## *CSBA Presentations Review*

President Valeri Severson, with lots of help from Robin Mountain, organized and conducted a truly outstanding CSBA convention in Sacramento this year. Attendance was down a bit, as would be expected with the down turn in the economy and the impact of the devastation in New York City and at the Pentagon. But, those who did attend were treated to a very interesting and informative program. Most of the participants also enjoyed their trip to the recently refurbished (right up to the day of the visit) Laidlaw Honey Bee Research Facility and their trip to Old Sacramento for sightseeing, dinner, and shopping.

The meeting began with Committee Reports, some of which contained items particularly worthy of note:

1. The rules governing the quarantine of red imported fire ants (RIFA) were relaxed ever so slightly. If a load of incoming bees was found to be infested (one ant is enough), the load would be sent to a specific location for pressure washing, then allowed into the state. A second or more shipments of bees, from the same operation, found to be infested with RIFA would be turned around at the border.

2. A "feral bee" survey conducted late this summer by Dr. David Nielsen, from Dr. Robert Page's lab at UC Davis, determined that Africanized Honey Bees had expanded their area of "colonization" north into Tulare County. AHBs were found near Posey, just over the border with Kern County and outside of Lindsay, a little over 10 miles east of the City of Tulare.

3. Pollination contracts may be a bit tighter this year, according to the Marketing Report by Kevin

Roberts. New plantings of almonds have maintained the total almond orchard acreage, but the new orchards require fewer colonies per acre than the old, full production orchards. It appears as though alfalfa seed acreage could be about 33% of the 1999 level. And, perhaps half the melon acreage will be out of production, due mostly to concerns about availability and prices of water. In the honey sales arena, Kevin thinks that "smaller players," who are still happy to sell honey to U.S. buyers at prices below those needed by U.S. beekeepers, will fill in the slack for reductions in Chinese and Argentine honey.

4. At the moment, there appear to be very few to no air lines that are willing to ship live bees (queens the biggest concern) to destinations in California. Shipments to other places, while possible, are much more perilous than they were, previously.

Dr. Christine Peng brought us up to date on methods for controlling *Varroa* mite infestations in colonies. She described heat treatments, high humidity, trapping mites in drone brood, screen bottom boards and sticky boards, foundation cell size, using *Apis cerana* in *Apis mellifera* colonies to "groom" mites off all the bees (only can be done in regions of the world where *A. cerana* is indigenous - not in the U.S.!), and breeding resistance, such as hygienic behavior, into the bees. The only reported case of biological control was a pseudoscorpion, *Chelifera cancroides*, which feeds on *Varroa* mites. However, if the mites run out, the pseudoscorpion is known to eat bee brood.

Dr. Peng is conducting research on fungi that might be useful in *Varroa* control. She stated that 750 species of fungi have been reported infecting 56 genera of arthropods. Of those, 58 species of fungi infect more than 73 mite species. In order to be effective, the fungus must be able to attach to the host, penetrate the cuticle, replicate in the host, and kill the host. In our case, the fungus must not infect any life stages of the honey bee, but it must be able to do it's job in the environmental conditions of a beehive.

Christine and researchers in three(?) other labs are working with potential fungal control agents. Best results seem to be with isolates of *Hirsutella*, a fungus that has accomplished mite control in greenhouses and in Florida citrus orchards. The most challenging portion of this study will be development of a

delivery system for hive treatments, after the best strains are selected.

Casey Stone, a cattle rancher, determined that the fluctuating income from his operation was not reliable enough. So, beginning in 1996 the company branched out, significantly over time, from making and selling jerky and producing and selling "Commando Bee Honey" (from yellow starthistle), to becoming a "dude ranch." Hedrick Ranch promotes itself as "Combines, Bovines and Fine Wines." The ranch boards visitors from all over the world, especially from Japan. You can practice roping steers, etc. but only from props - no live riding and roping allowed. But here is the punch line: Casey feels that the value of honey bees is a "hidden" message, known only to those very close to pollination. If we want our main product, honey, to command a good price instead of our taking what is being offered in the market place, then we have to get off our duffs and promote the daylights out of honey.

Rob Kiss from Blue Diamond reiterated Kevin Roberts information that new plantings of almonds have dropped off considerably and many orchards, at or approaching 20 years old, are going to be removed. Demand for almonds has been increasing nicely, about 5% per year for quite a while. It looks like the demand might level off at 850 million pounds and we are selling 760 million now. It appears that some growers are selling too cheaply. Rob feels that could be avoided by better communication among growers and shippers, so that everyone has a good idea of what the market is doing. With increasing demand and a leveling of production, Rob sees better prices for nuts in the future.

Tom Glenn, an experienced, commercial bee breeder from north-western San Diego County, described his observations incorporating SMR (suppression of mite reproduction) queens into his breeding program. The queens are descendants of those collected by Drs. Harbo and Harris, with the USDA/ARS, from colonies with low *Varroa* populations in Michigan and Louisiana. One of the interesting traits of these stocks is that the prepupae somersault about 80 times while spinning their cocoons. In so doing, they can trap up to 50% of the mites in their cocoons. That happens about 1-2% of the time with control stocks. Also, mite reproduction doesn't work correctly when feeding on SMR bees. For some reason the brother mite does not deliver sperm to his sisters. Also, for some other reason, the fecal patch, that usually is found on the "top" of the cell, is

placed directly on the pupa in cells where there are non-laying female *Varroa*.

In eight generations, USDA researchers have been able to select for strains of bees upon which there is 0% reproduction. Unfortunately, they have approached the limits of inbreeding and other problems are developing. In one of the tests of crosses, 650 mites were introduced into the colonies. Later, SMR X SMR had only 27 mites left; no mite reproduction was going on; but they only had about two pounds of bees (inbreeding). SMR X Control still had 456 mites around, but only 43% were reproducing. The hybrids had 4.2 pounds of bees. The Control X Control colonies had mite populations increasing to 816 mites, 59% of which were reproducing. They had only 3.5 pounds of bees.

This suggests to Tom that you don't want to replace existing stocks with pure SMRs. Instead, you want to have the SMR queens around to provide drones with SMR genes for "enhanced" mating. Over a number of generations the hybrid blends should become much better bees.

Dr. Dewey Caron, from the University of Delaware, did double duty at this convention. With a history of conducting beekeeping workshops at numerous Eastern Apicultural Society conferences, Dewey was invited to present a workshop on "Making Money Keeping Bees." Expecting about 15 people who were minimally involved with beekeeping, attendance swelled to nearly 25 and a number of participants were anything but minimally involved in beekeeping. Dewey enlisted the assistance of Dr. John Skinner and Mr. Matt Beekman to help him out, and Eric Mussen dropped by at the end to remind beekeepers of the most essential elements of successful beekeeping in California. Each participant received an autographed copy of Dewey's new, hard-bound, 355 page textbook, "Honey Bee Biology and Beekeeping."

In addition to the workshop, Dewey presented information on Africanized honey bees, with which he has had direct experience. Dewey thinks that the "K word" (Killer) was coined by Time Magazine, since "Africanized honey bee" wasn't very "catchy." Looking at various sources, Dewey found that I have attributed 8 U.S deaths to AHBs. He thinks it is 11. In South America, beekeepers often keep beehives in their back yards similar to saving accounts. If you need immediate cash, you go to the hives, take out some honey (or brood, which is consumed, too) and sell it to someone. When AHBs showed up in those hives, the first things that were lost were the families'

pets and dooryard livestock. So, Dewey was invited to the area to see if some better ways to handle colonies could be developed.

Dewey organized and ran six-day courses in various locations. To keep the participants returning, each day they were given an item or two for beekeeping, like veils and hive tools. Then they received one half day of lecture and one afternoon of in-field hive manipulations. The idea was to convert the growers of coca leaves (grown for centuries for cocaine) to producers of honey. However, the economics don't pan out, at the moment, on a pound to pound production basis!

Pollens are imported to Asia and consumed locally (corn, palm, avocado, and papaya). Pollination of the latter two sources of pollen is not a problem. Coffee would be an excellent honey crop, but plantation workers don't want AHB colonies around. Swarms can be collected, but it must be done correctly. If you grab just any old swarm, it is likely to fly away. If the swarm has landed and started to build comb, then it is ready to be incorporated into the operation. Mega-swarms, with 20-25 queens are common, but you don't hive those, directly. Interestingly, the mega-swarm reduces its queen number to one, when it finally settles down.

Four commercial queen producers were invited to sit on a panel and share their ideas about what can be done to enhance the longevity of a shipped queen once it arrives at its destination. Here are some of the ideas. Shannon Wooten tries to get queens to his customers as quickly as possible, avoiding temperature extremes. He also said: 1. be sure the bees are OK upon arrival (you can SMELL dead bees); 2. place a water droplet on the queen cage screen and turn the cage over (to reduce light intensity and ability of bees to see movement in the room); 3. when outside, place the cages in the shade and don't let the queens get hot; 4. if your queens come in a "battery box," punch a small hole in the box and feed the bees some syrup through the nozzle of a honey squeeze bear; 5. treat the receiving colonies for mites before the new queens are installed; and 6. feed syrup at installation.

Susan Cobey believes that all the chemical treatments for mites are having a detrimental effect on queen fertility. She suggests: 1. to determine the "true" supersedure rate, the queens have to be marked; 2. queens should be introduced when there are no treatments for mite control in the hives; 3. hives should not be moved for days following queen introduction; 4. battery boxes should be supplied with

replacement bees, or at least given a hole for flight (for defecation outside), upon arrival; 5. introducing queens into populations of younger bees is better than into older bees; 6. do not reject and eliminate susceptible stocks of bees, just examine them all and chose among the best; and 7. don't rely one just one line; it likely will become non-productive. The best results usually come when there is good communication between breeder and customer.

Frank Pendell has been paying fairly close attention to the effects of temperature on queens. It appears that too high heat simply kills them. However, exposure to cold may not kill them, but convert them to drone-layers. To keep track of temperatures, Frank has purchased some small, round battery sized data loggers from **ibutton.com** that are supposed to function for ten years. With some hardware and software, you can get the readings off the button and into your computer. Observations from battery boxes suggest that this is a very poor way to keep queens for any length of time. The outer queens are always too cold, since a "cluster" forms in the center. As a much better "queen bank" container, Frank uses a Styrofoam box fitted with special frames to hold the queens. He includes abundant young bees and hatching brood in the queen bank.

Tom Glenn was involved in some tests of the effects of Apistan and CheckMite+ strips in hives with developing queens. Coumaphos was harder on the queens, but it was common to see queens with undeveloped rear legs, curled antennae, reduced weight and sperm counts, and most of them died before mating. Tom does all his queen introductions with "push in" cages. But the workers still injure (lost leg or antenna) some of the queens, later, and they are lost. Tom is a firm believer in fumagillin. He uses it in his mating nucs, in his queen candy, in any water involved with the shipping process and suggests that the water, given to queens upon arrival in the mail, also include fumagillin.

Shannon Mueller, Cooperative Extension Farm Advisor from Fresno County, provided specific detail on the condition of the alfalfa seed market and its possible future. California continues to produce around 40-50% of U.S. alfalfa seed crop. Other important states are Idaho, Oregon, Washington and Nevada. Lesser production occurs in Wyoming, Montana, Utah, Arizona and New Mexico. Australia and Canada are our chief foreign competitors. Acreage in California

fluctuates widely and rapidly depending upon market forces. Acres of seed in California over the period from 1998 to 2002 are 67,000; 100,000; 75,000; 40,000; and 30,000. Fields, normally rotated on a six year cycle, are being kept for seven years, reducing demand for seed, a bit. Our foreign seed buyers (S. America, Canada, the Mid-East, Saudi Arabia, Mexico and Argentina) have decreased their demand. Seed companies feel that they are sitting on two years' inventory at current demand. A number of customers of alfalfa hay have not been impressed with its quality, recently, and they are changing over to corn silage. That will reduce the demand for seed, as well. Shannon thinks that the acreage will "stabilize" at about 30-50,000 acres, which is lower than the California "average" over the past decades.

Earl Williams, from California Cotton Ginners and Growers, stated that the industry is in a state of "flux" or "disarray," depending upon how alarming it may seem. Like alfalfa seed, next years' acreage will be depressed from normal California levels. Since 1976 it has been normal to produce about one million acres of cotton in California. However, from 1998 to 2002, the stats are: 835,000; 920,000; 830,000 and 500,000(guess). Cotton prices continue to be below the cost of production and only government intervention is saving the growers. They used to be able to switch from cotton to another field crop when the market appeared depressed, but now the markets for the alternatives are depressed, also. If you decide to grow an alternative crop, you are just hurting your neighbor. However, all is not lost! Cotton growers are willing to accept new varieties (including GM cotton) that increase yields on the same acreage. Pima (long staple) cotton has moved in and is priced better. Our yields are high, compared to the rest of the country. So, we will stabilize around 500,000 to 750,000 acres per year.

Gloria DeGrandi-Hoffman (USDA/ARS, Tucson) discussed the results of tests conducted with essential oils for mite control. The oils turned out to be bactericidal for *Paenibacillus larvae* (AFB) and somewhat fungicidal toward *Ascosphaera apis* (chalkbrood). Two naturally occurring, hive compounds, impregnated on strips, gave as good control as Apistan (90%). Trials also were conducted with essential oils delivered as "feeds," in pollen or "grease" patties. Some of the preliminary results looked promising and a commercial company is being enticed to formulate control strips for sale. A portion

of the funding for this research was provided by the CSBA.

Christine Peng provided a second presentation, this time on "Beekeeping in Tropical Asia," but I missed that due to my participation in Dewey's workshop.

At the Wednesday Research Luncheon, we broke from tradition and provided a Tribute to Harry Laidlaw.

(Continued in Jan/Feb 2002 issue.)

Rain is falling today, as it has over the past few weeks. Let's hope that it continues through April, with a distinct break during the last two weeks of January and the first week of February. Prospects of substantial bee forage are looking good!

Sincerely,

Eric Mussen, Extension Apiculturist
Phone - (530) 752-0472
FAX - (530) 754-7757
email - ecmussen@ucdavis.edu
Internet - entomology.ucdavis.edu/faculty/mussen.html

Eric Mussen
Entomology
University of California
Davis, CA 95616