THE BEE LINE

The Newsletter of the Oregon State Beekeepers Association

Volume 27, Number 5 **June 2002**

Keep Good Records of Where Your Off-Site Hives are Placed

By Mary Moss

When you cart your bees off to do their thing in someone's orchard or fields, or just store hives there, how do you keep track of where those hives are placed? If the answer is simply, "I know where those bees are, the farmer knows they're mine, there's no problem," you may be just the person who needs to clean up (or start!) your recordkeeping practices.

The lack of hive placement records can create a real problem for others. Unfortunately, none of us is immortal—we're not going to live forever. Can you picture the chaos that would ensue if you had about 150 colonies of bees scattered on farms in three or four counties, and no one but YOU knew where they were? And, very suddenly one day . . . you passed away! Imagine how your spouse, relatives, close friends and beekeeping buddies would try to deal with their grief, and then someone would eventually pause for a moment and ask that crucial question, "Where are all of his/her bees?" Uh-oh. The response would be silence and shrugs all around.

That actual situation occurred in real-life recently when a fellow beekeeper died unexpectedly. The only paper trail he left was a wall plastered with Post-it notes containing cryptic scribbles of names, telephone numbers and an occasional address. His family then had not only the sad task of culling through his personal effects and dealing with their grief, they also had to try to figure out where all of those hives of bees were.

Exhaustive telephoning efforts by several individuals revealed that some of those scribbled notes pertained to honey customers; others were social contacts having no connection with beekeeping. Very few were connected with the hive placement question. The bottom line was, there were no easily-found records to refer to, no clue as to precisely where and when the bees had been placed--let alone inspected or medicated.

Despite the best efforts of his local bee club, family and friends, there are still hives out there on farms that are unaccounted for. They only come to light when a farmer calls the OSBA and says, "You know, I've got some bees out here, and the beekeeper hasn't been around for a l-o-n-g time."

Obviously, in addition to being a terrible burden on survivors, this is an unreasonable situation for the bees. The majority of beekeepers naturally keep tabs on their colonies, checking conditions, removing and replacing full honey supers, etc. It's in the best interests of all concerned to keep track of colonies stored off-site or rented for pollination.

(cont. on page 3)

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WHAT'S INSIDE:

(cont. from page 1)
Some beekeepers do maintain meticulous records, either on a computer or in a notebook or set of files. Even a small box of index cards can serve the purpose. The point is, some kind of easily-found, easily-understood records must be kept, even if you're just doing five hives here, six there, and you've been doing it for years for the same growers or friends.

Because some beekeepers prefer not to have computers, printers and all the high-tech stuff, I've created a reproducible data form within this newsletter that can easily be photocopied and stuck in a notebook or file folder for easy reference.

Please—do your loved ones a real favor. Chart the locations of your off-site beehives and keep the records updated. Be sure to include, on the same sheet of paper, the name, address and telephone number of the property owner where the hives are stored or in service. Then, make sure your spouse, significant other, close friends or trusted beekeeping cohorts know where those records can be found.

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Mary Moss is a beekeeper and freelance writer who lives in Forest Grove. She is a past officer with TVBA and a member of the OSBA.

June – Beekeeping in Western Oregon

By Harry Vanderpool

Nectar flow is at its peak this month in the Willamette Valley. Watch your honey supers closely; they can be filled rapidly when conditions are right. Studies have shown that supering ahead of the need for space, increases honey production in colonies.

If you have comb to draw, and can sacrifice a bit of honey production, this is the month to make it happen. You can place supers with frames of foundation on your largest colonies, and they will quickly produce the prettiest comb you can imagine.

- Replace old dark or damaged comb and replace them with frames of foundation.
- Buy some queens and start up some small nucs. Queens can sometimes be in short supply late in the year. Requeening late in the year can be testy also. Starting small nucs now, will cover your late queen problems. You say that you don't have any nuc boxes?
- Buy nuc boxes. Put them to work.
- Examine colonies every ten to fourteen days.
- If you find hives with the beginnings of swarming tendency, remove the queen cells and rotate brood boxes. Pull a couple of frames of sealed brood and fortify weaker hives. Place foundation in their place. Give those juveniles a serious job to do; draw wax!
- If you find sealed queen cells of good confirmation, place the frame with the cells in a nuc box with a frame of feed, and a frame of pollen. Shake as many young bees into the nuc as you can from the parent hive. Make sure you do not shake the parent queen into the nuc! Stuff some grass into the entrance and set it aside in your yard or in an area with drone populations. Check the nuc every 14 days for eggs. Track these queens for vigor. Just do not make this your *primary* source for queens.
- Provide a steady supply of water.
- Ventilate your hives. Your honey will dry faster, and the bees will not expend as much energy cooling a crowded hive if there is adequate ventilation.
- Continue to be on the lookout for American Foulbrood.
- Start sampling colonies for mite load.WWW.greatlakesipm.com has the good old sticky boards that you need for a very reasonable price.
- Take a walk through your honey house and take an inventory of chores and supplies that you will need soon.
- Respect yourself and others in the beekeeping community by your attendance at your regional association's monthly meeting.

Oregon State Beekeepers Association

The Bee Line is the official publication of the Oregon State Beekeepers Association and is published ten times a year. Subscriptions are included with OSBA membership.

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Co-Editor's Message
By Mary Moss

As this issue of the newsletter goes to press, Ray and Diane Varner are totally immersed in the care of their son, Ric. Many of you have been following Ric's medical progress via this column and/or via e-mail announcements. If so, you are likely aware that all attempts to find a suitable blood marrow donor for Ric were fruitless. In the meantime, the leukemia came out of remission and is now at the point where treatment is both impossible and futile. So, Ric has been moved out of the hospital and into the Varner home for their loving care and ready companionship during this last stage of his illness, which is expected to last for perhaps two weeks.

Due to these circumstances, I am temporarily sitting in as co-editor of the newsletter so that the Varners may devote themselves to Ric. I hope that my efforts will be useful and that the errors will be few. Most of all, though, I hope that all of you out there will keep the Varners in your hearts and minds as they go through this heartbreaking experience.

Thank you all for your understanding and efforts made to help Ray and Diane cope with the situation.

WINTER LOSSES, AGAIN
By Eric C. Mussen, Extension Apiculturist, UC Davis

Beekeepers from all over California were disappointed or devastated this early spring, as colonies that seemed so populous in the fall and early winter dwindled severely or died fairly quickly in January. This phenomenon was not restricted to hobby, sideline or commercial beekeepers. It was "global."

That suggests that the cause of the problem was not likely pesticide poisoning, and tests for tracheal mites and *Nosema* determined that only a small portion of the tested bees had enough of those parasites to be detrimental. So, what might have been the cause?

The breadth of the problem suggests that we have to look at the "big picture." In retrospect, it appeared that the colonies did fine until they reached the point in time when the summer and fall bees were dying of old age and the "winter bees" should have kept the colonies going. Where were those healthy winter bees? It doesn't look like they were around.

Backing up to last summer and fall, how were the nectar and pollen sources? Did we have a really good honey year? Did we have the right amounts and timing of rain to support good growth and bloom of late summer and fall plants? I don't think so.

Beekeepers who saw a lot of dwindling also reported having some "loads" that seemed to be OK and built up well during almond bloom. Those bees had been moved into certain locations where the bluecurls, tarweed, etc. were pretty good (an exception last year).

Now we have to follow the nutrition story a bit further. If fall feed was nutritionally inadequate, then the late summer bees could not adequately feed the coming winter bees. Nutritional stress is extremely hard to see, because the bees look OK while the stored food reserves in their bodies just aren't there. Stressed bees are much more susceptible to diseases and parasites, as well as the vagaries of weather (like below freezing temperatures in February and March). And, what about stored pollens? If they weren't available to feed the winter bees as larvae, they could not have been stored in abundance to feed the spring brood, either. That means more stressed bees.

Although some of the colony populations appeared to die off in a manner reminiscent of *Varroa* infestations, *Varroa* mites were few and far between. I don't think that they were much of a factor in this winter's losses. That leaves tracheal mites and *Nosema*. Most beekeepers know that tracheal mites can be kept in check most of the time with "grease patties." So, I am going to skip that pest. The next article deals with *Nosema*, since so many people asked me about it this year.

Diagnosing and Treating Nosema Disease

Causative Agent --Nosema disease is caused by a single-celled animal (protozoan) named *Nosema apis*. *Nosema* species are obligate, intra-cellular parasites (microsporidians) of specific animals. *Nosema apis* cannot be reared in laboratory culture, as is possible with most bacteria and fungi. It can multiply only in living honey bee midgut cells.

Life Cycle

When a bee ingests *Nosema* spores, the spores are filtered out of the honey sac by the proventricular valve and released into the midgut. The exact physical and chemical conditions of the honey bee midgut stimulate germination. The organism penetrates a midgut cell and grows by absorbing nutrients from that cell. The parasite increases in size until it is large enough to divide in half. Each new parasite continues this process until the nutrients in the cell are exhausted. That stimulus triggers sporulation. In about six to ten days, approximately 100 new spores are formed in a parasitized cell. The nutrient-depleted cell ruptures. The spores are released into the midgut lumen to start the process, again. Heavily infected worker honey bees can contain an excess of 50 million spores. Damaged intestinal tissue is subject to secondary infections and "dysentery" (brown diarrhea spots on the exterior of the hive) is a common sign of this disease. Diseased bees also defecate inside the hive, contaminating combs with millions of infectious spores.

Effects on the Colony

Nosema infections have specific negative effects on honey bees. Worker bees that ingest spores when they are less than a week old normally do not produce royal jelly. Their life spans will be reduced up to 78%. Young queens that ingest *Nosema* spores normally are superseded within a month. In climates where winter prohibits supersedures for many months, colonies often go queenless and dwindle away in early spring. Experience in Minnesota suggests that an average of one million or more spores per bee can lead to Increased winter losses. When high percentages of workers are infected and spore counts exceed ten million spores per bee, significant numbers of colonies will die or lose queens during the winter. All levels of infection lead to very slow spring build up, even when forage and temperatures are ideal. Frequently, reduced honey yields follow this poor population build up.

Diagnosis

Nosema disease is difficult to diagnose without using laboratory equipment. Decapitating a bee and pulling out the last abdominal segments usually will remove the intestinal tract intact. A healthy midgut is tan in color, with concentric constrictions. An infected midgut will become swollen, whitish and lose its visible constrictions. However, other causes of dysentery, such as ingesting honeydew, fermented syrups; indigestible sugars in cola syrups, molasses and kitchen corn syrups; can result in similar intestinal changes.

Scientists use a specific methodology to determine levels of infestation. Known numbers of severed abdomens are homogenized, using a mortar and pestle. The homogenate is sieved through two layers of cheesecloth into calibrated centrifuge tubes. The tubes are spun in a clinical centrifuge at the next to the highest speed for six minutes to drive the spores to the bottom of the tubes. The liquid (supernatant) is poured off (decanted) and the plug (pellet) at the bottom is resuspended in a specific volume of water (one ml per bee). The plug is broken up well (resuspended) by sucking the water in and out many times through a small-tipped disposable pipette. Then a small droplet of the suspension is placed on a blood cell counting chamber (hemocytometer). The number of spores counted over certain areas of the chamber grid can be converted to millions of spores per bee. If infection levels are below 10,000 spores per bee, no spores will be seen and the diagnosis is determined to be "not detected." That does not mean that there is no infection.

Treating Infected Colonies

Medicating for *Nosema* is based on the most appropriate times to prevent comb contamination and development of disease in bees that clean up fecal deposits from combs while expanding the brood nest. Later in the summer, when bees are defecating outside the hive, *Nosema* usually cannot be detected. A few bees are infected all year, but only the diseased late season bees are of consequence. When they develop high levels of infection, they defecate on the combs in October, November and December, then die.

Brood rearing never ceases in many parts of California over the winter, but as the days begin to lengthen in late December, the bees are stimulated to pick up the pace. Availability of nectars and pollens, along with warming temperatures, accelerate brood rearing. It is at this time that many bees "cleaning and polishing" cells, in anticipation of egg laying, become infected. How severe the disease will get in the colony population depends upon the initial spore load (amount of contamination) and how much of the time the bees are confined to the hive by nonflight weather. So, *Nosema* levels can vary significantly from year to year.

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In order to "cover the bases" in Minnesota, if a colony population had one million or more spores per bee in April, we fed it two gallons of fumagillin-medicated, heavy (two parts sugar : one part water) syrup in September. If we had to "feed for weight," that was done earlier, so that the early syrup could be "ripened" and stored before the medicated syrup was applied. If the medicated syrup is mixed with other, unripened syrup, it can be diluted to ineffective concentrations. We anticipated that the medicated syrup would be consumed throughout the winter. Spore deposition on combs in early winter would be reduced and the parasite could not reproduce in medicated bees that became inoculated in the spring. The syrup would be consumed, totally, long before the bees produced any honey.

Although we have not conducted the experiments, it is likely that two gallons of medicated syrup may not be required in most of California. *Nosema* levels are not as high in California as they are in Minnesota. Combs should not be so badly contaminated during the winter months, since intermittent flight is possible. Therefore, first treatments with medicated syrup should coincide well with the normal practice of providing colonies with "stimulative" syrup and pollen substitute feeding in late December and January. A gallon, or so, of medicated syrup probably will provide protection until the bees are flying well in March and April. Heavy nectar flows from *Manzanita*, *Eucalyptus*, mustard and radish might dilute the medication significantly, as would later feeding with non-medicated syrup.

Expected Results of Treatment

Beekeepers who have fed *fumagillin* to field colonies in the past have noted significant differences in colony build up. In fact, many of them stopped using *fumagillin*. The colonies built up too quickly and swarm control became nearly impossible. I am happy to discuss *Nosema*, its consequences in colonies, and treatments. Contact information is shown at the top of the next column.

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Copies of this "Bee Brief" can be downloaded at the following URL: http://entomology.ucdavis.edu/facutly/mussen/beebriefs/index.cfm.

STINGLESS BEES

Stingless bees, in a general way, build more complex nests than *Apis mellifera* nests, although there is a great variety of forms, size and place of construction.

In the construction of the brood comb, storage pots and involucrum, most species use cerumen, a mixture of wax and plant resin. Some species, as *Leurotrigona muelleri* and *Trigonisca* spp., use pure wax. The bees that build exposed nests (such as *Trigona spinipes*) use leaves and other vegetation parts mixed with resin. *Partamona* spp. use mud and sometimes feces in the construction of their semi-exposed nests.

Most stingless bees build their nests in empty trunks or in hollow branches. Some species use mainly dead trees, including wood posts of fences. Even though the great majority of species use closed cavities to build their nests, some build completely exposed nests such as the species of the genus *Trigona*. Some species of *Partamona* build semi-exposed nests in large cavities, bushes and abandoned bird nests.

Some stingless bees construct underground nests using naturally abandoned ant nests and cavities under plant roots. This is the habit of mulatinha-do-chão (*Schwarziana quadripunctata*), mirim-do-chão (*Paratrigona* spp.), mandaçaia-do-chão (*Melipona quinquefasciata*) and mombuca (*Geotrigona* spp.).

A few stingless bees build their nests inside active termite nests, such as *Scaura latitarsis* and some species of *Partamona*. Other species that normally build nests in empty tree trunks have occasionally been found in termite nests such as Melipona quadrifasciata, Melipona bicolor and *Tetragonisca angustula*.

It is important to realize that termite nests, after they are dead, constitute a protective cavity that is also used commonly by *Apis mellifera* to build their nests.

A stingless bee nest has an entrance normally build of wax and mud. The form of the entrance varies a lot from one species to another and it is useful in the orientation of the bees and defense of the nest. After the entrance, there is a passageway, generally built of propolis, ending in the storage pots. In *Partamona*, between the entrance and the nest itself there is a structure called the "vestibule" that is similar to the nest and disorients parasites and predators, sometimes acting as an effective defense device. Next to the entrance and in many other locations there are deposits of resin, used frequently by the bees.

The storage pots are built with cerumen and normally have an oval shape. Some species such as *Frieseomelitta varia* build honey pots different from the pollen pots; the latter are longer and larger than the honey pots, which have an oval shape. The brood comb can be horizontal (in the subfamily Meliponinae, only *Dactylurina staudingeri*, an African species, has vertical combs as those in Apis mellifera) or in a cluster, in which the brood cells lack common walls. This kind of brood cell arrangement can be found in moça-branca (*Frieseomelitta varia*), mocinha-preta (*Frieseomelitta silvestrii*), and others.

The brood comb and sometimes the storage pots are, in many species (such as *Frieseomellita varia* and *Frieseomellita silvestrii*), enveloped by a series of membranes of cerumen which is called the involucrum and is important for thermoregulation. The brood combs are made of cerumen, suspended and separated by connectives and pillars. *Partamona cupira* has permanent pillars that pass through all the brood area and are made of mud, resin and wax. The species that construct nests in underground cavities isolate it using a series of membranes of batumen constituted of resin, mud and wax. Exposed nests also have a involucrum constituted of resin and other vegetation parts such as in arapuá (*Trigona spinipes*) or resin and mud as in *Partamona cupira*.

In the construction of the brood comb, each cell is fully built and provisioned before oviposition by the queen, after which the workers close the cell, not having contact with the new bee until it emerges.

After the larva finishes feeding, it makes a silk coccon, and the workers gnaw away the cerumen of the cell. That is the reason why new brood combs have the color of cerumen and are fragile, while the older combs, where the larvae have already spun cocoons, are clearer in the upper part and are more resilient.

When the bees build horizontal combs, they have a concentric growth. In some bees, the combs may be arranged in a spiral.

The number of eggs laid per day varies considerably within a species and from one species to another according to the situation of the colony, especially in relation to the food available.

The amount of honey stored in the colony varies enormously among the species, with some such as *Melipona scutellaris* and *Melipona compressipes*, which store more than 8 litres during a year, and others like *Plebeia* spp. that store only a few cubic centimeters.

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Purpose of the American Honey Queen Program

The American Honey Queen Program provides the entire beekeeping industry with a salesperson and a public representative. The purpose of the Honey Queen/Princess is to increase the consumption of honey as well as educate the public about the beekeeping industry nationwide. They travel throughout the United States during the year of their reign.

The beekeeping industry touches the lives of every individual in our country. The public finds this industry interesting and unique. Promotions can range from parades, fairs, civic organization speakers, to prime media such as radio, television, and newspapers.

The Queen and Princess educate the public with facts on the beekeeping and honey industry concerning pollination of our nation's crops and how dependent we are on the honeybee for agriculture; how honey is a healthy substitute for sugar; honey also extends the shelf life of baked products and adds that extra special something, maybe taste or texture to other products. The girls do cooking demonstrations using honey in their recipes which you will find in the brochures they hand out at promotions.

The Honey Queen and Princess also speak at schools, stores, conventions for homemakers, FHA, FFA, etc. and the list goes on. They have also been known to help in beekeeping demonstrations at fairs by wearing bee beards and with the processing of honey from comb to bottle.

To obtain recipe brochures for your next convention or to book the Queen or Princess for an upcoming event, contact:
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