

Jan/Feb 2010

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### Newsletter E-mailed to You

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The hyphens are there to tell the subscription software on the server not to be confused by any following information that occurs, such as a “signature frame” (or signature block, as I call it).

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of **sub**, you use **unsub** or **signoff**, then the name of the list and your first and last names followed on the next line by hyphens.

### Almond Pollination – Contentious to Chaotic!

While it has been known for nearly a century that bee pollination is required to produce a financially rewarding almond crop, strength of honey bee colonies (in frames of bees) became a serious consideration only in the 1970s. At that time almond growers expected at least four frames of bees and brood, with a laying queen.

Two areas of research impacted future desires for stronger colonies (balanced colonies have proportionally increased brood with increased adult bee populations). Field and laboratory research determined that hand pollination, with appropriate compatible pollen, could set about 60% of the flowers on a limb. It appears that “open pollinated” flowers set

around 40% of the blossoms, but that provides a good crop yield. In earlier times, with smaller colonies, a 25% set was considered satisfactory.

Considering colony population size, it was known that pollen demand and pollen foraging correlated extremely closely to the number of larvae being fed in the hive. With some variation, it appears that brood rearing and pollen collection increase linearly with the size of the colony population. A four frame colony collects X amount of pollen, a six-framer 1.5 X, and an eight-framer 2X. There is a point around 10-12 frames where there is a leveling off of brood production and pollen collection, regardless of the size of the adult bee population. Currently, almond growers desire to contract for colonies having either an eight frame average or, in some cases, an eight frame minimum bee population.

Looking back, it seems there must have been a large number of colonies in California that dwindled to fairly small sizes over the winter. This is a natural occurrence for European temperate climate honey bees. The population decreases to an adequate size to survive the winter with adequate bees to charge into spring brood rearing, but small enough to prevent consuming all the stored honey and pollens and dying of starvation. It appears that the desire for larger colony populations in February does not coincide with nature's plan.

Both the almond grower and the beekeeper have to watch their "bottom lines." To stay in business and make an acceptable profit, the income from the operation has to exceed the costs of operating. For decades the cost of renting colonies of honey bees for almond pollination was responsible for about 10-15% of the growers' expenses. When

beekeepers began to purchase and feed their colonies more pollen substitute and sugar syrup, to maintain colony strength over winter, they felt that the growers were not sympathetic to their increases in cost of production, especially when the beekeepers had the added expenses of fighting tracheal mites, varroa mites, resistant American foulbrood disease, a new species of intestinal parasite (*Nosema ceranae*), and the small hive beetle. A short description and graphic of those expenses are included on page 3. It also continues to be difficult for beekeepers to remain current on the effects of exposure to ever-changing pesticides to their colonies.

Almond growers also felt less comfortable with their potential for success. Costs of production have risen dramatically and income from a pound of almonds has varied drastically.

All these influences slammed together in the winter of 2004-05, when beekeepers and growers encountered the first year of colony collapse disorder – CCD. Colonies of honey bees that had been determined to more than meet the standards for almond pollination were loaded on trucks and shipped to California, similar to decades of practice. Between the time the bees arrived in California, from October to January, hundreds of thousands of colonies rapidly dwindled down to no adult bees in the hives, leaving behind patches of dying brood, adequate stores of honey and pollens, and sometimes the queen with a handful of newly-emerged workers that soon would die. Suddenly, there was an extreme shortage of colonies for almond pollination. The rental fees for those last colonies were abnormally high.

With almonds selling for a pretty good price, at the time, (Cont. page 4)

# How Much Does it Cost to Keep Commercial Honey Bee Colonies Going in California?

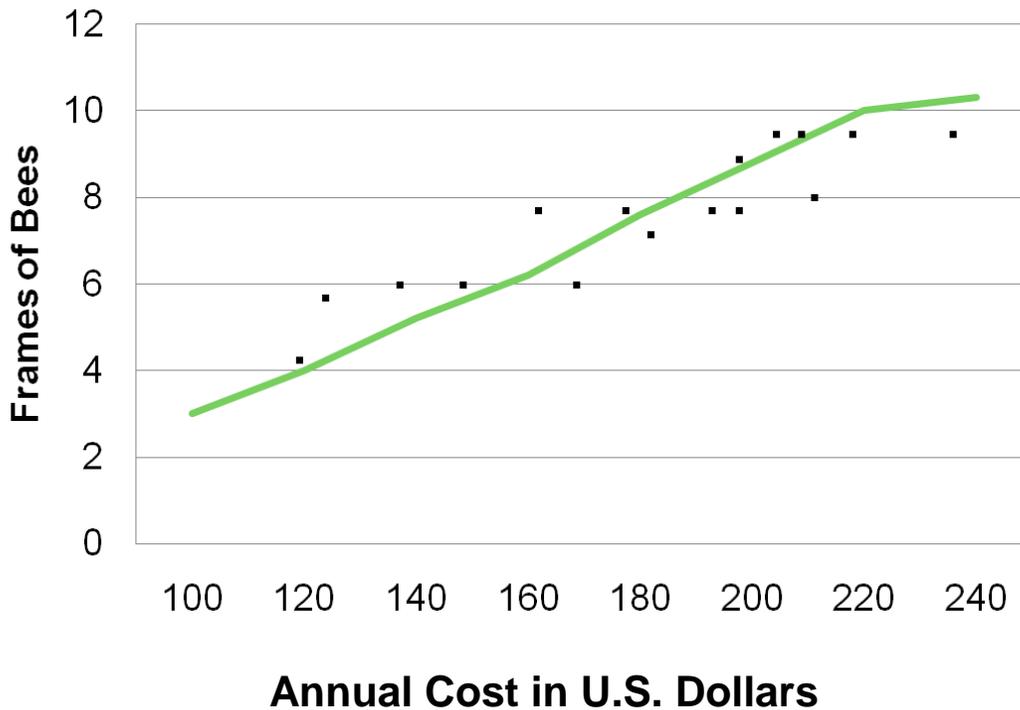
By Eric C. Mussen, Extension Apiculturist, December, 2009.

Responding to a request by beekeepers and growers of honey bee-pollinated crops to make an estimate of the cost of maintaining a colony of honey bees in California, I accumulated the following information. Although the information was contributed by a relatively small number of successful beekeepers, it is interesting to see how similarly they thought. I solicited their estimates of what it would cost to maintain colonies that would result in various levels of strength at February almond pollination time.

I was told in 1976 that an “acceptable” colony for almond pollination was being upgraded from “four frames of bees and a laying queen” to “six frames of bees.” Theoretically, four frames of bees is the size a Central Valley California colony is likely to be (if it survives) when it is not fed extra syrup and protein during the year. Currently, in 2009, almond growers are not pleased with colonies having less than eight frames of bees, and ten or twelve frames are much more to their liking.

The estimates in dollars for maintaining certain hive strengths are depicted on the graph, below. (The trend line is hand-drawn, not calculated.) The most common sentiments expressed were, “Who would want a weak colony, anyway?” “We feed them all to be ten-framers or better, but there is no guarantee that is what we will get, or that they even will survive.”

## Overwintered Colonies



almond growers let it be known that in February of 2006 they would pay \$150 for good (eight frames or better) colonies. That was about three times higher than the year before. That price generated great interest in the beekeeping community, especially since the bulk price for honey was below the cost of production. Also, the federal restrictions on live honey bee importations were loosened and beekeepers were able to refill empty hives with packaged bees from Australia at a time when packages were not available in the U.S.

In 2006, 2007, and 2008 prices for “almond bees” remained elevated. The rental fees now accounted for about 20% of a grower’s cost of production. Many beekeepers were lured to California by the high rental prices and the supply of hives in California exceeded demand. That invariably leads to price cutting, in which beekeepers under bid each other to obtain contracts. In quite a few cases, large numbers of high quality colonies were not rented because someone who arrived from far away, with no contract in hand, was willing to rent the bees for just enough money to truck the bees back home. Had the growers looked inside the hives they rented for \$75-100, they would not have been too pleased.

However, almond pollination is a community consideration. Honey bees begin by collecting pollen and nectar fairly close to their hives. Then, as long as the trips are rewarding, the bees spread out over the area. Property lines, roads, and irrigation canals have no meaning to bees except for use as landmarks to get back home. If the weather is nice, honey bees from well-stocked orchards will do a very good job of pollinating neighboring orchards containing dismal or no honey bee colonies. The past few years have had very little

inclement weather, so almond yields have hovered around record levels. World consumption has remained relatively recession-proof, but bulk almond prices took a temporary dip in 2009.

The dip in almond prices, coincident with a few years of excessive bee supply, prompted some growers in mid to late 2009 to proclaim that they were not going to pay more than \$75-100 per colony in February of 2010. For many far off beekeepers, those prices did not sound very attractive, especially since the price of honey had improved significantly. Many previous providers of almond bees decided to stay home. Other beekeepers who had been spending substantial funds trying to keep colonies up to the eight frame level decided no to do that for a \$100 rental fee. So, their colonies would be weaker in 2010. Then, CCD came back, with a vengeance! It appears as though colony losses may exceed those of previous years, despite the best efforts of beekeepers to do everything they can to keep their colonies healthy. Many beekeepers had only a seven frame average. But, almond growers were happy to pay full price for those colonies. Other growers, who were not willing to meet industry rental rates, found themselves without bees or paying nearly twice the industry average for colonies, as long as the hives contained four frames of bees and a laying queen – criteria from the 1960s! Significant periods of showers during bloom may interfere with pollination. Those growers who stuck with their reliable beekeepers and paid reasonable prices to rent good bees are likely to be rewarded this season.

#### FSA / ELAP Program

The most recent Farm Bill included language authorizing FSA offices to work with beekeepers to help determine limited

compensation for honey bee colony losses to colony collapse disorder – CCD. The program is new and work still is being done on compensation details.

However, deadlines for filing applications for colony losses to CCD in 2007, 2008, and 2009 came and went very quickly. One aspect of completing the application packet is obtaining a letter, from one of a very few listed types of experts, that the losses appeared to be due to CCD. I say appeared because we do not know the exact cause of the CCD losses, so we cannot demonstrate it.

I am one of the types of individuals who are qualified to write such letters. Upon receipt of beekeeper requests, I began writing letters of support. Using common sense, I developed a set of questions that were meant to differentiate between routine losses and those apparently caused by CCD. Word spread that I was writing letters, while others with similar expertise were reluctant to do so. I eventually wrote more than 50 letters for beekeepers in California and across the country.

The criteria for inspecting the losses on site were scheduled to tighten up for 2009 losses and subsequent years. It soon became obvious, however, that we experts could not visit apiary locations all over the country. So, the USDA, American Beekeeping Federation, American Honey Producers, and others organized to help the USDA develop an application form for self-reporting of CCD losses by beekeepers directly affected by those losses. They asked me to provide the “Mussen Survey,” a name that I never used, and are expanding my questions enough to cover possible compensation. I only covered apparent numbers of colonies lost to CCD. I stayed away from the money questions.

Determining the financial losses to CCD will not be easy. If a beekeeper simply purchases replacement hives full of bees, which may be his or her only annual replacement investment, there will be receipts to substantiate the expense. Similar receipts would be available for purchases of nucs, packages or queens.

But, what if the beekeeper had insufficient funds to purchase replacement stocks and tried to recover colony numbers simply by splitting good colonies into nucs in the spring? That latter beekeeper would have little or no records of financial loss. He or she would have to pour money into those little colonies to build them up adequately by the end of the year. Those feeding expenses probably would look pretty similar to feeding expenses on a preceding year when the colonies had not died off.

A beekeeper who was financially well off and filled his deadouts with major amounts of bees may be able to generate pollination and honey income that same year. The beekeeper making many splits will not generate income from the sub-productive colonies. How will FSA deal fairly with such huge variations in beekeeper practices? In their normal programs, such as drought relief, they compare the tiny honey crop to the previous five year average. It won't be nearly that neat this time around.

#### More on Pesticide Handling

Last issue I shared some information on proper handling and disposing of empty pesticide containers. In this issue we will take a look at transportation of pesticides. I am sure that you have seen agricultural and agency vehicles with placards on them that relate to hazardous loads they are carrying. Some trucks have various placards that fold in half when not in use for many different

types of materials they carry. Placards with magnetic backing would be good for most honey bee vehicles. But, when are they needed? I was supposed to find that answer in the federal regulations, but the best I could do was determine that such placards are not required when the amount of hazardous material is small. So, what is small? I'm not sure.

Here is the language, passed on to me by a DPR representative, dealing with transportation of pesticides in vehicles:

Title 3 of the California Code of Regulations (3CCR) section 6682 - Transportation states: "(a) Pesticide shall not be transported in the same compartment with persons, food or feed; (b) Pesticide containers shall be secured to vehicles during transportation in a manner that will prevent spillage onto the vehicle or off the vehicle. Paper, cardboard, and similar containers shall be covered when necessary to protect them from moisture."

DPR's Pesticide Use Enforcement Program Standards Compendium, Volume 8 - Guidelines for Interpreting Pesticide Laws, Regulations, and Labeling, Chapter 1, Section 1.16 Vehicles - Pesticide in Passenger Compartment interprets 3CCR section 6682 (see attachment) as follows: "This regulation section was not intended to apply to persons who fall under the jurisdiction of commercial transportation regulations, although they may be transporting pesticides, food, and feed in the same "compartment" (cargo box)."

"This regulation was intended to apply only to persons engaged in pest control businesses (structural or agricultural), growers, and other users who may transport opened or sealed containers to and from an application site. Section 6682 was enacted

to provide a reasonable level of protection from physical (dermal) contamination of people and commodities which, at times, are transported to or from a use site together with pesticide containers in the same vehicle. It was never intended to address inhalation exposure."

"When a van or SUV-type vehicle is being used, creating separation through utilization of a mounted panel or baffle that substantially separates passengers and cargo areas meets the intent of this regulation. An air-tight or even leak proof separation is not required to meet this standard. A separate compartment may also be created through the use of a container, such as a cargo box or cabinet, secured to the vehicle."

#### ARB Regulations

There are a number of changes that the California Air Resources Board is initiating that are going to affect not only California truck operators, but visiting trucks (as in hauling hives of bees) as well.

I am not familiar enough with all this to begin to tell you what is going on, but the California Farm Bureau Federation is heavily involved with the implementation of the regulations, since they impact so much of the state's farming community.

For the latest information on the diesel regulations and compliance, the length of time a visiting truck can stay in the state without becoming a California truck, with all its complications, please go to the Farm Bureau Web site at: [www.cfbf.com](http://www.cfbf.com). In the red block, under the weather, click on Action Center. In the tan drop down menu, click on Current Issues. Right at the top of the next page is the heading "Truck and Bus Regulation." It gets you off to a good start.

When I put “diesel” into their internal search box, I came up with a December 16, 2009, Ag Alert article saying that you should check the odometers on your trucks on January 1<sup>st</sup>, and save that mileage for later reporting. There is a quote in that article by Palo Cedro beekeeper Shannon Wooten. He wondered what would happen if a load of bees arrived at the border station on an out-of-state truck that was not retrofitted with a CA standard engine or particulate filter. Do the bees get stuck at the border?

### Carbon Footprint of Honey

As you probably already know, practically anything we do that consumes energy eventually results in discharge of carbon dioxide (CO<sub>2</sub>). Those emissions make up a large portion of greenhouse gasses, which have a rather unfavorable image because some think they are causing global warming.

The amount of carbon released by some process is called its carbon footprint. Currently, carbon footprints are being studied for many things we do. A group of researchers at the UC Davis Agricultural Sustainability Institute have decided to determine the carbon footprint of various aspects of producing and packing honey in the U.S. If nothing else, I hope this study will show that consuming domestic honey is more energy rational than purchasing imported honey.

Sonja Brodt is the lead contact for this effort. Between May of last year and July of this year her team will be collecting and analyzing data. If it works out as planned, their analysis is supposed to be able to suggest how the same functions can be accomplished with reduced production of CO<sub>2</sub> (and consumption of costly energy).

Apparently, Sonja is getting pretty good voluntary participation from larger commercial producers, but she is short on contacts from small scale operations, where smaller amounts of honey are produced, processed, and sold at farmers’ markets or to other local customers.

If you are a small scale beekeeper from anywhere in the country, who sells honey locally, Sonja would really like to have you contact her so that the team can obtain information to compare to the larger operations. You can reach Sonja at sbbrodt@ucdavis.edu or by calling her at (530) 752-9376. This might be another opportunity to demonstrate the value of the “locavore” movement.

### Bee Schools

Milwaukie, Oregon – Colony Collapse Disorder: A Blessing in Disguise. This three-day, weekend workshop (March 19-21, 2010) will feature speakers Gunther Hauk (co-founder and Program Director of the Pfeiffer Center in New York) and Vivian Struve-Hauk (teacher and expert human therapist). The film, “Queen of the Sun” will be screened and suggestions for keeping bees in a less-managed, and therefore more bee-friendly, manner will be prevalent.

To find out more about this workshop, which will be held at the Portland Waldorf School, 2300 SE Harrison Street, in Milwaukie, please contact Cathy Lusa at (503) 235-1741 or at beeworkshop10@yahoo.com.

Santa Rosa, California – Intermediate Beekeeping for Spring and Summer. Serge Labesque, meticulous and successful long-time beekeeper from Glen Ellen, will share his expertise and tips for colony management in two evening sessions

held at 1999 Bech Hall on the Santa Rosa Junior College campus. The sessions will be held on successive Wednesdays, March 11 and 18, from 6:30 to 9:00 pm. The registration fee is \$51. For further information call (707) 527-4372 or register at: [www.santarosa.edu/communityed](http://www.santarosa.edu/communityed).

Sacramento, California – Beginning in April the Sacramento Area Beekeepers Association will be sponsoring four classes for beekeepers: two for beginners (April 24 and May 22) and two for intermediate beekeepers (June 19 and July 17). Each class costs \$35 and will be held at 4145 Branch Center Road in Sacramento, from

8:30 am, sharp, to 4:30 pm. Refer to the color flier at [www.sacbeekeepers.org](http://www.sacbeekeepers.org). Look for the button for 2010 Classes.

Sincerely,

Eric Mussen  
Entomology Extension  
University of California  
Davis, CA 95616  
Phone: (530) 752-0472  
FAX: (530) 752-1537  
E-mail: [ecmussen@ucdavis.edu](mailto:ecmussen@ucdavis.edu)  
URL: [entomology.ucdavis.edu/faculty/mussen.cfm](http://entomology.ucdavis.edu/faculty/mussen.cfm)

Eric Mussen  
Entomology  
University of California  
Davis, CA 95616