

September/October 2006

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### Out of the Ivory Tower

Following the record setting heat wave this summer in central California, I was interviewed by Ag Alert, the news publication of the California Farm Bureau Federation, about the effects the hot temperature had on honey bee colonies throughout the state. When the article was published, I was quoted as saying that the bees could handle hotter temperatures as long as they had a source of water nearby, so that they could cool down the brood nest area through evaporative cooling. Then, I went on to say that honey bee colonies survived in Imperial County where temperatures reached 120 degrees F for long stretches in the summer. That is what was printed in the article.

When the article was read in the Imperial County area, at least one beekeeper said that if they wanted to know what went on in deep southeast California, ask them, not a guy in northern California. That's fine, but what failed to get printed in the article was a little more information that I shared on Imperial Valley beekeeping. I also said that the beekeepers worked very hard to keep the beehives as cool as possible. Hives are placed in locations with mid-day to evening shade. In fact, some beekeepers build structures (called ramadas, when I visited them), that have hive stands

that lift the hives up off the hot soil. The ramadas also have roofs that provide the mid to late day shade that is necessary to keep the combs from melting in the heat.

I did not see the publication before it was printed. I do not know whether the extra information was in the original article, and removed by an editor to save room, etc. But, I do know that there is always the possibility that what I say will get into print a bit differently than I explained it. I accept that, and I will continue to discuss bee-related topics with any member of the media, in the hope that more exposure to bee news is better than none. In this case, the information was not inaccurate. Beekeepers do keep colonies of bees in Imperial County in the summer. But, they have to take special precautions in order to keep the colonies alive.

Examining the colonies during that heat spell showed that the bees had developed some interesting changes in behavior. Apparently, the center of the brood nest was just too warm for further egg laying, so the queens moved to the outside edges of the brood nest. The number of eggs laid was reduced. However, if you looked only into the central portions of the brood nest, you would be led to believe that the queen had quit laying and needed

replacement. If, indeed, the queen really did get overheated, she would have dropped off in egg laying for good, like they do if they get overheated in transit from a bee breeder. At least in the University colonies, we did not see permanently injured queens.

### Condition of CA and US Colonies

If the observations around the country hold up, CA and US honey production may be the lowest since we have been keeping records. This time the mites take the second seat. Weather was the culprit this year. For much of the build up period in the spring, it rained quite a bit and kept the bees behind schedule. Then, it got hot and dry in a hurry and put many of the honey plants out of business before they really got started.

When the bees don't produce much of any honey over the summer, they aren't producing very much brood, either. The bees were short on nectar and pollens, and the brood that they reared probably was suffering from malnutrition. This does not bode well for wintering populations of bees. To rear a substantial population of "winter bees," the ones that we want to live well into almond pollination season next year, colonies have to have a large population of "nurse bees" (age 9-12 days old) to consume pollens and produce brood food (glandular secretions). There have to be abundant pollens to provide the proteins, lipids, vitamins and minerals required to raise healthy bees. Unless things are better elsewhere than they have been around Davis, our CA honey bees have been facing poor foraging conditions since July. Feeding colonies with nectar and pollen substitutes may help to a certain extent, but so far we have never developed

substitute feeds that provide the brood rearing stimulus that pollens do.

### Almonds in China?

China has become a major producer and exporter of many agricultural crops. Might almonds be coming? Almond grower and Almond Board of California member, Dan Cummings; UCCE Farm Advisor Joe Connell; UC Davis Professor Tom Gradziel, and others visited China to see for themselves. There were quite a few trees, but little to no crop. The weather, in the current production areas, just is not appropriate for successful production of almonds.

### Is High Fructose Corn Syrup OK?

For decades, many beekeepers have been feeding their colonies high fructose corn syrup (HFCS) when the bees required a nectar substitute. On the surface, the less expensive sweetener would seem to be satisfactory, because it contains mostly glucose and fructose, the typical sugars in stored honey. However, over time many beekeepers have become disenchanted with HFCS, for a number of reasons. So, the question becomes is it the syrup or the bees, or both?

A few very interested northern California beekeepers held a meeting, recently, with representatives of a sweetener handling company. At that meeting it was determined that there are very few companies in the HFCS production business, and most of the syrup, distributed to the beekeepers all over the country, comes from a very few original sources. Then, a very few "middle men" make the blends, or ship the original components, to retailers, etc. The system is very

similar to the way honey is handled in this country.

The differences in the syrups purchased recently, versus those purchased years ago, listed by the beekeepers included: 1. The syrup is less viscous – it pumps more easily and runs out of the feeder can holes more readily; 2. it stimulates robbing more than the original syrups did (part of this may be due to the problem mentioned above, under “condition of colonies”), 3. at times the syrup color has ranged from light straw to significantly darker; 4. the bees no longer used it to “whiten the combs” when it was fed; but most problematically, 5. the bees didn’t build up any brood on it.

Noting all these problems, the beekeepers asked me to look into it. Obviously, I’m not a carbohydrate chemist, but I went to the Web and found out how HFCS is made. Poking around more, I found an article about comparing the results of feeding sucrose syrup, HFCS, diluted honey and grape syrup (mostly fructose?) to 1,200 honey bees caged with some brood to feed for a period of 60 days. All the sugars were adjusted to 50% by weight in the syrups. Briefly, bees don’t consume or use grape syrup. Bees do consume and store sucrose, honey and HFCS at about the same rate. The life expectancy of the bees feeding on honey and HFCS is about half that of bees fed sucrose. And, brood rearing was 14% for honey and 18% for HFCS of what it was with sucrose (100% = 538 capped cells).

So, why might the syrup be less viscous than it used to be? It could have less total solids (less dissolved sugar). That would not be good quality control somewhere along the process. If you rely on your refractometer to take a reading, remember that unless it is a “honey refractometer,” it is

calibrated for sucrose, and invert sugars of the same concentration read a little less due to the different refractive indices of invert sugar solutions and sucrose solution. It could be due to the pH being lower. Higher pH (basic) tends to keep the sucrose molecules intact and since they are twice as large as glucose and fructose molecules, they don’t move quite as easily. Lower pH (acid) tends to break sucrose into fructose and glucose, which move more readily.

Does it stimulate robbing? I don’t know. This observation is at odds with other comments stating that, even when it was spilled on the ground and formed a puddle, the bees weren’t interested in eating it. Does that mean that once the syrup is “handled” by hive bees it picks up the “honey” scent and becomes something worth dying for? If the product is a sugar syrup and it is not attractive to bees, it sounds like there may be something repellent in it. If fructose encounters free amino acids at higher temperatures, Maillard reactions take place. The resulting chemicals are dark and they have distinctive flavors. In fact, using just the right amino acids and temperatures, some of our most desired food flavorings are made that way. But, do the bees like them? Also, there still may be some contaminants of corn processing, such as saponins, that taste bitter, can act as animal feeding inhibitors or even be toxic to animals.

The color of HFCS and sucrose syrups should be “water white” (clear). The fact that some of the syrups have been tainted with various levels of tan color suggests very strongly that the syrups have been heated enough to convert the sugar molecules into other substances. In the case of a significant color change, one beekeeper stated that the syrup (continued on Page 6).

# California State Beekeepers' Association

117<sup>th</sup> Annual Convention

Mont Bleu Resort Casino & Spa (formerly Caesar's)

55 Highway 50

S. Lake Tahoe, NV

(888) 829-7630

November 14-16, 2006

Monday, November 13      Board of Directors' Meeting

Tuesday, November 14

8:00 AM      Registration & Exhibits Open  
8:30          Opening Ceremonies and Committee Reports  
10:00        Exhibitors' Break  
10:20        Exhibitor Introduction & Door Prizes  
10:30        "Small Hive Beetle" – **Dr. James Ellis**, Univ. Florida, Gainesville  
11:30        "Almond Industry Outlook" – **Steve Rothenberg**, Blue Diamond Growers  
12:00 Noon   Lunch  
1:30 PM     "Factors that Reduce the Production of Glandular Bee Food" – **Eric Mussen**, UC Davis  
2:15        "Mite Resistant Queens" – **Tom Glenn**, Glenn Apiaries, Fallbrook, CA  
2:45        "2006 Almond Pollination Using Imported Australian Bees" – **Dr. Frank Eischen**, USDA/ARS, Weslaco, TX  
3:30        Exhibitors' Break  
3:50        Exhibitor Introduction & Door Prizes  
4:00        "Western Apicultural Society" – **Dr. Adrian Wenner**, UC Santa Barbara  
4:15        "U.S. & World Honey Markets and Trends" – **Ron Phipps**, CPNA International, Ltd.  
6:30        Reception: American Honey Queen and New Members

Wednesday, November 15

7:00-9:00    Sioux Honey Association Breakfast  
8:00        Registration & Exhibits Open  
9:00        Panel: Almond Pollination / Bee Brokering Outlook – **Joe Traynor, Randy Oliver, John Miller, Lyle Johnston**  
9:45        "Honey Bees and Viruses" – **Dr. Judy Chen**, USDA/ARS, Beltsville, MD  
10:30       Exhibitors' Break  
10:45       Exhibitor Introduction & Door Prizes  
11:00       "Maintaining European Colonies in Africanized Habitats" – **Dr. Gloria deGrandi-Hoffman**, USDA/ARS Tucson, AZ  
11:45       "Rules and Regulations for Beekeeper's Private Applicator's License" – **Larry Lima**, Merced County Agriculture Department  
12:00 Noon   Research Luncheon: "Update on the Use of Oxalic Acid to Control *Varroa* Mites" – **Dr. Marion Ellis**, University of Nebraska  
2:00 PM     Annual CSBA Auction  
4:00        Unscheduled Interval

7:30 Research Committee Meeting

### Thursday, November 16

8:00 AM Registration & Exhibits Open – Begin Silent Auction  
8:30 CSBA Annual Business Meeting  
10:30 Exhibitors Break  
10:45 Exhibitor Introduction & Door Prizes  
10:55 “What to Feed Honey Bees” – **Abdi Saffari**  
11:10 “Report from American Honey Producers’ Association” – **Steve Park**, Palo Cedro, CA  
11:20 “Report from American Beekeeping Federation” – **Bob Miller**, Watsonville, CA  
11:30 Ladies Auxiliary Business Meeting and Luncheon (2 hrs)  
11:40 “Report from National Honey Board” – **Bruce Boynton**, NHB  
12:00 Noon Lunch  
1:00PM Exhibits Close  
1:30 “Working Bees in a Small Hive Beetle Environment” – **David Mendes**, N. Fort Myers, FL  
2:00 “2-heptanone to Control *Varroa* Mites” – **Dr. Gloria deGrandi-Hoffman**  
2:45 “Hygienic Behavior in Honey Bees” – **Dr. Marla Spivak**, University of Minnesota  
3:30 “Soft Treatment of *Varroa* Mites” – **Dr. Medhat Nasr**, Alberta, Canada  
4:15 “Hivastan<sup>®</sup> -A New Acaricide for *Varroa* Mites” – **Doug Vangundy**, Wellmark, International  
4:45 “Mite Away II<sup>®</sup>” – **Davis Vanderdussen**, NOD Apiary Products, Canada  
6:30 Social Hour – No Host Bar & Silent Auction  
7:30 **Annual Banquet, Awards and Auction**

### Friday, November 11

8:00 AM CSBA Board of Directors Breakfast Meeting

### **Convention Tips**

The remodeled Mont Bleu Resort Casino and Spa has six bars and lounges, two fine dining restaurants (Ciera = steaks, chops, sea food, vegetarian; and Opal = sushi and fusion delicacies), and six casual dining outlets (20-Four = ‘round the clock cuisine; del Sol = nuevo mexicano dishes; the unbuffet = all-you-can-savor buffet; The Zone = deli favorites; and Starbucks = beverages and sweet treats).

New ownership and remodeling automatically mean higher prices in the hotel trade. However, the Mont Bleu is going to honor the room prices worked out in the former Caesar’s contract with CSBA. That will be \$79 per night (Sunday-Thursday), during the week of the convention. Our Friday and Saturday night special is \$99. The contract includes a “block” of rooms that will be held for us until November 3rd. However, if the rooms in the block are sold out before that date, you might have to pay the full “rack” rate on your room, even if the block date hasn’t expired. The rack rate can vary wildly, from very low to exceedingly high. Waiting

to the end will be gambling for a room rate, typical of S. Lake Tahoe. Get you reservations early by calling (800) 648-3353 and requesting your room using CSBA identification code **STBEES6**. Also, if you want to save a few more dollars to leave with the casinos, be sure to get your pre-registration materials to Patti Johnson, SCBA Secretary/Treasurer, before October 30<sup>th</sup>. After that date the rate goes up from \$60 to \$85. A pre-registration form can be downloaded on line at [www.californiastatebeekeepers.com](http://www.californiastatebeekeepers.com) and click the link to Events.

(cont. from Page 3) tasted “bitter.” A lesson learned some time ago was that if a beekeeper tastes a potential bee feed substance and it tastes OK, then the bees are likely to eat it. If it doesn’t taste good to the beekeeper, the bees aren’t likely to eat it, either.

The fact that bees do not build much brood on the feed was covered earlier in the information on the problem of bees ignoring substitutes when little or no pollen is coming into the hive? Are there nurse bees? Is there abundant pollen or substitute? The industry has available some new substitute products. Are they attractive enough to overcome the lack of forage? I’m not convinced that the syrups lack the nutrients to support brood rearing. However, the colonies may not be in the right shape to conduct brood rearing. All this remains to be determined.

Why don’t the bees use it to whiten combs? When bees have nectar coming into the hive faster than it is being used to produce brood, the bees tend to store it as honey. This takes wax, and on a good flow, the bees are producing nice, new wax to use as cappings. Apparently, the bees are not recognizing a surplus of these HFCS products as surplus nectar. It was stated that surplus sucrose syrup is handled like incoming nectar and comb whitening is common.

### QuickSand<sup>®</sup> Insect Trap

An advertisement in the September/October 2006 issue of Adirondack Life caught my attention. Under various names, like Cluster Buster<sup>®</sup>

and Powder Trap Technology<sup>®</sup>, a company is selling a plastic box that adheres to windows. The box has a slanted cover containing slots through which flies, beetles and wasps can enter. Once inside, the insects eventually come into contact with the “exploded (extremely finely powdered) egg shells” dust that fills about half the box. Once coated with dust, the insects eventually fall into the material and bury themselves while trying to move around. The insects make their way to the bottom and the dust moves up a bit.

I have no idea how a honey bee would fare in the trap, but it sounds lethal. So, if you have a room that occasionally has insects on the window that you would prefer not to be there, this may be a solution. For more information visit their Web site at: [www.PowderTrap.com](http://www.PowderTrap.com) or call 1-877-FLY-SOUP.

### GM Plants with GM-less Pollen

A major concern of many about GM (genetically modified) plants is that the altered genes will be passed along in the pollen. Some think that this might hurt pollen consumers, like honey bees. Others think that it would be a mechanism for spreading the genes far and wide on the wings of pollinators or by the wind.

Kim Flottum, editor of Bee Culture, sent me an e-mail containing results of efforts of researchers to prevent such occurrences. Without all the detail, the scientists found a way to incorporate extra genetic instructions into a plant that function only during the processes of pollen forma-

tion to kick out (auto-excision) any foreign genetic material (the added traits of interest) before the pollen grains are formed. It is true that the genes required to set off this self-cleansing mechanism are still in the pollen, but they do not cause any new proteins, etc. to form in the pollen. This mechanism will cause complexities when trying to produce hybrid seed crops.

This paper was picked up by the USDA's Information Systems for Biotechnology (ISB), a data base administered by Virginia Tech for those interested in responsible use of biotech products. ISB publishes their News Reports periodically, and they can be accessed by subscription or viewed at: [www.isb.vt.edu](http://www.isb.vt.edu). This information was in the News Report for August 2006, pages 8-10. I believe the original reference may have been: Mlynarova, Ludmila and Jan-Peter Nap, 2006. Transgenic Plants that Make Non-transgenic Pollen. Critical Review in Plant Sciences 24: 83-107.

#### Disappointing Research News

In the later days of July, the National Honey Board issued a press release that discussed research the Board had funded on controlling *Varroa* with a fungus. The Board received a report, titled: "Microbial Control of *Varroa* with the Fungus *Metarhizium anisopliae*." The research was conducted jointly by Dr. Rosalind James at the USDA non-Apis pollinator lab in Logan, UT, and Jerry Hayes, State Apiarist in FL.

Unfortunately, similar to the studies that Dr. Christine Peng and I conducted some time ago, the fungus worked well in the lab but was of extremely limited value in the field colonies. The delicacy of the fungal spores and difficulty in placing the spores where the mites would contact them were the same two impediments that prevented us from using *Hirsutella thompsonii* effectively in colonies at UC Davis.

#### 4.9mm Cell Sized Plastic Comb

The SuperCell company, P.O. Box 762, Westmorland, CA 92227, phone: 866-343-7191 FAX: 888-396-8245, e-mail: [office@honeysupercell.com](mailto:office@honeysupercell.com), or Web site: [www.honeysupercell.com](http://www.honeysupercell.com), is marketing a polypropylene combination frame containing partially drawn foundation with a 4.9mm internal diameter cell size. The frames are advertised as ready to go, without the necessity of spraying with wax or sugar syrup. Potential benefits listed are: 1. reduced *Varroa* problems, 2. used immediately by bees, 3. doesn't absorb chemicals, 4. works in high speed extractor, and 5. unaffected by wax moth and hive beetle. The frames are sized to fit 10 to a Langstroth super and are shipped 20 to a box that weighs 39 pounds (1.78 pounds per frame).

#### Adjuvants and Honey Bee Mortality

Following a field presentation to almond growers, that included precautions about spraying the bees, Orchard Systems Farm Advisor Franz Niederholzer contacted me and shared some information he had on the effects of adjuvants on honey bees. The studies were conducted in New Zealand, where they really do go out of their way to try to protect honey bees from contact with bee-toxic pesticides.

The products in the studies were:

1. Citowett®
2. Pulse® - 100% contact mortality
3. Boost® - 100% contact mortality; 72% by ingestion at 85 hours
4. Codacile oil®
5. Contact®
6. Raingard®
7. Peptoil®
8. Sunspray®
9. Ethokem® - 90% contact, with 2 hour delay; 90% by ingestion at 85 hours

10. Multifilm®
11. Uptake®
12. Du-Wett®
13. Li-700®
14. Bond®
15. Bond Xtra®

The results suggest that with a couple exceptions, adjuvants are not toxic to honey bees. But, the three that were problematic have the following chemistry:  
Pulse – organosilicone surfactant  
Boost – perhaps organosilicone  
Ethokem – polyethanoxy alkylamine (ethoxylated tallow amine).

Interestingly, as I have proposed more than once with fungicides, the New Zealand authors wrote: “The results of this

laboratory study suggest that surfactants may be causing bee mortality in the field and it would therefore be beneficial if they went through the registration process and if necessary carried appropriate warning labels.”

Sincerely,

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