where we currently stand on CCD in his March/April issue. Dr. Mussen has graciously allowed me to reproduce this insightful article.

Colony Collapse Disorder by Dr, Eric Mussen
This year the attention of most of the world has been focused on the population crashes of honey bee colonies in northern temperate climates, beginning in fall and continuing into spring. Honey bee populations that appeared to be normal would simply dwindle down to empty or nearly empty boxes in days or weeks. This is really peculiar, since a

honey bee population tends to decrease going into and during winter but is supposed to survive until well into the next spring.

The phenomenon is not new to U.S. beekeeping. It was observed in the late 1800s and has occurred periodically for a century. Now called Colony Collapse Disorder (CCD), this disorder has been called “spring dwindling,” “autumn collapse,” or disappearing disease” in past years. The hives end up with plenty of stored honey, stored pollens, usually some amount of brood, and often the queen bee with a tiny number of young workers bees with her. In California or other “warm” climates, that little group of bees may survive, but the exposed brood dies. In colder regions, those remaining adult bees will die off.

Many suggested reasons for such losses have been made. However, one has to consider that the phenomenon seems to be very widespread but did not affect all beekeeping operations equally. While one beekeeper could be losing nearly every colony of bees, the next beekeeper may have seen nothing irregular. So, the idea of the problem being a simultaneous worldwide outbreak of a previously unknown infectious disease; contact with a new, globally distributed toxic agent; or complications involving an increase of electromagnetic waves does not seem to fit the patchiness of the occurrences.

Analyses of samples of bees and stored food for disease-producing pathogens have demonstrated all the viruses of which we are aware. The concentrations of the viruses in the bodies of the bees ranged from slight to very heavy, with some of the apparently healthy bees being most heavily infected. We now know that RNA viruses seem to be constant companions of honey bees. They can be found in all the life stages of the bees and in their stored food. At this point in time, they do not seem to be the primary cause of CCD losses.

Adult worker bees were found to be infected by microbes that would not normally infect honey bees. Those microbes were extracted from the bees and cultured. They were determined to be soil and airborne inhabitants that had previously been found in beehives, but they are not considered pathogenic to honey bees. So, why were they infecting the bees? Most likely, the innate resistance of the bees to becoming infected was lowered, allowing what we call “opportunistic” infections to develop. Such infections are common in many animals when their protective tissues (especially skin) and immune systems are physiologically impaired.

The two possible toxic agents that are drawing the most attention are a systemic insecticide and proteins from genetically modified (GM) plants. The suspected insecticide is imidacloprid. There are certain facts about imidacloprid that cannot be disputed. Every year there are more uses for the chemical. It is quite safe to use around mammals and birds, but it is highly toxic to invertebrates. It usually penetrates the treated plant or animal and becomes systemic. While this is good for presenting the pesticide to chewing and sucking insects, it causes many to be suspicious of the chemical occurring in the nectar and pollen of treated plants at levels that may be toxic to honey bees and other non-target animals. Studies conducted on the nectar and pollens normally demonstrate no residue or less than would be toxic to adult honey bees. But, other laboratory conducted studies show that sub-lethal doses of imidacloprid do change behaviors of honey bees. Those changes are thought by some to interfere with the navigation or memory systems of the bees, and they fly off and never get back to the hive.

While the concentrations of the parent chemical and its breakdown products in the nectar and pollen probably don’t have this immediate effect, we do not know what effect small concentrations over a period of time have on honey bees. Do the residues continue to build up in the bee body until reaching a specific dose that leads to the loss of the bee? Or, do the chemicals inside the bee body contact enzymes that denature the toxins? A tobacco hornworm can eat tobacco and not have a problem with the nicotine. Can the honey bee do the same with neonicotinoids? There never has been a time when we needed the assistance of an insect toxicologist (honey bee toxicologist) more than we do today with these questions.

Genetically modified plants usually have genes added that instruct the plant to produce novel proteins that benefit the plant. In order to keep lepidopterous insects from consuming corn plants, the plants are stimulated to produce a toxin that occurs naturally when the bacterium, *Bacillus thuringiensis* (B.t.), sporulates in culture. The extra-sporal crystalline body in the bacterial cell paralyses the intestinal tract of the caterpillar, which eventually starves to death. B.t. has been used for decades as a bio-control agent on field and orchard crops. *Bacillus thuringiensis* and its toxin are not toxic to any stage of honey bees at concentrations that would be encountered in the field. Apparently, a study was conducted over four years where the toxin was fed to honey bee colonies at 10 times the dose they would encounter in pollen from

GM corn. Nothing negative happened until a “honey bee parasite” worked its way into the experiment. Then the bees fed the 10X dose of toxin were more susceptible to the parasite.

Another modification of plants is to include instructions for producing an enzyme that breaks down an herbicide, glysophate. Enzymes are proteins. If this protein is present in the pollen of the GM plant, then one would suspect that it would be digested with the rest of the proteins in pollens as they passed through the bee’s digestive tract. The novel protein would be problematic only if it interfered with food digestion or turned into a toxicant as the protein broke down. Neither of those is likely to be the case.

Recently, a third approach to pest insect control consisted of having the plant produce an enzyme (protease) that does attack the digestive proteins of the target insects. Extensive studies were conducted and the induced protease does not interfere with honey bee digestion.

The suggestion that electromagnetic fields are interfering with navigational systems in the honey bee do not seem to be tenable. Studies on honey bee navigation decades ago determined that the bees rely very heavily on learning landmarks for returning to their hives. During the time that adult honey bees are transforming from in-hive to foraging bees, they can be seen in large numbers flying around directly in front of the hive, back and forth and in ever increasing circles. This flight is called “play flight” or “orientation flight.” With time, the distance from the hive becomes greater, and a bee eventually learns the hive location in the “neighborhood.” As the bee goes off to forage, it learns the landmarks to and from the water, nectar, or pollen source. It cannot recognize landmarks in areas where it has never been, and honey bees are not like homing pigeons – they will not return to their hive from places they have never been before, unless they are close enough to catch a “whiff” of the hive odor.

Honey bees also use polarized light as a navigational aid. Investigators looking at the dance language of bees noted that the dancing bees use gravity as an indicator of where to fly in relation to the position of the sun. A waggle dance, straight up, means fly toward the sun. A straight down dance means fly directly away from the sun. If you have polarized sun glasses and hold them at arms length, while looking just above the horizon, you will see that the sky is brightest when the sun is straight ahead or directly behind you. It is darkest 90 degrees to the right or left of the sun. The bee’s eyes can see this, too. Experiments with polarized filters placed above the entrances of hives and rotated in various directions caused the bees to fly off in different directions, and then correct themselves when they reached un-modified sunlight. Neither the landmark nor polarized light navigation would be influenced by communication electromagnetic waves.

The cell phone studies are not persuasive. An earlier paper, by the authors of the paper that caused the recent stir, determined that having a functioning cell phone relay, accepting in-coming and sending out-going calls, inside a beehive for a year did not affect the bees’ performance. The paper that created the stir suggested that the frequencies used by cell phones appeared to be of wave lengths that might cause resonance in bee brains or portions of bee brains that were the correct size. A good way to measure that would be to put electrodes into the brain tissues and see if “spikes” could be generated on an oscilloscope. Instead, the researchers collected bees from entrance tubes of colonies, with and without cell phones in them. They marked the bees and took them away from the apiary and let them go. In these trials, the bees from the hives without cell phones returned in greater numbers and more quickly than did the ones from hives with a cell phone in them. In fact, no bees returned to one of the hives containing a cell phone. Referring back to earlier comments on honey bee navigation, if the bees taken from this last hive were bees taking orientation flights or they were transported to a place they had never been before, it is not surprising that they did not get back.

A possible cause of CCD that is not getting much attention is the nutritional status of the bees. Research decades ago determined that honey bees, like humans, require certain amino acids, lipids (especially a precursor for cholesterol), vitamins and minerals to survive. It has been known for a long time, also, that no one pollen contains all the nutrients required by honey bees for brood rearing and survival. So, a good mix of nutritionally adequate pollens will lead to the production of strong, healthy, “fat” (stored nutrient reserves) bees. Such bees are resistant to many of the potential causes of CCD mentioned previously, such as infections by naturally occurring soil and air-borne microbes.

Malnourished bees, in addition to being more susceptible to infections and toxins, are expected to be lighter in weight and to have reduced life expectancies. However, we are lacking the specific information on exactly how much a bee’s life can be shortened by malnutrition. If foragers are not bringing in pollens, the bees tend not to rear brood. If only a little pollen is being brought in, what is the condition of the few bees being reared? It will matter greatly if the bees being

reared are winter bees! How much can a normal six-month life expectancy be shortened before the bees simply stop rearing brood?

Although state administrators in California do not want to call 2007 a drought year (because there is adequate stored water in the reservoirs from last year's rains), beekeepers already can see problems in their bees. In January, there was just a tiny fraction of an inch of rain. The normal mustard, filaree, wild radish, red maids and shepherd's purse were not there. In almonds, most of the colonies responded to the wealth of food by rearing good amounts of brood, and populations were on the incline.

As soon as the almond flow ended, many of the colonies tapered off brood rearing, even with (possibly problematic) pollens stored from the previous late summer and fall in the hives. Natural pollens are still not available. Sage plants, which usually provide a reasonable honey crop, are not providing anything in most places. Commercial beekeepers already are feeding pollen substitutes to their colonies. As the season progresses, naturally occurring forage plants appear to be few and far between. Plants that provide the late summer and fall food for bees likely will produce nearly nothing, as the soil moisture will be long gone before August and September.

Unfortunately, beekeepers cannot control the weather. Weather impacts the availability and, probably, the quality of the pollens crucial for honey bee health.

Weather allows or prevents the bees from flying when the food could be available (rain and high winds keep bees in the hive). Currently, we do not have a man-made diet for bees that even comes close to providing the nutrients needed to sustain.

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CCD and cell phones (from THE SPEEDY BEE, March 2007)

I first saw the following article in the Missouri State Beekeepers Association, and then in the March issue of THE SPEEDY BEE. I don't know about everyone else, but I sometimes don't have much more luck getting my bees to behave than I do my old dog or my teenage sons (the old dog is often the best behaved, but at 14 1/2 years old she doesn't have much energy to misbehave with these days). So this article is about more then CCD, cell phones, and bees. And sometimes we just really need to laugh!

Beekeepers! Beware of Cell Phones! (by Marc Hoffman, Silver Spring, Maryland)

Are cell phones killing our bees? I never let my bees use cell phones. They are social insects, and I have found once I let them have cell phones it is impossible to control their use. The charges from time overruns can bankrupt even the most efficient apiary operation. Once they learn to use them, they become dependent: They stop returning to the hive to dance and just phone in the location of their forage discoveries.

Furthermore, the increased peer-to-peer communication plays havoc with traditional bee values. "To heck with pheromones!" they say. "Chemical communication is passe compared with digital." As in many societies, the young are the early adopters, spending their time text messaging instead of doing their jobs. In the end we observe a breakdown in hierarchy and, fatally, anti-royalist sentiment.

This, then, is the cause of CCD -- foolish notions of independence among the immature, loss of authority of the elders, breakdown of group cohesion, and collapse of the aristocracy.

To have THE BUZZ! sent directly to you!

If someone has forwarded you this issue of THE BUZZ! and you would like to have THE BUZZ! sent directly to you via e-mail, send me an e-mail at phil.craft@ky.gov and ask to be added to my list. I organize my e-mail list by name, so make sure you sign your e-mail with first and last name. Also, if you are a Kentucky beekeeper, I'd appreciate knowing a little about you and your beekeeping activities – address, how many hives, years of beekeeping experience, and if you

belong to a local beekeeping group or to the Kentucky State Beekeeping Association. I would also like your mailing address. This information helps me better serve the beekeepers of Kentucky by knowing where beekeepers are located and allows me to let you in on regional beekeeping activities or to drop you a note if I discover your e-mail address stops working. This e-mail newsletter is not restricted to Kentucky residents. Many subscribers are from our surrounding states, especially Tennessee and Indiana. If you're from out of state, I need only your full name and home state; any other information is optional.

Keep those smokers lit and your bee veils on!

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