When Your Number Comes Up *Selected CSBA Convention Highlights*

When Your Number Comes Up

I always learn something new when I attend meetings with beekeepers. This time I learned how to predict when problems like American foulbrood, tracheal mites or *Varroa* are likely to arise.

Shannon Wooten, a CA commercial bee breeder told me problems happen when your numbers are up. I asked, "Number of mites?"

"No," Shannon said.

"Number of colonies?" I asked.

"No," Shannon said. "When your number's up."

What he means is that, periodically, things (negative) just seem to happen, no matter how well you have tried to prevent them. That is when your number comes up and, hopefully, you can survive it.

Now, that is the type of predictability that drives scientists crazy!

2003 CSBA Convention

The weather outside was brisk, but inside Caesars Casino and Convention Center things were very comfortable. The presentations the first day dealt mostly with honey production and handling. Bonnie Woodworth described the family North Dakota honey operation. That was followed by a description of the Ashurst's "multi-faceted" beekeeping operation in southeastern California, including desert honey production, seed pollination, and truck towing.

Eric Mussen reviewed the current literature on effects of miticides on queens and drones. The health of those bees is critical to colony production. While the literature is scant, it seems that fumigants, like menthol and

formic acid, are influenced significantly by temperature. If it is too cool, little gas is released to kill the mites. If it is too warm, concentrated fumes tend to drive the bees out of the hives and often queens are lost. Even at proper doses, the fumigants cause bees to fan very vigorously ("roar") and move brood and stored food to some distance from the source.

The only documented scientific studies on drones and queens concern fluvalinate and coumaphos. Results suggest that queens tolerate fluvalinate relatively well, but it does "stunt their growth." Fluvalinate seems to be more detrimental to drones. Total numbers, longevity, and sperm counts of drones were reduced. However, the untreated controls in some of these experiments were not the most numerous, healthy bunch of bees, either, but differences were "significant." Bee breeders should do whatever they can to increase drone numbers to colony maximums, which may be no where near what "they used to be."

Coumaphos seems to be about equally hard on drones as is fluvalinate. However, the effects of coumaphos on developing queens is much more extreme. When the earliest tests were conducted with one or more strips in the hive, queens could not be reared to adults.

Subsequent tests were conducted with only ¼ and ½ strips placed in various locations in the hive. Interestingly, the new wax that was used to construct queen cells contained really high levels of coumaphos, compared to surrounding wax in the combs. Queens that survived treatments appeared to be a bit under weight at emergence, but they seemed to mate normally. Their longevity wasn't followed in this study, but other studies demonstrated that "premature supersedures" are common. It is obvious that for long term mite control, reliance on chemicals introduced into the hives is not the answer.

Beehive Design

Keith Delaplane provided some very interesting information on beehive design. If the hive walls are slanted, like a Kenya top bar hive, the combs are not connected to the hive walls. However, top bar combs are pretty fragile and have to be kept hanging, vertically. So, Langstroth's two great discoveries were: 1. a wooden frame all the way around the outside of a comb would prevent bees from connecting the combs to a vertical hive wall and 2. as long as the wooden frames provided the proper "bee space" between

components, they would not be stuck to the hive walls, either.

Keith also dropped a couple hints about producing a maximum honey crop: 1. extra empty combs on the hive at the beginning of a flow increases yield, while 2. higher densities of bees on combs increase yields once the flow is fully under way.

Honey Processing

Once you make the honey crop, it has to be packaged. Two of the country's largest honey packers presented video tapes of their packing lines and explained the processes. In order to obtain a "Best if Purchased by" date (shelf life) of two years, comercially processed honey is heated to 160°F, mixed with a filtering agent, run through a large filtering device, then bottled at a warm (110°F) temperature.

Despite all this scrubbing, some samples of honey contained more live microbes (viable spores) than some customers were willing to accept. When samples of producer's honey were found to have very low "plate counts," internal examination pointed to the outsides of the honey barrels as being the culprits. Now, the barrels are sent through a barrel washer before the honey is melted from the barrels in the "ovens."

Pollination

The second day was devoted to pollination. Keith Delaplane found himself defending honey bees as pollinators. He admitted that earlier studies describing honey bees as "inefficient" pollinators (1% pollination per visit to southern blueberries) on a visit-by-visit basis was accurate. The competition, solitary bees, works faster and longer during the day. But, they have a relatively short season in which to complete a generation.

Studies with southern blueberries, caged with increasing concentrations of honey bees, showed that typical field production (40% set) and berry size are much lower than true honey bee potential (79% set in the cages). Thus, Keith said that the idea of saturation pollination has not caught on, as it appears that no one is willing to invest the money (four times as many honey bee colonies per acre) to analyze the returns.

Intensive Hive Management

Because George Hanson of Oregon devotes nearly all his beekeeping time to crop pollination, George was asked to share his opinions with us, a

couple times. He has integrated recent computer technology into his management scheme and he integrates music and animation into his presentations. The presentations are very creative, very educational, and very interesting. Since George is likely to pollinate almonds, cherries, pears, apples, raspberries, melons, cucumbers, carrot and onion seed, he examines all his colonies frequently and "fixes" the ones that are not adequate.

Despite all the extra attention, the bottom just about fell out of his operation during the winter of 1996 (tracheal mite, *Nosema*, *Varroa*). As Shannon would say, "His number came up."

George then shared his presentation on "How Not to Keep Bees." The ideas were very enlightening as well as amusing. Apparently, some beekeepers have told him that they are conducting some really different beekeeping practices in the real world!

In order to document what is going on in each of his hives, George gives each hive and nuc an individual identity bar code number. Colony number and specific data are collected on each hive visit with handheld computers and then moved into the data base on the main office computer. George has "crunched" the data in many different ways, but he has not found that BIG DEAL factor that makes or breaks a season. At this point, he does not think that such information overload will be of value to all beekeepers.

George has found that trying to keep every colony in "just right" condition is very time consuming. Large colonies must be reduced, weak colonies increased, dead colonies replaced, etc. This flexibility is most easily maintained in George's operation by running a really large number of nucs on pallets. He builds nucs to prevent swarming, for introduceing replacement queens, for replacing deadouts, for banking queens (queenless nucs), for reducing colony populations (bottomless nuc with frames of brood placed over a queen excluder draws bees up from below), drawing new combs from foundation, wintering small colonies (grouped together under tar paper, and for sale to other beekeepers. Nucs also are the choice for seed pollination in cages. Old foragers tend to beat themselves to death trying to get out of the cages. The nucs are collected mid-day to try to leave the old foragers behind.

<u>Almond Future</u>

Joe Traynor, a well known "bee broker" from

Bakersfield, CA, shared his opinions on the future of almonds in CA. He thinks that with a slightly reduced crop, but much stronger prices, almond growers will do better this year than last. Yields of 2000 lbs. per acre used to be considered good here (Spain averages 500-600 lbs.). Three to 4,000 lb. crops now are relatively common in CA. Almond planting seems to go in 20 year cycles - heavy in 1970s, 1990s. But, about 136,000 of our 530,000 bearing acres are old and should come out. Acres being removed are about the same as the acres being planted, but nurseries need about a five year notice to have a large number of trees available for planting. China tried growing apples and almonds. Their apples are seriously impacting the American market. The lack of a Mediterranean climate in China prohibits them from growing very many almonds.

Joe feels that bee supplies are apt to be short in coming years. Joe thinks that good (8-frame or better) colonies will rent for around or above $50 each. He believes that with strong colonies, growers can rent fewer colonies per acre and still get good crops. Growers are tending to clump early, mid and late varieties close to each other so that the bees do not have to be moved between orchards to cover all varieties.

Joe warns both beekeepers and growers about waiting too long to get contracts. Late bees usually cost quite a bit more and may not be very good. Last minute growers haven't established permanent ties with good beekeepers, so that might be because they may not be able to pay for pollination, regardless of price.

Joe also cautions against the use of fungicides during bloom. He believes that pink bud, popcorn, and petal fall applications can control almond diseases adequately. Besides being concerned about the bees, Joe is concerned about possible negative effects on pollen and pollen germination.

Joe also abhors colony theft and he gave each of his beekeepers pet identifier "chips" that could be hidden in a load of bees to deter hive rustling.

Honey bee antivenin

After years of languishing on the "good idea back burner," a company call Atopix Pharmaceutical Corp. is intending to bring to market purified beekeeper antibody against honey bee venom components (antivenin). The antivenin already has been demonstrated to be

effective in two manners. Patients who receive numerous stings may develop severe problems if the two major enzymes dissolve their tissues and permeate their cells. Beekeeper antibody will inactivate those enzymes, but the treatment must be administered quickly enough to prevent damage.

Individuals who are allergic to bee stings can be inoculated with antibody and be free of allergic responses for 12 weeks. Formerly, we knew that passive immunity to bee stings persisted for a month. However, newer methods of extracting and purifying (4X as much, 4X as fast) the antibody produces much greater yields from the same volume of blood than earlier methods. The antibody can be freeze dried and have a shelf life of three years at room temperature.

Atopix personnel are negotiating with large drug companies to get the products onto the market as soon as they can. Once contracts are signed, it should take about 13-16 months to get the therapeutic use going and about 25-29 months to get the prophylactic use into the hands of immunologists. Although starting as prescription medicines, the company hopes to progress to auto-injectors.

Atopix needs plasma donors. For an hour and a half of sitting in the donor chair, beekeepers will be paid for their antibodies. Call (760) 603-7680 if you live within traveling distance of 2221 Las Palmas Drive, Carlsbad, CA 92009-1528.

Identity Chips, Again

Identification chips were the rage at the convention. After Joe Traynor mentioned the subcutaneous pet identification chip that he gave beekeepers, Jerry Bromenshenk, from the University of Montana, Missoula, demonstrated a similar but much more sophisticated chip. The newer chip is programmable. Each one has a specific, individual ID code, but that code can be changed and the chip also programmed to transmit pictures and "descriptors" (word descriptions of the item to which it is attached). If programmed correctly, a large cardboard box can be passed in front of the antenna and the computer screen shows what and how many (American honey queens, frames boxes, smokers, feeders, queen cages, etc.) passed by the detector.

Large distributors, like WalMart, will be buying countless numbers of these chips to monitor truckload deliveries, as well as storage and shelf invent-

tories. However, the crowning achievement will be the ability to provide a no-need-to-swipe checkout at cash registers. Just push the cart by and all items and prices will appear on the screen and checkout receipt.

Could one of those chips be glued to a queen, so that she could be found quickly? Can a chip be programmed to smell AFB or monitor various bee pheromones? As Jerry says, "Anything is possible." However, we won't be buying bee chips by the billions, so it is a good thing that we have an "in" who may be able to get the technicians to devote some efforts to beekeeping, just for fun(the challenge).

CSBA Research Reports

Three research labs reported on work conducted on CSBA funds this past year. The work on the fungus that attacks varroa mites, conducted at UC Davis, was somewhat frustrating. The fungus will attack the mites, but only if it can be delivered to the colony in some reasonable fashion. We know what doesn't work, but we haven't found what does.

Studies were conducted at the USDA/ARS bee research laboratory in Tucson, AZ, on the possibility of finding pheromones of honey bees or varroa mites that possibly could be used to "direct" (repel or attract) mites away from developing bees. Until recently, it was thought that drone pupae were most attractive to *Varroa*. These studies demonstrated that *Varroa* are more strongly attracted to their own excreta than to anything else tested. The "preferred defecation site" has been previously shown to be very important in mite mating, oviposition, maturation, and protection from being trapped by larvae spinning their cocoons.

Looking at four graphics representing chromatographs of mites, drone pupae, and combs shows one large peak for clean comb that shows up in every sample. Except for some "clutter" (which probably is where the important differences are to be found), the major peaks seem to be the same, and they all carry comb volatiles with them.

Gordy Wardell and Gloria DeGrandi-Hoffman, also at the Tucson lab, have formulated a dry mix that can be added to sugar syrup and fed to bees. It appears to be as good as a mix of pollens for sustaining brood rearing. The first batch of prepared mixture was tested by beekeepers in AZ and in 28 operations in five other locations around the country. In AZ: 1. The feed was stored near the brood, like pollens. 2. The

microbial count did not increase appreciably in three days in the hive. 3. The diet was optimized for honey bee consumption. 4. Five frame nucs in flight cages fed either diet only or pollens only were compared to free flying nucs. Brood rearing was equal in all three treatments, but the free flying bees out produced (honey) both sets of caged nucs when they were placed outside. 5. Brood marked on combs in all three treatments developed at the same rate and showed no differences in mortality. 6. Worker bee longevity was longest in the diet fed bees in the first replication of that study, so it looks very promising.

Sincerely,

Eric Mussen
Department of Entomology
University of California
Davis, CA 95616
Phone: (530) 752-0472
FAX: (530) 754-7757
Email: ecmussen@ucdavis.edu
URL:(no www)
entomology.ucdavis.edu/faculty/mussen.cfm

Eric Mussen
Entomology
University of California
Davis, CA 95616