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--

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Apiary Assessments Again?

With encouragement from the California Department of Food and Agriculture, the California State Beekeepers' Association's (CSBA) Executive Board requested that the California Apiary Board be brought out of moth balls and back into action.

The regulations in the California Agriculture Code that formalize the Apiary Board are still on the books. But, when the beekeepers decided to discontinue paying assessments, the Board became inactive.

Probably the major reason for re-activating the board is to take financial pressure off the CSBA. For many years CSBA has been conducting the business of the association and funding annual research projects on honey bees from its general funds. Much of that revenue is generated from membership dues and the annual convention auction, as well as profits from the Research Luncheon and individual contributions to the Research Fund.

Pressures on the budget, especially with the need to hire professional assistance

to deal with the seedless citrus problem, have reduced the amount left for funding research to inadequate levels.

Implementing a colony assessment on ALL colonies that are resident in the state, or are brought into the state for pollination or honey production reasons, could generate a substantial sum of money for research while leaving funds in the CSBA budget to do other essential things.

The "re-invigoration" is in the "formative" stages. Adjustments would have to be made to at least the sections of regulations dealing with the size of assessment fees and the distribution of those fees among the state and county offices, as well as research funding.

At the time that the assessments ended, beekeepers were being assessed $0.33 per colony. Since that time, all costs have increased, and so has pollination income. It is likely that the new assessment will be considerably higher than when it ended.

If you have strong feelings about this topic, or if you have ideas for modifying the text of the regulations (which are going to be changed), then contact CSBA President Jackie Park-Burris and share your ideas. Jackie is available at: jackielynn44@aol.com. The text of the applicable regulations can be found in Sections 29020-29028 and 29030.5-29032 of the California Food and Agriculture Code.

In my e-mail, today (June 9, 2009), I received the official call for candidates to the Board. If you wish to nominate yourself, or someone else to a Board position, or simply desire further information on the Apiary Program and committee vacancies please contact: Gerald Miller at (916) 651-9449.

Heat Treating Nosema Spores

On page 1102 of the 1992 edition of the Hive and the Honey Bee, there is information on decontaminating hive equipment, of *Nosema* spores, using dry heat. The reference is to research by Drs. George Cantwell and Hachiro Shimanuki who determined *Nosema apis* spores (sprayed on combs placed in supers and heated in an oven) were susceptible to a temperature of 120^{o}F, if kept at that temperature for 24 hours. This is tricky business in a warehouse or hot room environment. Cool spots will not get the job done. Hot spots, around 130^{o}F, will cause the combs to sag or melt.

The first U.S. information to be released about heat inactivation of *Nosema ceranae* spores, appeared in a press release from Bee Alert Technology, Inc. in Missoula, Montana. Flow cytometry studies, conducted in Rob Cramer's lab, demonstrated that IN SOLUTION 96% of the spores were killed in 90 minutes at a temperature of 122^{o}F.

Later in the press release, it is suggested that a relatively short heat treatment could make used combs, upon which bees may have died of *Nosema ceranae*, safe to use, again. "A 2-3 hour exposure of bee equipment to temperatures around 120^{o}F may be warranted."

I have a feeling this is being too optimistic. Microbes are affected differently by dry and moist heat. Dry heat (hot room) usually kills microbes by oxidation, and air does not transfer (conduct) heat nearly as well as water does. Moist heat (flow cytometry) usually kills microbes by denaturing (coagulating) proteins, and water remains in contact with the microbe all the time.

At this point in time, I would be more inclined to keep the equipment in the hot

room for at least 24 hours. Although I haven't read the 1970 paper, recently, it is likely that spores buried in pollen or honey would not get heated through in 24 hours, and spores will survive. This sounds like a treatment for empty honey supers, which really aren't a problem, anyway.

A number of researchers are looking into this question, as I write this, so we should have better data on field treatments before long.

Fungicides and Honey Bees

Most of the time, honey bees and crop disease-preventing fungicides coexist fairly well. Only in a few cases do there seem to be problems. I will cover those specific instances briefly. That will be followed with some recommendations for keeping potentially damaging fungicides out of honey bee food (pollens).

The first time California beekeepers were documented as observing a possible connection between a fungicide and brood problems was in 1967, when beekeepers complained of substantial brood losses following applications of captan in some almond orchards in northern California. In 1971 similar reports led to investigations of dying larvae, prepupae, pupae and emerging bees. Many emerging adults were light in color, light in weight, and often had deformed wings.

The results of various flight cage and field studies can be found in Atkins and Kellum (1986). They concluded that up to 50% of the brood could be negatively affected by captan used at field doses. In a later laboratory study, Mussen *et al*. (2004) determined that a number of fungicides, including captan, could be lethal when incorporated into the larval diet at concentrations thought to represent the amounts that would be in the larval food after an application in the field. Captan was among the most toxic.

The next fungicide that raised some concern was Rovral®. Again, beekeepers observed brood losses following applications of Rovral to blooming almonds. Their concerns prompted the previous study by Mussen, *et al*. In that laboratory study, Rovral was involved in larval mortality, but a number of pupae remained alive for many days, only to succumb during the molt between the pupal and adult stages.

Currently, California beekeepers have observed brood losses following applications of Pristine® to almonds and other nearby orchards. Additionally, when beekeepers, who specialize in producing queen honey bees for sale, tried to rear queens in hives where the bees were consuming stored almond pollen from Pristine-treated orchards, their success in rearing queens dropped to nearly zero.

The question becomes, "Do these fungicides have anything in common, chemically?" Captan contains N-trichloromethylthio-4-cyclohexene-1,2-dicarboximide. Rovral contains 3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazoldinecarboxamide. Pristine contains a blend of two active ingredients: Boscalid® which is 2-chloro-N-(4"-chloro[1,1"-biphenyl]-2-yl)-3-pyridinecarboxamide and Pyraclostrobin® which is methyl N-(2-{[1-(4-chlorophenyl)-1 *H*-pyrazol-3-yl]oxy-methyl}phenyl)N-methoxy carbamate.

Each of the problematic fungicides have a dicarboxamide or R-CO-NH_2 ("dicarboximide" is interchangeable) component. It appears as though that type of chemistry significantly interferes with hormonally controlled development of the immature bees. In the case of Pristine, an

active carbamate molecule always attracts attention, since most carbamate insecticides are very detrimental to bees.

So, what is the suggested solution to using preferred fungicides when honey bees are within flight distance? In the case of almonds, and most other blooming crops, monitor the honey bee flight activity in the orchard or in the field. On nice days, the pollen collecting honey bees will be done by early to mid-afternoon in almonds. Since pollen contamination appears to be the problem (Boscalid was the seventh most common pesticide found in beeswax samples from CCD (colony collapse disorder) hives (Frazier, *et al*., 2008), applicators should make a concerted effort to avoid contaminating foraging pollen collectors or the pollen they are gathering.

If possible, fungicides should be applied before or after the plants are in bloom, thus avoiding honey bee visits to treated flowers. This pertains, also, to planted ground cover or weeds that might be flowering among the cultivated crops. Afternoon and later applications will reduce bee and pollen contamination to a minimum in almond orchards, and will go a long way in protecting the pollinators that are absolutely essential for pollination of nearly 100 of California's crops. Similar recommendations have been suggested for *Osmia lignaria* when used in commercial agriculture (Ladurner *et al*., 2005). With honey bees being as fragile are they currently seem to be, it is to the benefit of all of agriculture for applicators to do everything they can to keep pesticides off the bees.

References

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Mussen, E.C., J.E. Lopez, and C.Y.S. Peng. 2004. Effects of selected fungicides on growth and development of larval honey bees, *Apis mellifera* L. (Hymenoptera: Apidae). Environ. Entomol. 33(5): 1151-1154.

Insect Growth Regulators

For decades I have been telling beekeepers that insect growth regulators definitely affect honey bee larvae in laboratory tests, but they don't seem to be much of a problem in the field. Some losses of brood were seen in the field, but the colonies seemed to recover their brood rearing fairly quickly, so it appeared as though there wasn't much of a problem.

A beekeeper's call, today, sent me to the Web to check on the subject and I found a very interesting paper by a team of British researchers, led by Helen Thompson (The effects of four insect growth-regulating insecticides on honeybee colony development, queen rearing, and drone sperm production. 2005. Ecotoxicology 14: 757-769).

In their studies, they added field applied doses of fenoxycarb (juvenile hormone analog); diflubenzuron (chitin synthesis inhibitor); azadirachtin (ecdysteroid synthesis inhibitor); and

tebufenozide (ecdysteroid analog) to sugar syrup fed to specially prepared colonies.

Disease-free colonies, with drones removed and excluded, were run in single boxes. On the day of treatment, eggs were marked on overlays and followed through development. Amounts of brood and bees were monitored. Queen development and performance, as well as sperm production in new drones, were followed.

Briefly, the observations replicated what was seen following field applications, pertaining to loss and recuperation of brood. However, brood recovery wasn't enough. Azadirachtin and tebufenozide were not much of a problem to brood rearing. Chronic, sublethal exposure to residues of azadirachtin, fenoxycarb and, especially, diflubenzuron tended to shorten or eliminate the early, nurse bee activities and convert the workers into shortened life foragers. Emerging bees failed to gain weight normally, but of greatest concern were effects on overwintering. Four colonies of five treated with azadirachtin didn't make it through the winter. Fenoxycarb was also very hard on wintering bees, and queens reared in its presence never mated. Things are even more complex, but models of exposures to these chemicals in mid-summer projected poor wintering and poor spring build up. The document definitely is worth reading.

Canadian Colony Losses

With an eye on the US colony losses and concerns about increased losses in some areas of Canada, the Canadian Association of Professional Apiculturists (CAPA) worked with the Provincial Apiarists to determine the extent of losses by province.

Similar to the states in the US, the losses were not evenly distributed. Sorted by worst to best, the provinces reported 38% (BC); 36% (PE); 30% (AB); 29% (NB); 28% (MB); 27% (ON); 20% (QC); 18% (NS); and 12% (SK). These losses are about double the long-term trend, but are better than the losses over the winter of 2006-07.

After the arrival of varroa mites, average winter loss in Canada has been about 15%. This past year, the average was 26.4% or 1.8 times "normal." During the winter of 2005-06, Canadian beekeepers lost 29% of their colonies.

Abnormally high losses in some locations have caused shortages of colonies for blueberry production in portions of British Columbia.

Investigations of the losses suggested three principal causes: 1. Ineffective control and mismanagement of varroa mites. Resistance to fluvalinate and coumaphos, as well as very short windows for adequate colony fumigation, led to many losses.

2. Inadequate control of nosema disease. Beekeepers do not routinely submit samples for *Nosema* spore quantification. Both species of *Nosema* are being found, and exact treatment recommendations have not been developed for *Nosema ceranae* control.

Finally, 3. Starvation still was a problem, especially around Vancouver Island and the Maritime Provinces.

Now the question is, "Is CCD in Canada?" Based on US criteria for the disorder, the answer is, "No." But, the report goes on to say, "Because longer winter conditions preclude the active brooding and flying of colonies found in early-season pollination areas of the U.S., colonies in Canada may not exhibit similar colony-level symptoms. Instead, it is conceivable that Canadian producers may simply see these

effects as higher numbers of dead colonies coming out of winter or those described as dwindling during the early spring."

"Most scientists in the U.S. and Canada would agree that what is being described as CCD in the U.S. and the high winter losses seen in Canada are likely being caused by several common interacting stress factors acting on honey bee colonies. Researchers in both countries are examining similar root causes of these stresses and their effects on bees."

How Are Almonds Doing?

Not too badly, according to the May/June issue of Almond Facts, an industry publication by Blue Diamond Growers which is intended to reach every almond producer in California. World supply and demand continue climbing each year. California bearing acreage is climbing every year, also. The NASS estimate of bearing acreage is 660,000 for 2008, and projected to 710- and 740,000 acres in the next two years. That means a demand for 1.5 million, or more, colonies of honey bees in California in two years. Can we do that?

Almond prices have backed off quite a bit, because the value of the dollar has lost a lot of ground in foreign countries. Right now the price is a bit below that of January 2002 ($1.70 a pound – adjusted to $1.00 per pound in 2002 dollars). The price peaked to the grower in January 2006 at about $3.75 per pound. The growers are feeling rather pinched, since their costs of production have increased 180% for fertilizer, 170% for fuel, 121% for pollination and 150% for herbicide between 2005 and 2007. That fuel increase will look quite small compared to what is happening today on the fuel market.

By the time the nuts are handled and on the market, here is how they compare in price to the wholesalers:
Walnuts and pecans, about $4.40/lb.
Hazelnuts ("filberts"), about $4.00.
Pistachios, about $3.00.
Almonds, about $2.40.
At those prices, it is not likely that almonds will be replaced by another type of nut in many products.

New Beekeeping Text About to be Released

Springer publishing is going to bring a new textbook on honey bees to the market in July. The title will be – The Buzz about Bees: Biology of a Superorganism. This is an English translation of a runaway best selling text book in Europe, originally written in German by Jürgen Tautz.

Written for consumption by all sorts of audiences, bee biology and behavior are presented in a slightly different manner than in current text books. "In contrast to the view of bee colonies as perfect societies of selfless individuals ruled by a queen, Tautz introduces them as a 'superorganism', a self organizing and complex adaptive system based on a network of communication; a fascinating result of evolution – a mammal in several bodies."

"The entire range of astonishing bee activities is described. Remarkable action photographs never shown before present bees busy with cell cleaning, caring for the brood, serving in the queen's court, visiting flowers, receiving nectar, producing honey, comb building, entrance guarding, heating and cooling. Spotlights include bees grooming, swarming, fighting, telephoning, sleeping and communicating by high-toned beeping, scents and dances."

The proposed price for the text will be $39.95. The hardcover book has 284 pages containing 230 high quality photographs. It already has an ISBN number: 978-

3-540-78727-3. For more information about the book go to this url (remember this type of computer address has no empty spaces in it): http://scientific-direct.net/c.asp?707188&c10271858e93dff0&3.

PIB Gets the Nod

The votes have been counted and the Honey Packers and Importers Research, Promotion, Consumer Education and Industry Information Order (called PIB by the industry) was passed by 78% of the voters and 92% of the volume of honey.

This change leads to the suspension of the assessment payments to the National Honey Board. The provisions and regulations that set up that Board will be terminated before long. There still will be an assessment of $0.01 per pound of honey, but it will be paid by any first handler or importer dealing with 250,000 or more pounds of honey.

The new Board will have ten members: three first handlers; two importers; one importer-handler; one national honey marketing cooperative representative; and three producers and their alternates. Once the order becomes effective, AMS will be accepting nominations for board members. To learn more about that, please contact Kathie Notoro at (202) 720-9915 or e-mail her at: Kathie.Notoro@usda.gov.

California 4-H Essays

The following essays were submitted for the national competition, but didn't quite fit the format. I would like to share the author's ideas with you.

THE RESULTS OF HONEY BEE POLLINATION IN MY COMMUNITY
Emmaly Little – nine years old

Honey bees are great for my community. The bees bring pollen from flower to flower to pollinate things like almonds, alfalfa hay, flowers and other things too. The almonds are good for people to eat. The alfalfa hay is good for cows, horses, goats, sheep and other animals too. The flowers make my community full of beautiful and colorful flowers. I like all of the things bees pollinate for us. I like almonds because they are so delicious. I like alfalfa hay so I can feed my animals. I really like the flowers for the sweet smell and the beautiful sight. Overall the result of honeybee pollination is great for Los Banos, California – my community.

THE RESULTS OF HONEY BEE POLLINATION IN MY COMMUNITY
Brianne Little – 12 years old

Honey bees play a very important role in the Los Banos, California community. They are important because bees pollinate things in my community such as almonds, seed alfalfa, and flowers. Seed alfalfa is important in Los Banos because there are lots of dairies in town and alfalfa hay is fed to the cows on those dairies. Bees are important to almond trees because they pollinate them and pollination keeps them healthy. Also pollination of almond trees makes delicious almonds. I have my own bee hive and have taken it to an almond orchard last year to help pollinate the trees. One of the things I like most about having a beehive of my own in my backyard is walking around outside and watching my bees pollinate all of the beautiful wild flowers in my back yard. I also enjoy seeing all of the different colors of pollen going into the hive. In conclusion, bees are very, very important in the community of Los Banos, California.

2008 4-H BEEKEEPING ESSAY CONTEST
By: Mackenzie Hurley OLF 4-H

The first thing people would think to do when they see a bee hive is to take out their spray and kill them. The thing they don't know is that they are hurting their community and themselves every time they kill a bee. Most people think that bees are an annoying, mean insect that stings you whenever you bother it, but that is not true.

Bees are very helpful to your community in many different ways. Every third bite of food that you eat is from a honey bee that has pollinated the trees and plants. Beekeepers put their bees out in the almond orchards during January. The honey bees do their job by pollinating their trees to make food for us. I have been a beekeeper for two years and going on my third. Last year we moved mine and another girl's hive to the almond orchards. The orchard owner paid us money because it is so important for the farmer's trees to get pollinated.

You might have heard someone say how honey bees are so important but it probably went in one ear and out the other. That is how it is for most people. That is why we are trying to educate the community about how important honey bees are for us. We all, as a community, need bees.

If everyone keeps killing bees we won't have half of the food on our plates that we have now. I think we are lucky to have what we have, and we wouldn't have it without bees. I hope all of you have been convinced about the importance of honey bees.

Sincerely,

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