

# APIS



## Apicultural Information and Issues

From IFAS/University of Florida  
Department of Entomology and Nematology

November 2000

### Inside APIS:

#### **Beekeeping Pest Research**

Funding from the Florida legislature needs beekeeper support. *Page 1.*

#### **Florida Bee Inspection**

A proactive approach may ensure continuity. *Page 2.*

#### **Economic Impact of Florida Beekeeping**

New study reveals the importance of this activity. *Page 2.*

#### **International Barriers to Honey Trade**

More can be expected. *Page 3.*

#### **Disease Diagnosis Update**

Free handbooks available. *Page 3.*

#### **Smokers and Their Fuel**

Studies are lacking in this area. *Page 3.*

#### **Essential Oils**

Research continues, but the jury remains out. *Page 4.*

APIS Volume 18, Number 11

ISSN 0889-3764

Copyright© M.T. Sanford "All Rights Reserved"

## Research on Beekeeping Pests: \$300,000 Request from Florida Legislature

THE NEXT LEGISLATIVE SESSION is likely to feature many new players in the wake of election 2000, and could well be one of the most important for beekeeping interests in many years. At the recent Florida State Beekeepers meeting in Haines City, a plea was issued asking members to write letters in support of Apiary Pest Control Development, a request by the Florida Department of Agriculture and Consumer Services for \$300,000 to be used in bee research initiated by the Honey Bee Technical Council. These funds are important for several reasons. They not only would provide support for current research in both small hive beetle and Varroa control, but would also be viewed as matching funds to be used to garner other research support. A sample letter of support was provided at the meeting:

"Dear (Senator, Representative),

"The Florida beekeeping industry has been devastated over the last decade and a half by introduction of exotic pests. Most important are the Varroa bee mite (*Varroa destructor*) and the South African small hive beetle (*Aethina tumida*). The Division of Plant Industry, Florida Department of Agriculture and Consumer Services recently asked the Florida legislature to provide \$300,000 in funding under its Florida Apiary Pest Development program to find a way to control these pests in an environmentally safe and sustainable way.

"These funds are extremely valuable as seed money and should also help attract matching resources for an ongoing program to control both mite and beetle. These pests have cost my business alone an estimated \$ \_\_\_\_\_ over the last five years. Although chemicals to treat colonies are presently available, they are losing their utility and in the long run are not sustainable. The only solution is a long-range one, which will require development of innovative control techniques that will be effective in controlling these pests and will be environmentally and economically acceptable.

"Given the importance of the beekeeping industry, especially managed insect pollination so important for many agriculturally important crops in Florida, I believe the modest amount requested is warranted not just for the beekeeper, but also for the welfare of the general citizenry. I thank you for your assistance on this important issue and if you have questions or concerns, please don't hesitate to contact me or the Florida State Beekeepers Association: <http://www.flareal.com/fsba.htm>." ■

# Florida Bee Inspection: What is its Future?

AN ALLIED LEGISLATIVE ISSUE is the future of bee inspection in the Sunshine State. Many governmental agencies, such as the Florida Department of Agriculture and Consumer Services, are being asked to submit operating guidelines under a proposed heavy funding cut. This effort to cut costs across the board is expected to be particularly devastating for the apiary inspection program<sup>1</sup>.

There is widespread agreement that the bee inspection program in Florida is the most supported and best in the nation. Not only does it keep tabs on its prime objective, incidence of American foulbrood, but has been actively involved in research to control small hive beetle and Varroa. Many European countries demand phytosanitary certificates in order to accept imported honey. These too are provided by the bee inspection service, which has also been

involved in honey adulterating and labeling issues<sup>2</sup>. Other activities include doing periodic surveys<sup>3</sup>, publishing a directory of beekeepers<sup>4</sup>, and conducting meetings of groups that advise the Commissioner of Agriculture on apiculture industry issues, such as the Africanized Honey Bee Task Force and Honey Bee Technical Council<sup>5</sup>. It was deliberations of the latter body that led to the \$300,000 request for research funding and the Division of Plant Industry's financing of the recent study by Alan Hodges and colleagues at the University of Florida, both described elsewhere in this issue.

In spite of the value of inspection services, they have often been criticized by beekeepers and there have been calls to do away with them, especially in the wake of the introduction of tracheal and then Varroa

mites. The basis for much of this was that the contagious disease American foulbrood (AFB) was perceived to have been beaten by widespread use of Terramycin®<sup>6</sup>. This has changed with recent discovery of Terramycin®-resistant foulbrood<sup>7</sup>.

Experience with past American foulbrood epidemics is the basis for most bee inspection programs in existence today. Unfortunately, they continue to decline in number. In many states where they have been eliminated, dismayed beekeepers have found it almost impossible to get them reinstated. It would be a shame if the same fate was in store for Florida's honey bee inspection program, but this appears likely if affected beekeepers don't do something proactive to ensure its survival. ■

## Economic Impact of Florida Beekeeping

A STUDY BY ALAN HODGES and colleagues at the University of Florida, funded by the Division of Plant Industry, Florida Department of Agriculture and Consumer Services, reveals the apicultural industry of Florida contributed \$30.5 million in output, \$15.2 million in value-added products and 806 jobs to the Florida economy in 1999. The economic impacts associated with pollination services to growers were \$38.2 million in output, \$20.9 million in value-added and 490 jobs. The two primary sources of revenue were honey-bee-derived products (\$17.6 million) and pollination (\$1.5 million), according to the study. In 1999, Florida beekeepers managed 285,000 colonies, nearly 150,000 of which were in migratory operations.

The study reports cash operating expenditures of \$12.1 million in 1999. Pre-tax income was \$1.5 million for all beekeepers. Average net income was \$1,280 per beekeeper with a profit margin of 7.8 percent. Return on noncurrent assets was 3.03 percent, and pre-tax net income per colony was \$5.88. Total assets were \$50 million with total employment 749 people.

An added dimension to this study was a survey of fruit and vegetable growers. More than 31 percent contracted for pollination services within the last five years. Sixteen percent used pollination services,

“

*The figures give an up-to-date view of the importance of apiculture in Florida ... something beekeepers can take to the bank.*

”

but also grew some of the same crops without contracting pollination, an intriguing lack of consistency. Some 34,845 acres of fruit and vegetable crops were pollinated by contracted honey bees at a cost of \$327,000, with a reported increase in yield of 20 to 62 percent in 1999. The majority of fruit and vegetable growers (92 percent) reported expenditures under \$10,000, and 56 percent of respondents indicated expenditures under \$1000. The authors conclude that pollination service charges seem to represent a relatively minor expense for Florida fruit and vegetable growers. The marginal value benefit of using pollination services totaled \$26.4 million. Results of the survey also suggest that growers recognize the importance of honey bee pollination and are mostly satisfied with the cost.

According to the study, “Beekeeping has now become a marginal economic enterprise and a decline of the beekeeping industry could have widespread repercus-

sions for the agricultural sector and consumers. Population pressures are increasing the demand for crops and, quite possibly, the need for honey bee pollination services. An estimated 15.1 million persons resided in the state of Florida in 1999. Between 1992 and 1997, Florida's population grew by 9 percent, from 13.5 million to 14.7 million individuals. Over this same period, the volume of Florida crops dependent on insect pollination grew by an average of 65 percent per crop. If growing crop volume trends persist, the need for insect pollination services on pollination-dependent crops will grow.”

This conclusion appears fortuitous for the beekeeping industry, given the legislative issues mentioned above. The figures give an up-to-date view of the importance of apiculture in Florida. It is something beekeepers can take to the bank when defending their needs for both research and inspection in the Sunshine State. ■

# International Barriers to Honey Trade

DOUG MCGINNIS of Tropical Blossom Honey Co., Inc.<sup>8</sup> provided information at the recent Florida State Beekeepers Association meeting on what he sees as increasing international trade barriers for honey. He has just returned from the SIAL (Salon International de L'alimentation) outside Paris<sup>9</sup>. At the event, Mr. McGinnis realized that buyers insisting on low levels of hydroxy methyl furfural (HMF) and the enzyme diastase are adversely affecting honey being exported from Florida. This is in spite of evidence that these criteria are subjective at best. Saudi Arabia, he said, is even calling for honey free from genetically modified organisms for which there is no available test for most honeys.

Finally, Mr. McGinnis reported increasing concern with presence of antibiotics, pesticides and glycerin in honey, and new trade specifications for yeast, mold and bacteria (mostly *Bacillus*). Importers are insisting on very low levels of bacteria measured in what are called colony-forming units or CFUs<sup>10</sup>. This concern is also influencing the domestic U.S. honey trade as more of the sweet is being incorporated into products, making the issue of honey house sanitation far more important than in the past<sup>11</sup>. Discussion at the meeting suggested that levels of bacteria can be significantly reduced by simple measures that can be used while harvesting the crop, such as isolating drip boards, using dust covers when supers are in transit and washing hands with disinfectants (i.e., Clorox®).

Far more attention will be given to honey cleanliness in the future, Mr. McGinnis concluded, and will inevitably mean more testing. This will either be required by purchasers or done voluntarily to ensure quality control as exemplified by programs like HAACP<sup>12</sup>, and are the basis for quality assurance programs like the one proposed in the National Honey Board referendum to keep honey special in the hearts and minds of the consumer<sup>13</sup>. Latest news is that the referendum failed and so the quality assurance program now will be voluntary, not mandatory. ■

## Diagnosis of Honey Bee Diseases Updated

AGRICULTURE HANDBOOK NUMBER 690, *Diagnosis of Honey Bee Diseases*, by Dr. H. Shimanuki and D. Knox, has been updated and released this year. The manual is one of the most comprehensive in its field. It not only covers the basics of most bee maladies, but also describes laboratory techniques used for diagnosis at the U.S. Department of Agriculture Bee Research Laboratory. This edition documents some of the changes that have occurred in beekeeping diseases and pests over the last decade, including introduction of the small hive beetle, adoption of a new disease (honey bee parasitic mite syndrome), and renaming the American foulbrood causative organism (from *Bacillus larvae* to *Paenibacillus larvae* sub. *larvae*). The book is available from the Beltsville Bee Research Laboratory, Bldg. 476, BARC-East, Beltsville, MD 20705, Phone: 301-504-8205, Fax: 301-504-8736, E-mail: FeldlauM@ba.ars.usda.gov<sup>14</sup>. ■

## Smokers and Their Fuel

IN THE JULY 2000 issue of *American Bee Journal*, Carl J. Wenning discusses "The 'Neglected' Smoker," (Vol. 140, No. 7, pp. 537–542). As Mr. Wenning says, disregard for studies concerning both smoker and fuel management is reprehensible in light of the technology's importance to beekeeping. Over the years, the smoker changed little with exception of the present use of stainless steel and protective heat guards. Smoker fuels too have not generated much research. Thus, Mr. Wenning mounted a qualitative study of possible fuels (baling twine, bark mulch, burlap, cardboard, cedar chips, cotton rags, cotton, corn cobs, denim, fir needles, pine needles, peanut shells, "punk" wood, sumac seeds and twigs). The clear winners in terms of lightability, smoke density and temperature, ash discharge and longevity were red cedar chips and sumac seed heads, with corn cobs and pine needles not far behind.

Response to the article involved another concern, human health effects related to these fuels (*American Bee Journal*, Vol. 140, No. 10, pp. 803–806). There are over

a hundred kinds of sumac, for example, and some seeds and smoke thereof could be poisonous. However, according to one of Mr. Wenning's correspondents, "I do not know how the [Staghorn] sumac smoke influences the nasal passages or lungs if it is inhaled. I only know that I have been doing it for over 50 years with no noticeable impact." Mr. Wenning could find no evidence that smoke from cedar chips and/or shavings might cause cancer as suggested by some.

Tobacco was also suggested to Mr. Wenning as a good fuel, with the added advantage that it might also knock down Varroa mites. There is little question that inhaling tobacco fumes either purposefully or as an innocent bystander (secondhand smoke) can cause health problems. Thus, Mr. Wenning concludes, the "jury dealing with the health concerns of beekeepers in relation to the use of various smoker fuels will remain out (with, perhaps, the exception of cigarette tobacco) until such time as the appropriate research is conducted — if ever." *Continued next page*

<sup>1</sup> <http://doacs.state.fl.us/~pi/plantinsp/bees.html>

<sup>2</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis96/apmar96.htm#2>

<sup>3</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis90/apaug90.htm#3>

<sup>4</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis94/apjun94.htm#5>

<sup>5</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis92/apjan92.htm#1>

<sup>6</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis91/apaug91.htm#1>

<sup>7</sup> [http://www.ifas.ufl.edu/~mts/apishtm/apis\\_2000/apjan\\_2000.htm#1](http://www.ifas.ufl.edu/~mts/apishtm/apis_2000/apjan_2000.htm#1)

<sup>8</sup> <http://www.tropicalblossom.com/>

<sup>9</sup> <http://www.sial.fr/indexs.htm>

<sup>10</sup> <http://www.bact.wisc.edu/bact102/102cfunf.html>

<sup>11</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis99/apjun99.htm#2>

<sup>12</sup> [http://www.ifas.ufl.edu/~mts/apishtm/apis\\_2000/apapr\\_2000.htm#5](http://www.ifas.ufl.edu/~mts/apishtm/apis_2000/apapr_2000.htm#5)

<sup>13</sup> [http://www.ifas.ufl.edu/~mts/apishtm/apis\\_2000/apaug\\_2000.htm#4](http://www.ifas.ufl.edu/~mts/apishtm/apis_2000/apaug_2000.htm#4)

<sup>14</sup> <http://www.barc.usda.gov/psi/brl/brl-page.html>

Perhaps more significant to beekeepers is the effect of some smoke on the bees themselves. This may be true for that from natural products like cedar chips, tobacco and sumac, but is perhaps more important with reference to treated materials producing toxic fumes in the smoker. Bailing twine, for example, may be treated with fire retardant and rat-chewing preventative (creosote). Cotton products might have high levels of pesticides, dyes or other substances incorporated into them. Cardboard, too, can be infused with a wide variety of chemicals that produce toxic or irritating smoke. The history of cardboard boxes is unknown and can be problematic, according to Dr. Frank Eischen at the Weslaco ARS facility, one of Mr. Wenning's correspondents, who also reported that corn cob smoke killed bees in cage studies, but not immediately, beginning its effects four days after application.

Reduction of possible smoker fuel health problems might include several strategies, according to Mr. Wenning, such as reducing needless inhalation of smoke (holding the breath), using the bellows appropriately (pumping less vigorously) and guiding the smoke to where it's most needed using the hand. In general, a minimum amount of smoke is required to control even the most defensive colonies<sup>15</sup>. For those with great concern, Mr. Wenning concludes, alternatives do exist. These include use of liquid smoke and/or water or sugar water mixed with essential oils (vanilla, peppermint). ■

## Essential Oils: Research Continues, Jury Still Out

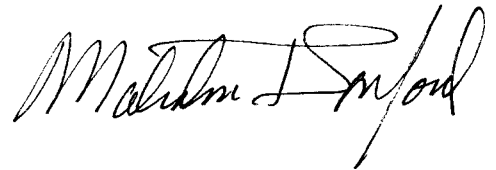
ESSENTIAL OILS (oils of essence) continue to warrant research in mite control. Previous studies have been considered preliminary at best<sup>16</sup>. Dr. Robin Whittington and colleagues at Simon Fraser University in British Columbia have more recently reported on the botanical oils neem, thymol and canola to control both Varroa and tracheal mites (*American Bee Journal*, Vol. 140, No. 7, July, pp. 567-572). A 5 percent neem oil spray killed  $90 \pm 6\%$  of Varroa mites, three times more than died in the control group, whereas thymol and canola oil spray killed  $79 \pm 8\%$  and  $65 \pm 6\%$  respectively. Colonies treated with thymol-oil had a significantly lower tracheal mite level ( $1.3 \pm 7.5\%$ ) than untreated controls ( $23.3 \pm 6\%$ ). None of the other treatments showed a statistically significant lower population. However, both neem and thymol-oil spray were detrimental to colonies exhibiting a 50 percent queen loss. The authors counsel that although effective for Varroa, formulations and application methods for these essential oils must be perfected to maximize control of parasites and minimize bee loss.

At a South Carolina beekeepers meeting, I was given a bottle of D-limonene, which it was suggested might be a good material to control mites. This substance is a readily available and relatively safe essential oil<sup>17</sup>. It, along with three others,

all found in grapefruit (citral, linalool, citronella), were recently evaluated for bee mite control by Dr. Patty Elzen and colleagues at the Weslaco ARS bee research facility (*American Bee Journal*, Vol. 140, No. 8, August, pp. 666-668). This research was carried out in part because smoke from grapefruit leaves has produced some tantalizing results for scientists<sup>18</sup>. Citral was most effective, with a 72.8 percent Varroa knockdown. However, in the field this was less so (7.9 percent knockdown) and not statistically significant from untreated controls. The material was more effective in controlling tracheal mites in the field (66.8 percent). As with neem and thymol, however, results were extremely variable, and thus, the authors conclude: "Given the low efficacy of citral on Varroa in field tests, it would appear that additional factors may be found to act either with citral or in addition to citral explaining the rapid knockdown of mites using grapefruit leaves as a smoker treatment in laboratory tests."

Even if essential oils were extremely effective in controlling mites, they still might not be acceptable. The odor of these natural products is often penetrating and could contaminate honey, making the sweet less desirable to the user<sup>19</sup>. ■

Sincerely,



<sup>15</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis99/apmar99.htm#1>

<sup>16</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis97/apnov97.htm#4>

<sup>17</sup> <http://www.floridachemical.com/whatisd-limonene.htm>

<sup>18</sup> <http://www.ifas.ufl.edu/~mts/apishtm/apis97/apaug97.htm#3>

<sup>19</sup> [http://www.ifas.ufl.edu/~mts/apishtm/apis\\_2000/apjan\\_2000.htm#6](http://www.ifas.ufl.edu/~mts/apishtm/apis_2000/apjan_2000.htm#6)

*APIS*, a monthly newsletter, is celebrating its 18th year of service to beekeepers. For subscription or other information, please write, phone, fax or e-mail.

**Malcolm T. Sanford**  
**P.O. Box 110620, Building 970**  
**University of Florida**  
**Gainesville, FL 32611-0620**

Phone: (352) 392-1801, Ext. 143  
Fax: (352) 392-0190  
Internet: [MTS@GNV.IFAS.UFL.EDU](mailto:MTS@GNV.IFAS.UFL.EDU)

Back issues are available on the World Wide Web:

<http://www.ifas.ufl.edu/~mts/apishtm/apis.htm>.

For an electronic subscription, send a subscribe message to:  
[listserv@lists.ufl.edu](mailto:listserv@lists.ufl.edu).

The Cooperative Extension Service, Institute of Food and Agricultural Sciences, is an Equal Employment Opportunity - Affirmative Action Employer authorized to provide research, educational information and other services only to individuals and institutions that function without regard to race, color, sex, or national origin.