

March /April 2006

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### Newsletter Direct

At the request of many of my newsletter subscribers who do not always remember, or prefer not to have to negotiate the links, every two months to see the most recent issue, I have taken the plunge.

I have established a ListProc mailing list that subscribers can join simply by e-mailing listproc@ucdavis and signing up. In the body of your message (not the Subject line) put in the following: sub ucdavisbeenews <your first name (without these “brackets” around it)> <your last name>. If I were subscribing, it would be: sub ucdavisbeenews Eric Mussen. If you wish to be removed from the list, then you do the same thing, but instead of sub you use unsub or signoff, then the name of the list and your first and last names.

Then, all I have to do is figure out how to get the newsletter sent to central control, and it will be sent to each of you.

### Cost to Operate a Colony

Over the last couple of years the rental price for a colony of honey bees used

in almond pollination has basically doubled. Almond growers are wondering how the cost of operating a colony of honey bees could have gotten so much more expensive over such a short period of time. While beekeepers can point to certain increased costs, the growers are more likely to think that they are paying way more than they should.

So, what is the cost to operate a colony of honey bees for twelve months in a California commercial operation?

Many agricultural commodities and commodity handling industries in California have worksheets from Cooperative Extension that they can use to determine annual costs of production. We have tried that, before, for beekeeping operations, but beekeeping isn't as “clean” and easy to compartmentalize as many other endeavors where the production choices are much more limited.

However, since the growers are really interested in what portion of the annual expense they are paying, I put together a two-page form that you can use to try to estimate those costs. I had the general outline set up. Then, a beekeeper who keeps

meticulous computer records shared 2004 with me. I am going to be very surprised if, after filling in the blanks, both you and the growers aren't terribly impressed with how much it does cost to operate your bees. That knowledge should justify your current rental rates and, also, question why your rents were SO LOW a couple years ago.

I used the forms as this issue's center fold (pages 4 & 5). You can copy them and fill in the numbers. You can alter some of the numbers and see how that affects the total costs. You can even send me your results, if you find them impressive. Notice that there is nothing on the form that requests information on INCOME. If you wish to see if the year was profitable, then you have to subtract your total expenses from all that income that you reported to the government.

### Unsettling Research

As researchers dig deeper into the problems besetting our industry, the news is far from good.

Tracking the deformed wing virus in tissues of queen honey bees suggests that if she becomes infected, the virus gets into most of her body tissues, including her reproductive tract. The virus is found associated with eggs. Whether or not the larva becomes, or hatches, infected remains to be seen, but it appears to be the case. We call that transovarial transmission.

Deformed wing virus can replicate in most drone tissues, too, including his reproductive tract. Can the virus be transmitted through sexual contact between queens and drones? If so, we would call this a venereal disease.

We used to think that getting rid of *Varroa* would put an end to transmission between bees, but now it appears that transmission doesn't require a mite vector. Then, how do we get rid of the virus?

Deformed wing virus turns out to be an equal opportunity infector. Recently, bumble bees were observed in Europe with deformed wings. Studies of the virus found in the bumble bees determined that it had the same genetic makeup as the virus from honey bees. So, how might it have gotten into the bumble bees?

One scenario is that the bumble bees occasionally visit a honey beehive (to rob honey?). Was the virus in the food they took home?

A second possibility is that the bumble bee picked up the virus from a close association with honey bees. How does that happen? In warehouses, mated, "hibernating," female bumble bees can be given exposures to carbon dioxide and "started up" at any time of the year. She stays home and begins her nest much better, if she has a few very young honey bees around to "help out." It is probably more "moral support" than true help, but it works. The bumble bee is provided honey bee collected pollen, also. So, there is ample contact with honey bees, and bee food, to inoculate the bumble bees.

If the virus infects most of the bumble bee tissues, as it does honey bee tissues, then it may spread quite easily. Perhaps this is a negative consequence of rearing bumble bees in captivity.

Another set of studies deals with the observation that many more colonies of honey bees than normal are succumbing to *Nosema* infections in Spain and Germany. The rate in Spain has climbed nearly

exponentially over the past four years. Previously, we examined honey bees or bumble bees for *Nosema* using a light microscope. The microbe forms a distinctive spore that can be counted to determine the levels of infection. However, the problems in Europe are not caused by the well-known *Nosema*'s of old. They are caused by a new strain of *Nosema*, *Nosema ceranae*. From the name, you can guess that the bee from which it first was extracted was *Apis cerana*, the implicated source of *Varroa* mites. Whether or not the new parasite originated in the Indian honey bee or moved into it from another species, like *Apis mellifera*, really doesn't matter. What does matter is that a new strain of *Nosema* is moving around the world and causing significant losses when it shows up.

### Starthistle, Again

Beekeepers in northern California occasionally become concerned when researchers attempt to introduce new biological control organisms to reduce stands of yellow starthistle (*Centaurea solstitialis* L.). The otherwise noxious weed is about the only plant that produces pollen and nectar in abundance during the hot, dry summer months. The honey produced from starthistle is light colored, mild in flavor, and has a delicate floral bouquet.

Researchers from UC Davis, CDFA, and USDA converged on California to determine the extent of infestation of the weed. In the late 1950's, two estimates placed the total acreage around 1.2 and 1.9 million. In 1985, a third estimate suggested about 7.9 million acres infested. At that time Lake County was most heavily infested, followed by Siskiyou, Humboldt and Trinity Counties. At that time, Alpine, Imperial, Inyo, Mono, Orange and San

Francisco Counties appeared to be starthistle free.

To get a more detailed estimate of invasion, researchers conducted a survey in 2002 based on townships across the state. Townships are 6-mile-by-6-mile squares.

The survey determined that 3,010 townships, of 6,389 statewide were infested. Of those 3,010 townships, 1,441 had "low" abundance and the other 1,569 had high abundance. The total acreage now covered is 14.3 million acres. Monterey County now can boast of having the most acres of starthistle: 1.65 million (about the same as the whole state in the 1950's). Siskiyou and Mendocino Counties each have around 1 million acres each, with Fresno right behind (925,000 acres). Yolo and Yuba Counties are tied for the dubious record of having the highest portions of the county infested: 100%. Monterey is next, with only 78% of the county infested. Imperial and Orange County still have no starthistle, but it is just arriving in Inyo, Mono, and San Francisco.

So, it appears that Sacramento Valley beekeepers can relax a bit. The authors of the article, found on pages 83-90 in the April-June, 2006, (Vol. 60, No. 2) issue of California Agriculture (UC DANR publication) conclude the following: "We anticipate yellow starthistle continuing to increase its density and distribution in both Northern and Southern California, with the highest rates of increase in the southern coastal counties."

### Valley Citrus Wars

Early in my career at UC Davis, the San Joaquin Valley citrus growers and area beekeepers were having problems dealing with the beekeepers' desire to produce citrus

honey and the growers' desire to use insecticides, usually directed at citrus thrips, during bloom. The insecticide labels on the ag chemicals prohibited application on bloom being visited by bees.

“Orange blossom” honey normally attracts a premium price for light colored honey. It is a favorite of mead makers, as well as the portion of the consuming public with refined palates for varietal honeys.

Honey crops vary from year to year, mostly due to weather conditions. It is surprising that the beekeepers can produce as much honey as they do, because very large numbers of colonies are taken to citrus right after almond bloom, before the out-of-staters head back home.

Eventually, the California Department of Food and Agriculture had to become involved in the situation. A compromise was reached that neither group enjoyed, but each said that they could live with it. Briefly, the Ag Commissioners divide the citrus producing areas into regions. The commissioners dictate the beginning and end of the official period of bloom. While related to % bloom on the trees, it is hard to set such dates when some citrus varieties bloom earlier than others and higher elevation citrus blooms earlier than that on the valley floor. However, the compromise has worked for decades.

Now, the growers and beekeepers face a different dilemma. The market for small, seedless mandarin type citrus is extremely good. New plantings of that type of citrus are coming into production in ever increasing acreages. The problem is that the new plantings are adjacent to other citrus plantings that produce pollen that sets seeds in the mandarins.

So, lawyers representing at least one very large farming operation have been contacting beekeepers and landowners in the area around the mandarins and threatening to sue them if the bees are not moved away. Basically, it is stated that the bees are trespassing and ruining the fruit crop.

From the other point of view, the beekeepers are saying that the restrictions on where they can keep bees are negatively impacting their ability to make a living. Many of the beekeepers have been using their “citrus locations” for decades.

It is difficult to determine what the outcome would be if this mess were to be taken to court. Earlier court cases have ruled that honey bees are free-flying and are not trespassing when they show up on someone else's property. If the citrus interests were to win this case, then anyone, anywhere, could tell beekeepers to move their bees beyond the flight range of the colony so that their bees would not be trespassing on their property. How much range would be available to bees under those conditions?

It also is interesting that the company contacting the beekeepers also produces almonds. It seems strange that a company so dependent upon honey bees, at one time of the season, would be so adamant about keeping the same beekeepers away from an essential part of their production just a month or so later.

#### Possible Research Endowment

Following the winter of 2004-05, the US beekeepers found that approximately 40% of their colonies had perished. That resulted in many fewer colonies that were available for almond pollination. (Cont. 7)

# Calculating Annual Expense of Operating a Honey Bee Colony - 2005

Eric Mussen - Extension Apiculturist, UC Davis

- A. In which do you consider yourself most actively engaged: (you may choose more than one)
- honey production
  - pollination
  - queens / bulk bees / nucs

B. If someone asked you how many colonies you operated in 2005, what is the best estimate that you could relate to him or her? \_\_\_\_\_

## C. Labor

- Wages paid (include yourself and family members) \_\_\_\_\_
- Payroll Taxes \_\_\_\_\_
- Social Security paid on laborers \_\_\_\_\_
- Workman's comp \_\_\_\_\_
- Medical plan for employees \_\_\_\_\_
- Doctor visits for employees \_\_\_\_\_
- Pension plan \_\_\_\_\_
- Food and Lodging \_\_\_\_\_
- Miscellaneous ( \_\_\_\_\_ ) \_\_\_\_\_

## D. Bees

- Colonies (hived) \_\_\_\_\_
- Queens or cells \_\_\_\_\_
- Packages \_\_\_\_\_
- Nucs or frames of bees \_\_\_\_\_
- Bulk bees \_\_\_\_\_

## E. Supplies

- Personal
  - Smokers \_\_\_\_\_
  - Hive tools \_\_\_\_\_
  - Gloves (leather, rubber, latex, etc.) \_\_\_\_\_
  - Veils \_\_\_\_\_
  - Helmets \_\_\_\_\_
  - Coveralls / gauntlets, etc. \_\_\_\_\_
  - Sweat bands \_\_\_\_\_
  - Miscellaneous ( \_\_\_\_\_ ) \_\_\_\_\_

### Hives

- Location rentals (cash or honey) \_\_\_\_\_
- Smoker fuel \_\_\_\_\_
- Hive repair (paint, staples, etc.) \_\_\_\_\_
- Replacement frames and/or foundation \_\_\_\_\_
- Replacement supers \_\_\_\_\_
- Replacement covers \_\_\_\_\_
- Replacement bottom boards or pallets \_\_\_\_\_
- Lumber \_\_\_\_\_
- Honey containers (jars; tins; barrels) \_\_\_\_\_

Queen breeding specialty items (cell cups, queen cages, package supplies, etc.)

Miscellaneous ( \_\_\_\_\_ )

Bee feed

Sugar

Protein

Bee chemicals

Antibiotics (AFB, *Nosema*)

Acaricides (tracheal and Varroa mites)

Small hive beetle controls

Miscellaneous ( \_\_\_\_\_ )

F. Vehicles (trucks, pickups, forklifts, trailers)

Loan payments

Insurance

Fuel and lubrication, etc.

Tires (rims)

Repairs (engine, trani, axles, windows, bumpers, etc.)

Freight

Miscellaneous ( \_\_\_\_\_ )

G. Property (land, warehouse)

Mortgage, other loans

Taxes (real estate / property)

Insurance

Utilities (electricity, sewer, water, trash removal, etc.)

Upkeep (water heater, plumbing, air compressor, etc.)

Communications (phones, computer Internet service)

Miscellaneous ( \_\_\_\_\_ )

H. Office Expenses

Office supplies

Postage

Advertising

Dues and subscriptions

Depreciation (whole outfit)

Interest on loans

Professional services (accountants, lawyers, etc.)

I. **Total Cost** of Operation (Add all the rows above)

J. Cost per colony per year - **Total Cost** divided by the number of colonies entered on Line B

K. Is this figure about what you expected?

Yes

No, it is lower

No, it is higher

Almond growers were forced to rent colonies that may or may not have been of adequate strength, at top dollar. Not wishing to encounter such a shortage of honey bees in the future, a group of almond industry leaders suggested that it would be a good idea to solicit contributions to place one or two, \$1 million, endowed chairs in apiculture on the UC Davis campus. The idea was met with various degrees of acceptance, from full to none. Using industry money to “buy” a research position on campus was “setting a very dangerous precedent,” according to some.

Simultaneously, a number of beekeepers in the California State Beekeepers’ Association had been wondering if an attempt should be made to reinstitute some sort of “assessment” on CA beekeepers that could be used to fund additional research. The beekeepers did not appear to be interested in the past Apiary Board approach, but perhaps something more like a commission, where there is little outside input from (or expenses to) state administrators.

Becoming aware of the possibility of funds becoming available to the campus, our fund raising administrators called together an interesting assemblage of individuals who all have an interest in an upcoming hire into the UC Davis Entomology Department of a “Pollination Biologist.” Plant breeders, commercial bumble bee providers, commercial beekeepers, Almond Board representatives, and University members met to discuss the needs for pollination in the state. There appeared to be interest among the assemblage to consider contributing to an endowment fund that could generate annual support for pollination research.

Much work needs to be accomplished before the mechanics of the endowment can be finalized, but this may be a mechanism whereby the beekeepers can make contributions to an ever growing fund that will generate increasing amounts of funding to support pollination research for the foreseeable future.

### Feedbee<sup>®</sup> – A New Bee Diet

In the May 2006 (Vol. 19, No. 2) issue of HiveLights, published by the Canadian Honey Council, the manufacturer of Feedbee explains how the diet was conceived over 12 years of trial and error and what makes it a good diet for feeding bees.

Ten steps were involved in developing the recipe:

1. 255 seeds, roots, fruits and grains nutritious to animals were selected
2. the potential feeds were dried and presented to the bees for possible consumption
3. the ability to digest the feeds was monitored
4. feeds were analyzed for toxic sugars, like stachyose
5. feeds were analyzed for protease inhibitors
6. speed of digestion and absorption were monitored
7. compared speed of digestion between feeds and pollen
8. compared nutrient levels with pollens
9. matched bee and royal jelly nutrients to nutrients in feeds
10. reviewed nearly everything known to be fed to honey bees.

Following initial testing, the better ingredients were mixed in various proportions and Feedbee eventually was the result. Feebee is advertised as a nutritionally balanced diet that is: highly palatable, meets all the bees' nutritional requirements, can be fed year 'round, doubles brood rearing, doubles bee population in the colony, and doubles honey production. Could you ask for much more?

Besides the preliminary tests conducted by Dr. Pam Gregory, mentioned in my previous newsletter, Feedbee was sent to Australia and compared to feeding Bee pol<sup>®</sup> (a mixture of pollen, soy and sugar) and pollen. You can't beat pollen, but Feedbee was not significantly inferior to pollen, either.

If you are interested in trying some of this new bee feed, the manufacturer/distributor can be reached at the following: Bee Processing Enterprises Ltd., C/O Grain Process Enterprises Ltd., 115 Commander Blvd., Scarborough, Ontario, Canada, M1S 3M7. Phone: (416) 291-3226; FAX: (416) 291-2159; E-mail: amsaffari@yahoo.com.

Sincerely,

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