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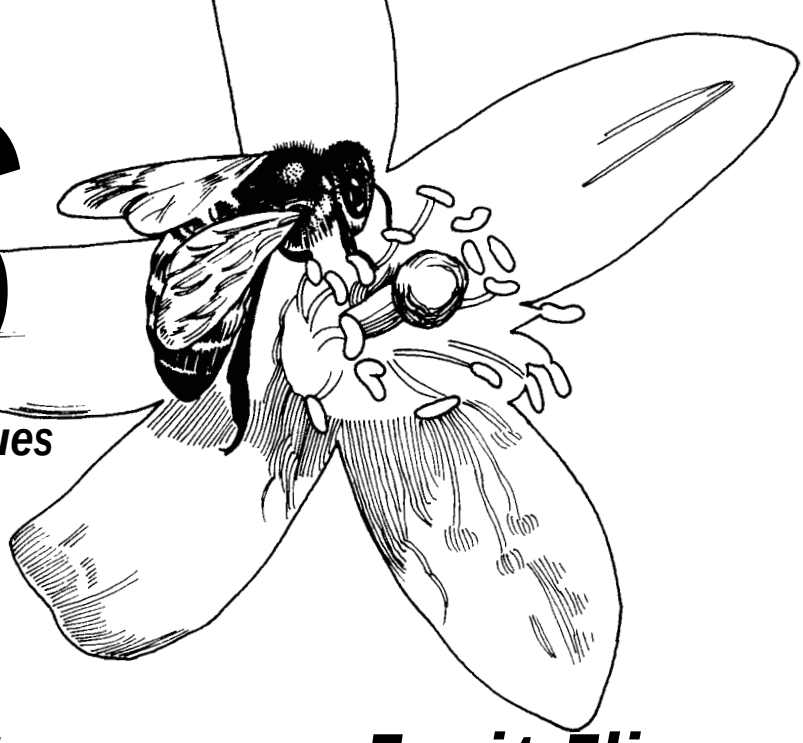

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Mediterranean Fruit Flies in Tampa

ACCORDING TO T.R. FASULO, University of Florida, Department of Entomology Fact Sheet ENY 809, "The Mediterranean fruit fly, *Ceratitis capitata*, often called the 'medfly,' is considered to be the world's most important citrus pest. It has an extensive list of cultivated and wild host plants. However, thin skinned, ripe, succulent fruits are preferred." These include citrus, Surinam cherry, mango and peach. The fly has not been established in Florida, but incipient introductions continue to occur.

Unfortunately, The Office of the Commissioner of the Florida Department of Agriculture and Consumer Services (FDACS) has confirmed another: "As of June 1, 41 Mediterranean fruit flies have been found and confirmed in and around Tampa since the first Medfly was found on Wednesday, May 28." More recently, the number of flies found has been increased to over 70.

This is not good news for fruit growers or beekeepers. For obvious reasons, Florida traditionally has made Herculean efforts to keep this insect at bay when detected. The following are some of the measures to be taken according to FDACS:

SURVEY: Survey personnel have concentrated on placement and monitoring of traps in core areas. More than 1,000 additional traps have been placed in the core areas surrounding the finds.

CONTROL: Although most control personnel have not yet reported to the project, some measures have already been taken. Bait stations — a combination of Malathion, protein bait and water — are being applied to host trees in and around positive finds to trap any newly emerging Medflies. Further information is that aerial application of bait has began using DC3 aircraft.

REGULATORY: All of Hillsborough County except the area south of County Road 672 is under quarantine as of Friday, May 30. Movement of residential host fruits and vegetables in the quarantine area is prohibited. Methods of certifying commercial produce for movement are being developed by project officials. As regulatory staff report to the project this week, they will begin contacting produce vendors, lawn maintenance operators, etc., for the purpose of signing compliance agreements with the project.

How these efforts will affect beekeepers is not fully known. Historically, bee colonies have not been severely affected by protein bait application. After the bait dries, it is not attractive to bees that are vegetarians. However, if the material is applied directly on foraging populations and/or on colonies, there may be losses.

Unfortuntately, preliminary information is that aerial application has already begun during the hours between 6:30 a.m. to 5 p.m., when bees may be actively foraging. As a consequence, beekeepers are urged to keep a close eye on the *Continued next page*

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situation and monitor their colonies on a continuing basis. If hives are in designated spray areas and application is likely, they can be covered with cloth or moved out of the area. Application is best at night, however,even then colonies with exposed clusters bearding on the entrances are at risk. In addition to pesticide application, a quarantine is being imposed which probably will affect bee movement.

Communication and cooperation are the keys to preventing losses of colonies from pesticide application and complying with any quarantine. Beekeepers can best protect themselves by joining together in an effort to promote both of the above goals with authorities involved in controlling the flies. Fortunately, there is a very strong beekeeping association in the area. For information, contact Tampa Bay Beekeepers Association. President Richard Mitchell, ph (813)-689-3323 In addition, beekeepers can consult with the local bee inspector, James Alderman, ph (352)-521-1288 and/or the Chief Apiarist,Laurence Cutts in Gainesville, (352) 372-3505; both are FDACS employees and will be kept informed of activities in the area.

Suzanne Cady, vegetable extension agent, Hillsborough County, ph (813) 744-5519, is also informed on issues surrounding control efforts. She has provided me a list of resources which include: DACS DPI Entomology Circular No. 230 (9/81); UF/IFAS ENT-54 by J. L. Knapp, 1981; USDA APHIS Medfly Cooperative Eradication Program: Final Environmental Impact Statement dated 1993; and USDA APHIS Medfly Cooperative Eradication Program, Hillsborough County, Floirda: Environmental Assessment, June 1997.

The above quoted UF/IFAS fact sheet is available on the FAIRS CD-ROM and on the WWW at http://hammock.ifas.ufl.edu/txt/fairs/ch/19709.html.

The FDACS Division of Plant Industry also has an excellent Entomology Circular in its Triology series on this pest. Contact Mr. Laurence Cutts and ask for Entomology Circular #230 on the Mediterranean fruit fly.

Varroa Tolerance in Honey Bees

MR. RÉMY VANDAME has just published an eloquent thesis of December 18,1996, at the Université Claude Bernard-Lyon 1, Institut d'Analyse des Systémes Biologiques et Socio-économiques, Lyon France. It is titled "The Importance of Hybridization in Host-Parasite Tolerance" (my translation of "Importance de l'hybridation de l'hote dans la tolérance à un parasite"). The work is subtitled "The case of the parasite *Varroa jacobsoni* in European and Africanized bee races in the tropical humid climate of Mexico," (again, my translation).

This thesis is extremely well written and fully referenced. Its conclusions are provocative; they help us focus on some of the conundrums that still exist concerning European and Africanized honey bees in the Americas and their relationships with Varroa mites. I had the pleasure of talking to Mr. Vandame in English, Spanish and French here in Aix-en-Provence. He has now returned to Mexico to continue his studies. There is expected to be a symposium on honey bee tolerance to Varroa at the September Apimondia meeting in Belgium. To see details about this important meeting, see http://ourworld.compuserve.com/homepages/APISERVICES.

Mr. Vandame's full dissertation is 112 pages long in French, but it has both English and Spanish summaries. I do not have room to go into much detail and do not want to compromise the publishability of the work in scientific journals. Thus, I will emphasize the major conclusions and hypotheses only.

ACCORDING TO MR. VANDAME, honey bees may be tolerant to Varroa for several reasons according to the literature. He lists them to show that tolerance may be conferred by one or all, and discusses the controversy that exists about their relative importance:

1. Attractiveness of brood. Only drone brood is parasitized in the original host, *Apis cerana,* but in *Apis mellifera* both drone and worker brood are susceptible. The relative attractivity of the brood, therefore, may determine the level of parasitization.

2. Brood postcapping time. The longer the brood is capped, the more mites produced. *Apis cerana* has a shorter postcapping time than does *Apis mellifera,* conferring tolerance. However, Mr. Vandame says that at least two studies provide evidence that breeding bees for a short postcapping period is not a useful strategy.

3. Brood temperature. Though not proven to everyone's satisfaction, lower brood temperatures, Mr. Vandame says, might reduce Varroa reproduction in tolerant bees. However, this low temperature also increases bee development time, and so the results may be offsetting.

4. Varroa female infertility. Lower mite female fertility has been found in Brazil, New Guinea, Japan and Vietnam; this is probably the best known and most recognized factor in all cases of tolerance found to date. This could mean different Varroa subspecies might exist, some more adapted to reproducing on *Apis mellifera* than others.

5. Grooming behavior. It is known that *Apis cerana* has both a strong self and social grooming behavior which reduces the mite load. *Apis mellifera* from various areas (Brazil, Slovenia) also has demonstrated variability in this character. Unfortunately, groomed mites don't necessarily die and may get right back on another bee, reducing the effectiveness of this factor.

6. Removing parasitized brood. This hygienic behavior is presumably responsible for resistance to other diseases (American foulbrood and chalkbrood). Results from Brazil and other areas show variability in this trait. [Editor's note: I discussed with Mr. Vandame another possible reason that tolerance is observed; the capacity of AHB to abscond as a migratory swarm, a kind of self-nest-cleansing behavior.]

Mr. Vandame asks two questions in his thesis: (1) Are Africanized honey bees

in Mexico tolerant to Varroa?; and (2) if so, are some of the same mechanisms seen in Brazil and elsewhere responsible? It is important to recognize the difference between "resistant" and "tolerant," according to Mr. Vandame. The original host for Varroa, *Apis cerana*, tolerates a modest population of mites and, therefore, this is the preferred term. [Editor's note: This appears to be an academic and semantic issue. Increasingly, however, the term "tolerant" is used over "resistant" in agreement with the current trend in parasitology literature and vocabulary.]

MR. VANDAME carried out his experiments in 1995 at the Colegio de Postgraduados, Córdoba, Veracruz, Mexico. He chose a total of twenty colonies, 10 Africanized (AHB) and 10 European (EHB), selected using morphometrics from some 40 on the campus that had not been treated for Varroa for one year. In the course of the study, three of the AHB colonies absconded in August during the rainy season and were replaced by colonies with the same degree of Africanization and Varroa infestation. Several EHB colonies, instead of becoming simply weaker during the slowest period of the year in January, actually were in danger of collapsing due to Varroa infestation, and had to be reinforced with brood from other colonies.

Mr. Vandame found that AHB occupied an average of 23,686 brood cells throughout the year (plus or minus 6,342) with about 28,423 bees/colony, whereas EHB occupied 16,575 cells (plus or minus 7319) with 19,891 bees/colony. Besides superiority in numbers, AHB colonies also stored almost twice as much pollen and honey. The Varroa brood infestation rate for EHB was almost twice that of AHB. Mr. Vandame also measured the number of adult Varroa (phoretics). EHB averaged 2,835 mites/19,891 bees (14.2 percent) while on AHB there was an average of 1,513 mites/28,423 bees (5.3 percent). The difference between the two populations' development, according to Mr. Vandame, is most probably related to their responses to Varroa infestation. The data reveal a greater tolerance in the AHB population than the EHB one in Mexico. He cautions that to show differences in other factors (population buildup, honey production), experiments must be carried out on both populations, after being treated for Varroa.

Other results found by Mr. Vandame include a higher natural mite mortality in AHB brood and that female mites find EHB brood twice as attractive as that of AHB. Possible reasons for the tolerance found, with reference to those listed above, he summarizes as follows: fertility: no; postcapping duration: no; brood attractivity: maybe; grooming behavior: no; removal behavior: perhaps. He says it is remarkable that both AHB in Brazil and *Apis cerana* have the same Varroa tolerance level of two mites/100 bees (2 percent) and suggests that the Mexican AHB may also finally reach this equilibrium point in the future. He concludes this could happen as it did in South America through the hybridization process and awaits the outcome with anticipation.

[Editor's note: The amount of hybridization that actually takes place has always been clouded by the controversial issue of how bees are identified. Dr. Glenn Hall's DNA work at the University of Florida (February 1990 *APIS*) has suggested that hybridization does not occur as readily as might be supposed from other identification techniques.

One piece of evidence to support this is that Brazilian mitochondrial DNA has been found in many Central American and Mexican mother lines (July 1994 *APIS*). Another is that metabolic measurements have indicated a possible incompatibility in the hybridization process (June 1993 *APIS*). Identification using only morphometrics, the official and most used method, cannot recognize as components of the process either metabolic rate or DNA makeup.

Finally, the amount of natural hybridization attained will be very much be influenced by the active beekeeping population. The Mexican government and private queen producers are helping beekeepers to requeen regularly, keeping much of their stock European.] ■

Miel Biologique: Organic Honey In Europe

THE UNION NATIONALE de l'Apiculture Française (UNAF) is concerned about the European Union's efforts to develop a designation of organic honey (miel biologique). In an editorial in the April 1997 edition of the *Revue Française d' Apiculture* (No. 57, pp. 149, 158–9), the president, Henri Clément, said that UNAF's administrative council unanimously concludes that such a designation constitutes not only intellectual heresy, but also an unprecedented attempt to trick the consuming public.

> "All honey ... is by definition biologique."
>
> - Henri Clement

Mr. Clément further asks if the designation of organic (biologique) apiculture is really a conceivable objective? He responds in the negative, and in the strongest language, says it sends a wrong and deceitful message.

All honey, he says, unless damaged because of incorrect handling during harvest, is by definition biologique. He concludes that all French beekeepers must demand that this effort by the European Union should be abandoned.

Mr. Clément has some powerful allies. In the same issue of the magazine Dr. Rémy Chauvin, honorary professor at the Sorbonne and past director of bee research in the Ministry of Agriculture (INRA), concurs, as does J.P. Faucon, head of the bee unit at Sofia-Antipolis and Raymond Borneck, president of Apimondia (see letter of February 28, 1997). Other allies include professors Dr. E. Bengsch, Medical Research Center, Munich; R. Huber, director of biochem-

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Pollen's Value In Human Consumption

THERE'S A LOT OF POLLEN consumption going on in Europe these days. One just has to look at the health food stores and pharmacies along one of France's most vibrant streets, the Cours Mirabeau in Aix-en-Provence. The April edition of the *Revue Française d'Apiculture* (No. 572, pp. 161–3) reports on research done by Patrice Percie-du-Sert on pollen in an attempt to determine its effects on human nutrition.

One finding that surprises few is that although dried and fresh pollen have more or less the same constituents, the biological effects are far more potent for the fresh. As a consequence, Mr. Percie-du-Sert collects his pollen in twenty-spoonful amounts in plastic sacks, fumigates it with nitrogen gas and immediately puts it in the freezer. He can subsequently provide pollen to the consumer wrapped only in paper which will be viable in a refrigerator for some six weeks.

Mr. Percie-du-Sert has developed a test to determine pollen's antibiological activity. He uses a culture of *Proteus vulgaris* as the test organism in his bioassay. The differences between dried pollen and fresh noted above were confirmed using chestnut and other pollens, notably willow. The origin of the activity, Mr. Percie-du-Sert concludes, is in lactic fermentation. Like in the first part of the human digestive tract, lactic intestinal flora in the bee are responsible for creating an environment that digests long-chain sugars and cellulose, producing in the process vitamins K and B. This activity helps to ameliorate a major problem in human nutrition, Mr. Percie-du-Sert says, over consumption of the refined complex sugar, sucrose.

In conclusion, Mr. Percie-du-Sert says, two fundamental facts are involved in the human immuno-defensive mechanism with reference to pollen:

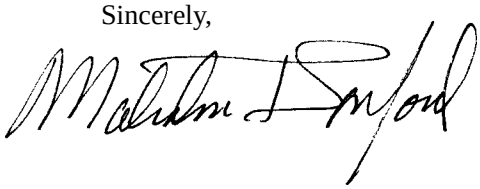
1. Lactic bacteria are an important barrier to external pathogenic bacteria like salmonella, proteus and yeasts (*Candida albicans*).

2. Fresh pollen favors growth of lactic bacteria, especially in conjunction with consumption of honey and other fruits.

> "How does one know which pollen to consume for maximum antibiotic activity and how much?"

Several questions come to mind with reference to this line of research. How does one know which pollen to consume for maximum antibiotic activity and how much? Where does this information leave the consumption of air-dried pollen, the product most often sold to consumers? And although biological activity is important, little mention is made by Mr. Percie-du-Sert of two possibly more important issues in pollen collection; the cleanliness and standardization of the end product (see August 1984 *APIS*). ■

Sincerely,



Biologique continued

istry, Max-Planck Institute; and A. Kettrup, director of medical research in Toxicology and the Environment (GSF, Munich). In a unified statement, they all call the designation absurd.

Discussions about the "organic" designation are also currently going on in U.S. bureaucracies and around the world (see October 1991 and January 1996 *APIS*). Let's hope those involved take a close look at the deliberations in one of the largest honey-consuming regions of the world before making any final decisions the honey-producing industry will have to live with, perhaps for a very long time. ■

APIS, a monthly newsletter, is celebrating its 15th year of service to beekeepers. For subscription or other information, please write, phone, fax or e-mail.

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