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Almonds Tough on Some Bees

A number of beekeepers contacted me at the end of the almond bloom to find out if I had any ideas about what happened to their bees. One beekeeper sent me a comb, so that I could have a good look.

The comb contained a band of brood that was not emerging normally. A number of worker bees had chewed through their cappings but were unable to pull themselves out of the cells. Many had died with their tongues extended fully.

Approximately half of the dead bees appeared to be nearly normal, but light in color. The other half had poorly developed or undeveloped wings. The aberrant bees reminded me of buckeye poisoning, but it was way too early for buckeye.

Right, or wrong, the cause that comes to mind is the fungicide Captan®. After years of complaints by beekeepers, Larry Atkins tested the effects of various doses of

Captan on larval bees. He found that higher doses were acutely toxic to larvae. Lesser doses lead to "morphogenic effects" ("...adults that survived were light in colour, and of light weight, and often had deformed wings or no wings.") The report also stated normal application doses of Captan "...would be expected to affect as much as 33-41% of the brood...".

Before jumping to conclusions about Captan, it must be stated that results of testing pesticides up to 1986 implicated five other materials that also cause this effect. Dimethoate, oxamyl, malathion, carbaryl and an experimental formulation are included. However, the brood effects are not likely to be seen if the adult bees turn out to be more susceptible to the poison than the brood. This is the case with dimethoate. This information, and much more can be found in the Journal of Apicultural Research 25(4):242-255 (1986).

The 1996-97 winter was very different from "normal." It stayed relatively warm and a season's worth of precipitation fell in a month or two. Flooding was severe in some areas. Almonds began blooming in late January. Dormant and delayed dormant orchard sprays were applied after the arrival of bees in the area, or skipped for a year. Fortunately, the weather was quite nice during almond bloom and the potential crop looks pretty good.

Probably, by now, the bees have recovered and it seems like there never was much of a problem. But each of these "minor setbacks" takes its toll on the bees. There aren't quite as many bees for honey production or crop pollination; colonies have to be equalized; ability to cope with diseases, parasites and future exposures to poisons is diminished, and the beekeeper is impacted negatively by each of these problems.

Dr. Rich Sexton, UCD Professor of Agricultural and Resource Economics, predicted that bearing acres of almond will increase steadily from 425,000 in 1997 to 525,000 in the year 2000. If bee-keepers are going to be expected to supply the approximately 1.05 million colonies of honey bees to pollinate that crop, more attention needs to be paid to protecting them from exposure to bee-toxic pesticides.

### More on Pesticides

Changes in federal legislation are going to change an important part of the pesticide use practices in the U.S. Up to now, when an unanticipated explosion of a pest

population or a problem with pests on a "minor" crop became problematic, requests could be made for "emergency exemptions" from certain parts of the drawn out registration process to obtain use of a pesticide. These "Section 18" registrations were temporary. Some of these registrations expire, but many are converted to "Section 3" registrations and the products remain in use. Under the old system, EPA did not establish tolerances for residues in food resulting from these uses, because other residue data was available and thought to be adequate.

The new Food Quality Protection Act (FQPA) requires that all pesticide uses be examined for their implications to the total pesticide load in foods, before any use is allowed. The idea behind this is that there is an upper level for all pesticides that may get into our diet. Thus, the new use is added to the old uses. If a person might get too much in his or her diet, the new use will not be allowed. This will cause problems for minor use registrations, in particular. Manufacturers may be approaching the limit for their products, and wish to be very selective about what other commodities should be treated. They probably wouldn't want to remove a major crop from the label in order to add a minor crop. Also, regulatory personnel have stated that they see very little difference, now, between an emergency and normal registration (time consuming) process. Remember, we might wish to get an emergency use of an antibiotic or mite control substance for our bees. It will impact us, too.

Apple thinning - One of the frustrations for beekeepers who rent honey bees for apple pollination is that growers want to thin some orchards while other trees still need bees. Since carbaryl (Sevin®) is used at bee-toxic doses for thinning, bee losses can be significant. The following information was developed by Joseph Grant, Warren Micke, Scott Johnson and Michael Devencenzi and distributed to apple growers by the University. Their cautions about bee toxicity are accurate, but not necessarily followed.

Suggestions for chemical thinning granny smith, fuji, gala apples in the northern San Joaquin valley

There is a certain amount of both art and science involved in successful use of chemical thinners on apples. This is mainly due to the many factors that can influence the response of trees to applied chemicals. These include (but are not limited to):

Weather before application - Cool, wet conditions may pre-condition leaves for greater absorption of thinning agents, leading to increased activity.

Weather during/after application - Cool, wet or humid weather prolongs drying, giving greater activity.

High temperatures following application, particularly if they follow cool periods, can cause mild tree stress and tend to increase thinning activity of some chemicals.

Tree Condition - Stress from any source (low nitrogen, lack of water, root damage, heavy crop in previous year, shading within canopy, etc.) may increase thinning response to applied chemicals.

Tree Vigor - Young, excessively vigorous trees are easier to thin than older, moderately vigorous trees.

The rates and timing discussed are those which have given the most acceptable and consistent results in field trials to date. They are provided merely as suggested guidelines for growers who wish to begin accumulating experience in using chemical thinning as a management tool.

Careful timing of spray application is important if predictable and acceptable results are to be expected.

Rates given pertain to dilute applications only (200-400 gallons/acre). We do not have field experience with applications below 200 gallons/acre, and can not suggest their use at this time. Reports from other areas have indicated that concentrate applications yield less consistent results than dilute applications. To prevent over-thinning in the lower portion of tree canopies, it may be helpful to adjust the spray pattern so as to reduce the volume of solution applied to this area.

Warning: In mixed variety blocks, take precautions to prevent drift of applied chemical thinners to non-target varieties. Spray drift from applications

made to hard-to-thin varieties such as Fuji are likely to over-thin Gala and Granny Smith.

#### **GRANNY SMITH**

The best and most consistent results to date have been achieved using a single application of **Sevin XLR Plus®** (carbaryl) at 0.75-2.0 pound active ingredient per acre, applied when the largest fruit are 10 to 15 mm (3/8" to 9/16") in diameter.

Where bloom is moderate or environmental conditions are favorable for thinning, use the lower rate (0.75 lb a.i./acre) within the range specified. Use the higher rate where bloom is heavy or environmental conditions are less favorable for thinning.

#### **GALA**

The best thinning of Gala has been achieved with a single petal fall application of **Sevin XLR Plus®** at 1.5-2.25 lb a.i./acre + **Amid-thin W®** at 25 ppm.

Equally effective but less consistent thinning has been obtained with applications **Sevin XLR Plus®** (2.0-3.9 lb a.i./acre) at both petal fall and 10-15 mm largest fruit diameter.

Use lower rates within the ranges shown where bloom is moderate or environmental conditions are favorable for thinning. Use the higher rates where bloom is heavy or environmental conditions are less favorable for thinning. Follow-up hand thinning is usually required following these treatments.

#### **FUJI**

Of the three varieties discussed here, Fuji is the most difficult to thin with chemical. The best and most consistent experimental result have been

obtained by the following combination treatment: **Sevin XLR Plus®** (3.0 lb a.i./acre + **Amid-thin W®** (50 ppm) + oil (2 quarts/acre) at petal fall, followed by **Sevin XLR Plus®** (3.0 a.i./acre) + oil (2 quarts/acre) when largest fruit are 10-15 mm in diameter.

Note on the use of oil: The oil used in these applications should be a light, summer type oil. Addition of oil enhances the thinning activity of Sevin. Spray oils are known to increase russetting of some russetting-susceptible varieties, but have not caused russetting in our tests on Fuji when used at the rate shown above. Oil may be omitted from the spray mixture, but less thinning should be expected. Do not apply pesticides which are incompatible with oil (e.g. sulfur, Captan®) within 30 days of oil applications.

This combination has not provided complete thinning of Fuji. Follow-up hand thinning is usually necessary.

Note: When used at the rates suggested above, carbaryl is toxic to honeybees if applied to bees during daytime while they are active in the orchard. Remove colonies from the orchard before spraying, or spray at night to prevent direct application to foraging bees. Once spray deposits are dry, the XLR Plus® and 4F formulations are less likely to be carried back to hives to by foraging workers than other formulations.

Switching the attention to cotton, there was a large, regional meeting on cotton pest control last week. Numerous "working papers" were submitted on controlling various cotton

pests. Basically, the reports say to follow the "Cotton Pest Management Guidelines" published by the University. You can get a copy at your county Cooperation Extension office, but I have reprinted the page that

includes the information  
beekeepers want most - effects of  
cotton insecticides and  
acaricides on honey bees. Be  
sure to register your apiary  
locations and request  
notification when bee-toxic  
materials are going to be used  
around your bees.

#### U.S. Honey Suvey

Currently the National Agri-  
cultural Statistics Service  
(USDA) is conducting, and  
publishing the results of, a  
producers' survey on honey  
production. About 6,100 honey  
producers spend an estimated 11  
minutes each month filling out  
the survey. The information  
requested includes number of  
colonies, amount of production,  
honey stocks and current prices.  
Survey data is used to administer  
programs and set trade quotas and  
tariffs. University and state  
personnel also refer to the data.  
It is probable that the data also  
influences honey selling and  
purchasing prices.

The Federal Office of  
Manage-ment and Budget (OMB) has  
targeted this program for review  
in accordance with the Paperwork  
Reduction Act of 1995. Thus, to  
continue conducting the survey,  
we have to justify it's  
existence.

"Comments are invited on:(a)  
Whether the proposed collection  
of information is necessary for  
the proper performance of the  
functions of the agency,  
including whether the information  
will have practical utility; (b)  
the accuracy of the agency's  
estimate of the burden of the  
proposed collection of informa-  
tion including the validity of  
the methodology and assumptions  
used; (c) ways to enhance the

quality, utility, and clarity of  
the information to be collected;  
and (d) ways to minimize the  
burden of the collection of  
information on those who are to  
respond, such as through the use  
of appropriate automated,  
electronic, mechanical or other  
technological collection  
techniques or other forms of  
information technology. Comments  
may be sent to: Larry Gambrell,  
Agency OMB Clearance Officer,  
U.S. Department of Agriculture,  
1400 Independence Avenue, SW,  
Room 4162 South Building,  
Washington, DC 20250-2000

All responses to this notice  
will be summarized and included  
in the request for OMB approval.  
Comments on this notice must be  
received by May 30, 1997 to be  
assured of consideration. All  
comments will also become a  
matter of public record.

#### AHBs More Active

Numbers of colonies of  
Africanized Honey bees (AHBs)  
being detected in southeastern  
California are on the rise. As  
this is being written, the CDFA  
has confirmed the 82nd colony  
found in California. The early  
part of this year has contributed  
heavily to the total, as we had  
only 38 reported at the end of  
1996.

Why the increase? Maybe it  
is because there is a mass of  
AHBs south of our border that is  
moving our way undetected. The  
Mexican government gave up  
monitoring the expansion some  
time ago. But, I am inclined to  
think that Varroa mite (or lack  
thereof) is the primary factor.

Varroa mites were extremely  
prevalent in 1995 and 1996. Bee-  
keepers would barely get their

colonies treated and they would be full of mites, again. Changes began in 1996, when researchers actually had to solicit help from beekeepers in finding mites for research projects. This year, most beekeepers feel that they have Varroa pretty well under control (including those who think that they may be rearing resistant stock or have found the ideal treatment).

Feral honey bee colonies are beginning to last a full year, instead of being overwhelmed by Varroa before October. But, this is a drastic change, since a year earlier when most people across the country felt that feral bees had nearly been eliminated by Varroa. So, what bees will fill in the void? In southern California, it very likely will be Africanized honey bees.

Given their propensity for frequent swarming and their ability to eke out an existence on limited resources, AHBS should be able to move into the nesting sites formerly occupied by bees of European lineage and do quite well. When Varroa levels were really high, even AHBS had trouble staying ahead of them. Now that they have to deal only with mite populations in their own colonies, AHBS should be able to build up and swarm with light infestations not bothering them that much.

We haven't noted much range expansion with AHBS in southern California, but the numbers indicate a higher population density than before. Also, the presence of AHBS on the Anza Borrego Desert State Park suggest that it will not be too surprising to find AHBS west of the Laguna Mountains before long.

## Ag Labor on Web

Wondering about legal and government references dealing with labor management? Want to know more about employee recruitment and selection, supervision, farm work place safety, wages, and incentive pay, discipline, interpersonal relations on the job, or labor law?

All this, and much more, is available on the World Wide Web from U.C. Simply type in <http://are.berkeley.edu/APMP/> and you find yourself in a huge information base. Some of the materials are written in Spanish, and teaching materials are prepared for downloading to slides or overheads. This site definitely is worth visiting.

## Forklift

Considering the purchase of a forklift for your beekeeping operation? A company in Colorado, Quality Corporation, would like to share their information on Donkey, Truck Carried Forklifts. They have a couple models, but the Bee lift weighs 2,500 lbs., can lift up to 2,000 lbs. as high as 10 feet, 9 inches, and clamps itself to the flatbed, up off the road, for travel.

The Donkey is a three wheel forklift that maxes out at 15 MPH. Especially for beekeeping, it has a 2 stage mast and adjustable forks and side shift.

For more information, contact: High Trak Equipment, 4238 Lozano Lane, Suisun, CA 94585 [(707)426-9780].

## 21 Century Apiculture

Dr. Roger Hoopingarner, apiculturist at Michigan State University, recently retired from the institution. In recognition of that retirement, the Kellogg Center is hosting an international symposium on "Apiculture for the 21st Century." The program covers two days, Friday and Saturday, June 27 and 28, 1997. The program is divided into four sessions: Genetics of Honey Bee, Behavior and Pheromones of Honey Bees, Dynamics of Honey Bee Populations, and Parasitic Mites of Honey Bees. Nineteen speakers from the U.S., Mexico, Canada, Germany, Italy and Brazil will take part in the program.

Briefly, conference expenses are: registration (with

proceedings) - \$60; Friday luncheon - \$13; Saturday banquet - \$20; single or double room in Kellogg Center - \$69 per night. Registration is being handled by: Linda Gallagher  
Department of Entomology  
243 Natural Science  
Michigan State University  
East Lansing, MI 48824-1115  
(517)699-2428  
The Kellogg Center can be reached at 1-800-875-5090.

Sincerely,

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