APIS

Apicultural Information and Issues

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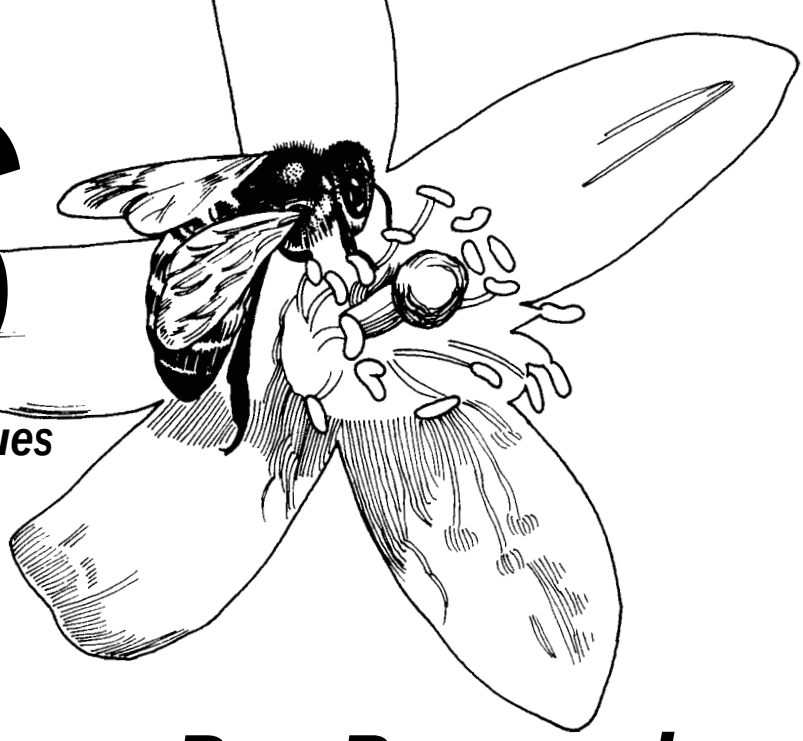

Inside APIS:

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Focus on Bee Research

A PANEL ON BEE RESEARCH was convened at the recent meeting of the American Beekeeping Federation. Billed as what bee researchers want from beekeepers and vice versa, presentations from both sides showed that a substantial divide exists between these groups. Researchers are primarily driven by the demands of their discipline and administrators. The latter often require that scientists themselves acquire the substantial funding to carry out their activities from granting or commercial sources. As for the former, researchers are called on to publish in journals that are peer-reviewed and read by others in their field. They get little if any credit for publishing in lay magazines. The practical result of this is that a lot of research is not perceived as directly helping beekeepers. In addition, much of it continues to be published in places not readily accessible to the lay public.

Many beekeepers see scientists as employed to solve applied problems and publish the results in accessible trade journals. They often have little patience for research published in scientific journals, especially that which they perceive has little practical value. A good many researchers, on the other hand, see beekeepers as supplying little, if any, funding. As a consequence, they have little patience for what they often view as complaints by a cadre of folks who are not informed about what really is involved in bee research.

Unfortunately, this conflict sometimes leads to beekeepers becoming fed up with researchers, and vice versa. In the worst-case scenario beekeepers may accuse researchers of complacency, even complicity, in ignoring their needs. At the same time scientists can lose respect for beekeepers, who they perceive as ungrateful for research even when it does directly affect their livelihood.

AT THE Colorado convention, several conclusions were reached. Quality research isn't easy. It takes patience, time, money and adequate controls. In 1985, I wrote an essay in these pages about the latter issue with reference to tracheal mite control. In part it read, "… no experiment is worth much without a control, an untreated colony in the exact same state genetically, qualitatively (same stores, amount of brood) and infested to the same degree as the colony being treated. This provides the basis for comparison to show a material's effectiveness. In bee research, developing effective control colonies is often the most difficult part of an experiment. This is because to be shown to be generally effective, experiments must usually be conducted on a large scale involving a great number of both infested and control colonies[1]." Short courses designed with a research component may help beekeepers better understand what is involved in bee research[2].

Continued next page

[1] http://www.ifas.ufl.edu/~mts/apishtm/apis85/apmay85.htm#1
[2] http://www.ifas.ufl.edu/~mts/apishtm/apis97/apoct97.htm#2

Bee Research continued

The beekeeper-researcher debate will no doubt continue. Andy Nachbaur's recent challenge to the Bee-L discussion list is one example. The following is his response to the legislative proposal that the National Honey Board (NHB) turn some of its efforts to bee research by further assessing honey:

"That is nice (Beekeeping research funds from NHB tax increase) and I can guarantee that all will be spent, and all will be back for more, as beekeeping research funding is the original black hole. If anyone can name 10 useful beekeeping tools, management schemes, PC software, or any other useful beekeeping advancement recognized and used by a bare majority of US beekeepers as being the product of so called 'public funded beekeeping' research in the last 20 or even 30 years I will do my best to match the $500,000 myself. I am sure all of this pie in the sky 'beekeeping' research money will end up replacing tax payer funded programs and I am for that but not if I have to replace it with my own limited funds after writing that big $500,000 check I am a little short." [3]

This quickly brought replies from several individuals who listed extender patties, artificial bee diets, swarm and pollen traps, and instrumental insemination syringes as being qualified. Though not a direct response to this challenge, Dr. Keith Delaplane, who was on the panel in Colorado and also is extension apiculturist at the University of Georgia, has written three articles in *Bee World* (Vol. 77, No. 2, 1995, pp. 71–81 and Vol. 78 No. 1, pp. 5–11 and No. 4, pp. 155–164, 1996) which pertain to the issue. All are published under the same title: "Practical Science — Research Helping Beekeepers."

His first article focuses on tracheal mites. The history of the mite is given in some detail and reveals how both beekeepers and scientists pieced this complicated story together over time[4]. He then discusses research in controlling these mites with menthol[5], formic acid and vegetable oil[6]. Finally, he describes research contributions in controlling tracheal mites using colony manipulation and bee breeding.

In his second article, Dr. Delaplane discusses colony manipulations for honey production. These include studies confirming that 1) bigger populations are better, 2) bigger combs are better, 3) swarming reduces honey yield, 4) good queens stimulate honey production, and 5) empty comb and moderate crowding stimulate honey production. Of those, according to Dr. Delaplane, perhaps the most profound way this research has influenced beekeeping is a shift by beekeepers from tolerating swarming to discouraging the activity, and the realization that larger colonies are more efficient on a per-bee basis. Widespread implementation of these has resulted in larger honey crops.

> "Clearly, the relationship between beekeepers and bee scientists is mutually beneficial. But it never hurts to remind ourselves how important that relationship is."
>
> - Dr. Keith Delaplane

Dr. Delaplane's final article homes in on the one organism that has been most responsible for changing the face of *Apis* beekeeping worldwide, the parasitic bee mite *Varroa jacobsoni*. Although over 140 chemicals have been tested for Varroa control, he examines only five in detail. These include fluvalinate (Apistan®), flumethrin (Bayvarol®), bromopropylate (Folbex®), formic acid and aromatic or botanical extracts (Apilife VAR®). He also discusses mite detection using ether roll, capping scratcher and bottom board inserts, and developments in determining proper thresholds for treating, the fundamental principle behind Integrated Pest Management, or IPM[7]. Finally, he describes manipulations to eliminate drone brood and efforts in bee breeding. He concludes: "The most notable accomplishments ... are the discovery and development of effective bee-safe miticides, application methods for miticides, IPM-based recommendations that reduce chemical reliance, hive manipulations that reduce Varroa populations, and discovery of mechanisms of genetic mite resistance in *A. mellifera*."

Another document that contributes to the subject at hand is the draft of the Strategic and Operational Plan for the USDA's Agricultural Research Service (ARS), now being circulated for review. The final publication is intended to communicate to state and federal scientists, customers and stakeholders (beekeepers) the ARS vision of bee and pollination research for the year 2000 and beyond.

It lists many research accomplishments by that institution over the years, including developing the first instrumental insemination device, fumagillin control for nosema, and chemical detection of honey adulteration. Also included are trapping and identification techniques for Africanized bees, and methods to maintain European queens while using open mating systems in areas infested with Africanized bees. In addition, ARS provides many services to beekeepers such as an active bee disease and pest diagnostic service since 1898, and publication of the "pollinator's bible," Ag Handbook 496, *Insect Pollination of Cultivated Crop Plants*[8].

To be fair, many research accomplishments in beekeeping cannot be attributed to one person or organization. There is also a considerable body of study developed in other countries, funded by both beekeepers and governments. Some of these are leading the way in beekeeper-financed research, including the ADAPI model in France[9] and the Canadian Bee Research Fund, which recently exceeded its first-year fund-raising goal[10].

Finally, the beekeeper must also be considered a full partner in much of the research that has been accomplished to date. As Dr. Delaplane concludes: "We can thank practical-minded beekeepers for inventing beekeeping equipment, working out basic beekeeping techniques, accumulating untold hours of natural observations, and identifying applied research needs. And we can thank generations of scientists who have pieced together bee biology, disease etiologies and treatments, parasitology, genetics and breeding. Clearly, the relationship between beekeepers and bee scientists is mutually beneficial. But it never hurts to remind ourselves how important that relationship is." ■

Honey Bee Technical Council: Mosquito Control in Florida

THE HONEY BEE TECHNICAL COUNCIL met February 24, 1998. This body exists to provide advice to the Florida commissioner of agriculture on various issues affecting beekeeping. It was involved in implementing changes to the bee law, including registering beekeepers, initiating registration fees, and controlling Varroa[11].

Mr. Steve Dwinell and colleagues provided an update on mosquito control efforts in Florida. The last meeting of this nature was held in 1980, according to Mr. Dwinell. It resulted in a series of maps developed by mosquito control agencies around the state to show where pesticide application was likely to occur. A lot has changed since that time, Mr. Dwinell said, and a meeting of this nature was long overdue. He suggested some things that might be done to improve communication between beekeepers, including reissuing updated maps, developing a World Wide Web site and publishing a set of recommendations for minimizing the effects of mosquito control efforts on honey bees.

There are 74 to 75 species of mosquitoes in Florida. Two general types are found: flood-water and permanent-water species. The latter lay eggs on the surface of the water and some (*Culex*) can spread disease, but they are not considered as much of a nuisance as the former group. Flood-water mosquitoes lay eggs in the soil, where they can remain dormant for years. Once conditions are right, these tend to hatch at once, however, and the resultant adults can cause big headaches. Some of these will probably be emerging in large numbers given the unusual rains over the last few months. Generally, mosquito control efforts are confined to certain areas like citrus orchards, pastures, roadside marshes and retention ponds. Lakes and ponds are usually not a problem because they have natural controls in place: fish.

Mosquito control efforts fall into three categories: 1) permanent control (draining standing water); 2) larval (chemicals or pathogens); and 3) adult (chemicals). Most chemical application in Florida is directed toward aquatic larvae. Spraying for adults is a last-ditch effort and only recommended after preliminary inspection shows extreme need. In most cases, larval control is accomplished using methoprene, *Bacillus thuringiensis* or temophos (Abate®). There are no bee problems associated with the first two. However, beekeepers report losses when bees collect water from temophos-treated areas. The pesticide is used rarely, but its application appears to require more information about effects on honey bees. Anyone having specific problems in this area is asked to contact Mr. Dwinell, chief of Bureau of Entomology and Pest Control, DAES, 644 Cesery Blvd., Suite 200, Jacksonville, FL 32211-7194, tel. (904) 488-7447 or (904) 727-6575, fax (904) 727-6564.

PESTICIDE application for flying adult mosquitoes is highly regulated in Florida. However, if there is a disease outbreak (encephalitis), these rules can be put aside. Unfortunately, each mosquito control agency (there 54 to 55 in Florida!) has a different set of procedures based on its own special circumstances. Discussion concerning use of aircraft in mosquito control revealed that they are used for both adult and larval control. It is not always apparent whether aircraft are applying larvicide to water or adulticide in the air. Although the label on materials used for adults says not to apply when honey bees are flying, applications are often done at the "crepuscular" hour, when both bees and mosquitoes can become exposed. Applications for controlling larvae are often made during the middle of the day, but are not thought to affect foraging bees. The Abate® label does, however, provide warning that it is toxic to bees, and again beekeepers are reporting losses from bees foraging for water that has been treated.

The label is the law, according to Dr. Roger Morse of Cornell University, now spending half the year in Florida: "I am writing today about your note relative to mosquito control in *APIS*.[12] Current EPA legislation is such that if any honey bees are killed by a pesticide the applicator is at fault. This has been the case since 1984 but the law has not been used and beekeepers are, apparently, not aware that they have this protection. It is a very simple, black-and-white situation!" Although there is legal protection for beekeepers, most at the meeting said they expected some loss of bees as part of operating in Florida.

Consensus at the meeting was that the best protection for colonies remains as it always has been, the result of constant and consistent communication between beekeepers and applicators. Other information resources about mosquito control in the state are the Florida Mosquito Control Association[13] and the John A. Mulrennan,

continued next page

Honey Bee Research Funds in Danger

THE SPEEDY BEE, Vol. 27, No. 1, January 1998, reports some disturbing news on the bee research front. The president's budget for fiscal year 1999 does not include funding that Congress appropriated last year for the Weslaco Bee Laboratory. The amount is $500,000! Research at the Weslaco laboratory includes chemical control of Varroa mites and management of Africanized bees. The former has been in focus recently, and Weslaco scientists have come to Florida several times to study reports of fluvalinate-resistant mites.

The article concludes that if the beekeeping industry wants to maintain the Weslaco funding, it must communicate to legislators that there is a need. Letters should be sent to the chairmen of the House and Senate agriculture appropriations subcommittees: Sen. Thad Cochran, chairman, Senate Agricultural Appropriations Subcommittee, SD-136 Dirkson Senate Office Bldg., Washington, DC, 20510-6026; and/or Rep. Joe Skeen, chairman, House Agricultural Appropriations Subcommittee, 2362 Rayburn House Office Bldg., Washington, DC, 20515-6016. ■

[3] andy.nachbaur@calwest.net
[4] http://www.ifas.ufl.edu/~mts/apishtm/apis91/apjun91.htm#T1
[5] http://www.ifas.ufl.edu/~mts/apishtm/apis88/apnov88.htm#2
[6] http://www.ifas.ufl.edu/~mts/apishtm/apis94/apoct94.htm#6
[7] http://www.ifas.ufl.edu/~mts/apishtm/apis96/apoct96.htm#3
[8] http://www.ifas.ufl.edu/~mts/apishtm/apis95/apoct95.htm#T1
[9] http://www.ifas.ufl.edu/~mts/apishtm/letters/aix7_6.htm
[10] http://www.ifas.ufl.edu/~mts/apishtm/apis97/apfeb97.htm#4
[11] http://www.ifas.ufl.edu/~mts/apishtm/apis92/apjan92.htm#1
[12] http://www.ifas.ufl.edu/~mts/apishtm/apis98/APfeb98.HTM#2
[13] http://www.famu.edu/jamsrl/fmca/

Precision Agriculture: A Beekeeping Perspective

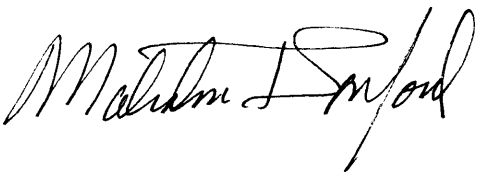
REMOTE SENSING employs aircraft or satellites to map the Earth's surface in various ways. It has been used to show soil properties, document water stress, detect pest outbreaks, and determine vegetative complexes. In the latter, for example, it is possible to use infrared photography to find certain plant species. I wrote a paper on this topic while at the department of geography, University of Georgia, back in 1972. The thesis was that this technology could be used to detect bee forage so as to better locate beeyards in rural Georgia. At that time, this was only an academic exercise, for no beekeeper could possibly have afforded to do this.

Using Geographic Information Systems (GIS) and Geographic Positioning System (GPS) in coordination with remote sensing data now provides more opportunity in this field[17]. An article in the November 1997 issue of *FloridaAgriculture*, information organ of the Florida Farm Bureau, is titled " 'Star Wars' comes to the farm." It discusses increased use of precision agriculture, with a special emphasis on GPS. Using small, hand-held instruments it is now possible to accurately determine one's location on the globe. According to the article, signals from the GPS can direct moving farm equipment within four inches of exact longitude and latitude.

For the beekeeper, there are many possible uses of this technology, but perhaps most important is to keep track of beeyard locations. This was the theme of a workshop during the American Beekeeping Federation's Colorado Springs convention on this technology. Once the coordinates are known, the information can be used in many ways. One is to provide new workers with specific instructions on how to reach yards. Another is to ensure pesticide applicators have precise knowledge of where colonies were located. An overview of the GPS is available at the University of Texas World Wide Web site[18], and a comprehensive list of precision agriculture links is on the World Wide Web at the University of Florida Institute of Food and Agricultural Sciences Web[19].

An article on precision farming in *Agri-Alternatives* (Jan–Feb 1998, pp. 24–26) provides a list of what to look for when purchasing a GPS receiver. Recommended attributes include ability to output data in ASCII format via a RS-232C serial port (standard in most computers), at least six parallel channels (more is better), battery backup 12-volt power supply, and ability to accept differential corrections in standard RTCM-SC104 format). Prices range from $150 up. Excellent accuracy is achievable with less than a $1,000 investment. ■

Sincerely,



Mosquito control continued

Sr. Arthropod Research Laboratory at Florida A & M University[14]. A comprehensive World Wide Web site on mosquitoes is maintained by Rutgers University[15]. Other information on mosquito control is available from extension entomologist Dr. Charlie Morris of the Florida Medical Entomology Lab (FMEL) in Vero Beach, FL. Dr. Morris edits the Mosquito Control Association's newsletter, *Buzzwords*[16]. Dr. Morris can be contacted about subscribing to the paper copy and for general questions about mosquito control at 200 9th Street, S.E., Vero Beach, FL 32962, tel. (561) 778-7200, fax (561) 778-7204 or by e-mail: CDMO @gnv.ifas.ufl.edu. ■

Honey Bee Seminar Near Tampa

THE TAMPA BAY Beekeepers Association will host a beekeeping seminar on Saturday, May 16, 1998. The location is the Hillsborough County Agricultural Extension Office, 5339 South County Rd. 579 (corner of Old Hillsborough Ave. and CR 579), Seffner, FL 33584[20]. Advanced registration before May 1 is $15 and $5 for additional family members. On the day of the seminar, registration will be $20. To register, send a check made out to Tampa Bay Beekeepers Association, 10002 Ida St., Riverview, FL 33569. For further information call (813) 677-0577. ■

[14] http://www.famu.edu/jamsarl/
[15] http://www-rci.rutgers.edu/~insects/links.htm
[16] http://WWW.IFAS.UFL.EDU/~VEROWEB/BUZZ/CURRENT.HTM
[17] http://www.uswcl.ars.ag.gov/epd/remsen/rspreag.htm
[18] http://www.utexas.edu/depts/grg/gcraft/notes/gps/gps.html
[19] http://range.ifas.ufl.edu/gisrs.html
[20] http://www.ifas.ufl.edu/www/county/Hills.htm?

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