Jan./Feb. 2003

"Hard Copy Newsletters"

For those of you still receiving this newsletter in the mail, it is time to pay for the 2003 year. Check your mailing label. If the date is "02" or older, this is the last hard copy of the newsletter that you will receive.

The annual subscription is still $10. Send a check made payable to **Regents of U.C.** to me at the address on this issue and I will be sure to keep the newsletter coming.

Thanks.

USDA Listening

I attended the "Producer Listening Session" convened by AgriLogic, Inc. in Fresno on February 21st. AgriLogic is an independent company that contracts with the USDA to study the feasibility of government sponsored insurance programs for agricultural producers.

The federal government would like to get out of the "Disaster Payments" business and into a program that could be much more predictable. In the case of beekeepers, this would mean a program that would insure a certain percentage of the historical gross income of a beekeeping operation, regardless of the reason for the loss.

At first blush, honey producers wondered why they should be covered for bee breeding or pollination, even though they never do it. The reason is because the premium is based on perceived risk to the operation. The largest fluctuations in beekeeping operation income usually relate to honey production and honey market prices. Large fluctuations

don't make insurance companies happy, so they charge considerably higher premiums for risky business. If the whole industry went in together, the honey producers would benefit from lower premiums based on the fluctuations of income from honey production; queen, package, and nuc sales; and pollination fees. The other production areas are much less apt to fluctuate wildly.

Specific questions about certain "risks and perils" stimulated a somewhat different response. It was decided that bear damage coverage should be available only to those who want it, in the form of a "rider." Bears are a volatile risk (much higher premiums) to only a limited number of beekeepers, so the group as a whole did not wish to have that risk included in their overall basic program.

After listening to the beekeepers at a number of these listening sessions, there appears to be very good agreement on what type of coverage the beekeepers would prefer. It is up to AgriLogic to develop a structure for such a program and convince the government that such a program will work.

Then what will be needed is a bunch of data that can be used to set up the program, *i.e.* determine the rates for various levels of coverage, etc.

For that, the company needs detailed income records from beekeeping operations over the past five to ten years. They don't intend to compare or name anyone, they just need statistics to plug into their tables to see what rates might be generated.

At Fresno, the beekeepers were aware that other crop growers pay premiums around 4% of their gross income. The beekeepers would like a similar rate. If that were the case the real cost of the insurance would be around 10% of the gross income. However, to avoid the headaches with the disaster payments program, the government is willing to pick up the matching 4% as well as the overhead expenses of handling policy formulation and claims. The insurance actually will be supplied through independent companies.

One expected outcome of having such a program should be that financial institutions would be much less reluctant to provide a loan to a beekeeper knowing that the beekeeper was insured for 75% or more of a normal annual income.

Where do you send the basic industry income information? To: AgriLogic, Inc., P.O. Box 9990, College Station, TX 77842-7990. Want to talk to somebody about this? Call: 1-877-245-6442.

Comments Heard at Almond Board Sponsored Pollination Meeting

At the end of August taxonomists at CDFA verified that samples of honey bees taken from Goleta (Santa Barbara outskirts) were Africanized. That led to a flurry of local

media activity, but to my knowledge nobody has been stung.

We finally have a "find" from Inyo County, also. But that was to be expected since AHBs have been in Las Vegas, not too far east, for quite a while.

Speakers from the Almond Board and alfalfa seed industries shared their ideas of the future of these crops. At the moment, the almond industry looks really healthy. This year will be the first billion pound crop, worth a billion dollars. We will export 582 million pounds. In the U.S., we consume 39% (0.9 lb. per person) of our almonds and 23% (0.5 lb. per person) of our walnuts. A significant portion of that consumption is in the over $2.2 billion of foods in which almonds are an ingredient.

The alfalfa seed industry is not as healthy. We had as many as 100,000 acres of alfalfa seed in CA not too long ago. Right now we have about 24,000 production acres. Half of that is in certified seed; about a third in certified proprietary seed, non-certified seed is increasing some, and non-certified proprietary seed is way down. We currently have a surplus of dormant seed (two years worth?) from CA and ID and non-dormant seed from CA. The future appears to be decreasing acreage until the surplus is gone. Then acreage will increase, but not to past surplus-producing levels. New varieties should increase demand.

The growers at the meeting requested that the beekeeping industry generate a document explaining to them how a colony of honey bees functions over the year. They were especially interested how to determine whether or not they had “good” bees in the boxes they rented.

With some excellent input from Gene Brandi, I developed the following text. Before I give it to the growers for distribution, I’ll put it out here for comment from readers.

Honey Bees from a Grower's Point of View

Eric C. Mussen, Extension Apiculturist, UC Davis

Many growers of crops requiring pollination by honey bees have questions about bees and beekeeping. Often, a telephone call between grower and beekeeper results in hives showing up over night, at the beginning of bloom. At the end of bloom, the hives are gone overnight. The grower has no idea of what was in the boxes, but usually the crop is set and the grower pays the bill. At a recent meeting, an almond grower stated that growers desire "the best bees at the lowest price." As with most things in life, this quality/quantity relationship probably will not match perfectly. This article explains the annual colony population fluctuation of a European honey bee colony in a temperate climate. It discusses colony strength, how it is measured and what beekeepers can and cannot

do to bolster the strength of their colonies.

European honey bees evolved in a habitat where there is food available during late spring, summer, and fall but little to nothing during the winter. Thus, they adjust their colony population size to match the resources on a year-round basis - largest when there is food to collect and store; smallest when they are living on stored food.

Beginning with the lengthening day light hours at the end of December, the "winter bees" begin to feed the queen adequate royal jelly so that she will begin laying eggs. The eggs hatch and the larvae are fed royal jelly, diluted honey and pollen for six days. Worker larvae pupate for 12 days and the new bees emerge in 21 days. The small patch of brood expands as the temperature becomes warmer and fresh pollens become available. The speed of increase in the population in the spring depends upon the weather and the availability of nectar and pollens. In the Central Valley of California honey bees do not rear enough brood to substantially increase the size of the colony population until the hives already are located in the almond orchards. During the winter, the population decreases to a range of 8,000-24,000 through the loss of worn out "summer bees." Thus, the size of the spring population depends upon the numbers of winter bees reared in the hive between mid-August and October.

It is apparent that availability of late summer and fall food sources make a great difference in the size of winter "clusters." Normally, the winter population size correlates extremely closely to amount and timing of the previous year's winter rains and to the size of the honey crop. When we have wet winters, especially with substantial rain into April and May, the wildflowers usually respond by producing copious bloom that lasts through the fall. Honey crops are good and winter bee populations are strong. When we have drought conditions or rain that comes only into January or February, then bee forage is short and honey bee populations will reflect that shortage into the next spring.

Beekeepers who pay close attention to their colonies will notice when food stores (especially pollens) are short and brood rearing is lagging. They can feed sugar syrup as a nectar substitute concurrently with a protein source, like brewers' yeast, as a pollen substitute. At best, the supplemental feeding can reduce the nutritional stress on the bees. This means that the newly reared bees will be healthier and better able to rear more and healthier brood in the future. At this time, we have not found a pollen substitute that will increase significantly the numbers of larvae being reared. Only a strong "pollen flow" results in significant population increases in late summer and fall.

Summer bees normally work inside the hive for the first

three weeks of their lives. Their hive duties change with age. Most important to the colony is the time between nine and twelve days after emergence. This is when the workers are called "nurse bees" and are best at digesting and converting pollens into royal jelly, as long as they are healthy. The next three weeks are spent outside the hive as foragers. These are the older summer bees that accomplish summer pollination.

Winter bees, on the other hand, are expected to live up to six months. The three-week period of "in the hive duty" of their earlier sisters, is stretched into months. Those bees do little other than cluster (see below). It is only when the winter bees begin to consume pollens and produce royal jelly that their clocks start and they head toward the last few weeks of their lives.

A number of growers now are renting honey bee colonies in California based upon the "size" of the colony population. Usually, strength is measured in frames of bees. That is a reasonable way to judge a colony, since honey bees tend to have a balanced population, with larger colonies producing larger amounts of brood. The correlation holds pretty well between five and twelve or so frames of bees. Smaller colonies have trouble keeping more than modest amounts of brood covered to keep them warm. Larger colonies appear to stop increasing the amount of brood when they reach an "optimal" level that is produced by 12 or more frames of bees.

We call the mass of honey bees in the hive a "cluster." A cluster is easiest to see in the winter, because as the temperature drops below 55°F the cluster tightens into a visible spherical shape to hold in heat. As it becomes colder, the cluster tightens even more. The inner bees produce heat by consuming honey. European honey bees can survive prolonged periods of temperatures way below zero using this clustering technique. On warm summer days, the cluster is not really evident because the bees have spread out over most of the frames.

The concept of a cluster is important to growers who request a strength inspection of their colonies. On a cool morning or day, the bees will not cover as many frames as they will when it gets warmer (cluster expands). Also, when it gets warm enough for foraging, approximately one-third of the worker population will be collecting water, nectar, pollens and propolis. Thus, the cluster won't cover as many frames at mid-day as it does in late morning or late afternoon.

There is one other aspect involving the cluster and hive strength determinations. Frequently, the bees arrive in two boxes. A quick strength inspection can be made by prying open the boxes and counting the frames covered by bees. Since the cluster is spherical, if it is centered between the boxes, the number of frames

covered by bees should look the largest. If the cluster is centered near the bottom or top of the hive, or confined to the bottom box by a queen excluder, a smaller portion of the sphere will be visible at the midline of the hive. Thus, the frames seen covered at the top will not represent the true colony size. The strength of honey bee colonies arriving in "singles" (one deep hive body, only) will be easier to judge. Beekeepers confine bees to a single when they believe that the bees do better and fly earlier when they have less empty space to heat in the hive. It is best, for safety reasons, to have the beekeeper present if the grower decides to participate in colony strength determinations.

Since the weather and the position of the cluster can impact rapid hive strength determinations, either the inspector has to look at the frames more thoroughly or some other measure of performance may be used. Most of the bee inspectors from the agricultural commissioners' offices count a frame 3/4 or more covered on both sides as a frame. Dr. Thomas Farrari observes flight activity during late morning on a good flight day. If he sees a total of 100 bees entering and leaving the entrance in a minute, then he feels that the colony is good.

The number of pollen foragers from a colony correlates almost exactly to the number of larvae being fed. If you move larvae from another colony into the first one, the number of pollen foragers in the first colony will increase proportionately in minutes. The number of pollen foragers from the colony that lost brood will diminish, but more slowly. A related correlation exists between number of foragers and amount of brood being reared. If an insecticide application kills foragers, the amount of incoming nectar and pollens is decreased sharply. The hive bees respond by cutting back the amount of royal jelly fed to the queen, eating eggs and larvae that they cannot feed, and quickly reducing brood rearing. Although some naive worker bees will attempt to fill in for the missing foragers, it will take weeks for the colony to get back into the same balance it was in when the bee losses occurred. The growers lose significant portions of their crops when their rented bees come into contact with bee-toxic sprays or residues in the field.

A less obvious loss of bees can follow treatment of crops with certain fungicides. For decades it has been known that Captan® can interfere with development of immature honey bees, leading to death or disabling malformations of developing brood. More recently, Rovral® has been observed to produce similar effects (both are carboximides). If it is possible, these fungicides should be applied after the pollen foragers have ceased work for the day (afternoon or evening and at night). The toxic effect to the bees seems to correlate with weather following the application. If the days following application are warm and sunny, the bees pick up the

most fungicide. If it rains following the application, the bees do not have a problem.

Quick Research Glances

Gas chromatographic determination of coumaphos and tau-fluvalinate residues in royal jelly produced under commercial conditions by Panos Balayannis. J. Apicul. Res. 40(2): 71-78 (2001).

This Greek study monitored the acaricide levels in royal jelly following treatments with coumaphos spray and fluvalinate on plywood inserts. No fluvalinate was found. But, it took 42 days for coumaphos levels to drop to "trace" amounts.

Fatty acids in pollen: a review of their importance for honey bees by Rob Manning. Bee World 82(2): 60-75 (2001).

Probably one of the most exhaustive studies done on the fatty acids of Australian pollens. Tables show that fatty acid composition of bees changes as they develop. Fascinating ideas include the "seeping" of fatty acids into the beeswax "sterilizing" the cells. Thus, during times of pollen dearth, the "stress" to bees may be due to higher loads of pathogenic microbes.

Respiratory symptoms and pulmonary function tests in beekeepers exposed to biomass smoke inhalation by Mehmet Polatli *et al*. J. Apicul. Res. 40(1-2): 51-57.

Exposure to smoke from biomass combustion is reported to be a main cause of chronic bronchitis and chronic obstructive pulmonary disease (COPD). If this is true, do beekeepers suffer more than non-beekeepers? Tests were run on pulmonary performance of 34 beekeepers and 25 matched non-beekeepers. There was no difference due to short term exposures to smoker fuel smoke. However, in either group, smoking tobacco products lead to decreased lung function and increased respiratory symptoms.

Wicwas Press

Many years ago, Dr. Larry Connor established the Bee Education Service. Larry provided presentations when he could and became a provider of honey bee related publications, videos, and slide sets, etc.

Keeping up with modern technology, Larry has established a Web site for the publications that he has edited as well as an address for email information on all the publications that Larry distributes.

The Web site is **wicwas.com**. The email contact is **ebeebooks@aol.com**. A quick visit to Ask Jeeves determined that there was erroneous info out there on Larry's contacts. For the record, Wicwas Press is at 175 Alden Avenue, Third Floor, New Haven, CT 06515 [(203) 397-5091].

Bee Schools

The **San Francisco Beekeepers** will sponsor a two-day beginning beekeeping course on Saturdays, March 8 and 15, 2003. Cost is $50 for club members or $65 for non-members.

For more information and registration, call (415) 285-7584 during the day or email **slugcarey@hotmail.com**.

The **Beekeepers' Guild of San Mateo County** will sponsor a $50, one-day beginning class on Saturday, March 29 in Belmont, CA. For more information (registration) contact Joe O'Brien (650) 341-9005 evenings or email at **jeobrien@earthlink.net**.

Sincerely,

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