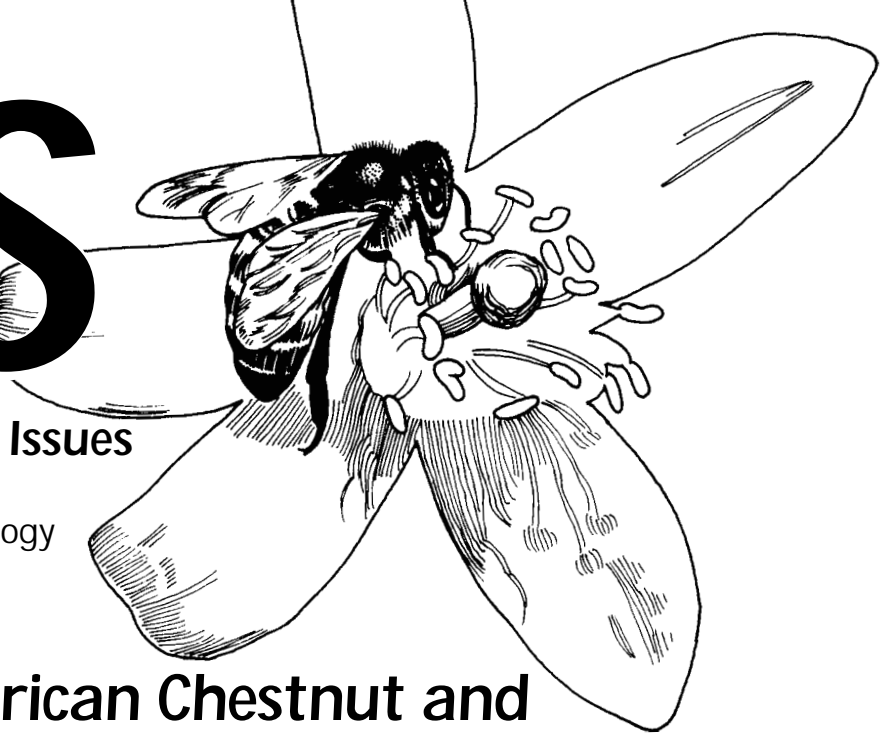


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American Chestnut and The American Honey Bee: Parallels in Pest Management

THE HISTORY of pest management is longer than many think. An outline is provided in the November 1997 issue of *Chemically Speaking*, newsletter of the Pesticide Information Office, Institute of Food and Agricultural Sciences, University of Florida¹. According to the article, the beginnings can be traced back to 8000 BC. As early as 200 BC, the Roman Cato the Censor advocated oil sprays for pest control and the first rat-proof grainary was built in 13 BC. From 1000 to 1300 AD, Arabians transported cultures of predatory ants to control foliage-eating ants on date palms. Many ideas were developed during Medieval times. In Berne, Switzerland, in 1476 cutworms were taken to court, pronounced guilty, excommunicated by the Archbishop, and then banished. And in 1485, The high vicar of Valence commanded caterpillars to appear before him. He gave them a defense council and finally condemned them to leave the area.

It was not until 1900 that pesticides arrived on the scene. By 1939, the insecticidal properties of DDT were recognized. Shortly thereafter, in 1946 insect resistance to this chemical was first reported. By 1993, the article concludes, more than 504 insect species were known to be resistant to at least one formulation of pesticide and at least 17 species of insects developed resistance to major classes of insecticides. There are also many examples of fungicides, herbicides and rodenticides that no longer work. It comes as no surprise that *Varroa* also appears to be developing resistance to the one formulation that is legal to use for its control².

Advances in pest management often come from studying one organism and using that information to address the problems of another. Take the American chestnut, for example. This quintessential New World tree was many things to many people around the turn of the century, according to Judy Treadwell writing for *NCNatural Digest Current Features*³:

"The reddish-brown wood was lightweight, soft, easy to split, very resistant to decay; and it did not warp or shrink. Because of its resistance to decay, industries sprang up throughout the region to use wood from the American chestnut for posts, poles, piling, railroad ties, and split-rail fences. Its straight-grained wood was ideal for building log cabins, furniture, and caskets. Split-rail fences made from the American chestnut can still be found along country roads throughout the northeast United States and the southern Appalachians. The fruit that fell to the ground was an important cash crop. Families raked up chestnuts by the bushels and took wagon loads of them to sell in nearby towns.

¹ <http://fshn.ifas.ufl.edu/11cmsp97.htm#a>

² <http://www.ifas.ufl.edu/~mts/apishtm/apis98/apapr98.htm#1>

³ <http://ncnatural.com/NCNatural/trees/chestnut.html>

The people even cooked the chestnuts for their own use. The bark and wood were rich in tannic acid, which provided tannins for use in the tanning of leather. More than half of the vegetable tannin used by the American leather industry at the turn of the century came from the American chestnut. So important was the American chestnut in the southern Appalachians that some of the major timber operations became subsidiaries of leather companies which were organized to harvest other species for lumber on land bought to insure supplies of chestnut tannin extract. In addition, the American chestnut was a graceful shade tree found in city squares and on the rural homestead.”

However, according to Ms. Treadwell, in about 1904 a blight was introduced into the United States from Asia. Commonly known as the chestnut blight, *Endothia parasitica* was first found in the chestnut trees on the grounds of the New York Zoological Garden. It is believed that the fun-

gus was unintentionally introduced into America from Asian chestnut trees that were imported as nursery stock. In spite of quarantines and other programs, within 40 years most of the American chestnut trees in the eastern United States were dead. American chestnut trees killed by the blight comprised 50 percent of the overall value of the eastern hardwood timber stands at that time.

IN AN ATTEMPT to restore the American chestnut, two strategies have been pursued. The first is breeding. This has been a long-term effort, and the American Chestnut Foundation has been established to carry on and help fund this work⁴. As part of this, Chinese chestnut trees have been enlisted in the fight. Their genetic material is being incorporated into American stock, and some successes in this arena have been seen.

Another strategy is associated with a recent discovery of a nonvirulent strain of

the chestnut blight in Asia that causes disease remission when inoculated into affected trees. This strain of the blight is essentially a “blight of the blight” that spreads through trees in the wild. It weakens the original blight, thus allowing the tree to survive. This has been called a “hypovirus,” according to Dr. W.L. MacDonald and S.C. Haynes in “The American Chestnut’s Struggle to Survive a Biological Invader,” *Land and Water*, September and October 1997. Many strains have been found associated with *E. parasitica*, some reducing the ability of the fungus to cause disease.

The honey bee, in contrast to the American chestnut, is an organism introduced into this continent. However, recent history of this valuable insect shows some surprising similarities to the situation seen in what was once called the queen of American trees. Arrival of the Varroa mite has been responsible for the deaths of not only many managed, but most of the wild or feral colonies of honey bees⁵. Like the chestnut blight, the Varroa mite arrived from Asia and infested American honey bees, which had no internal defense mechanism. Like the blight, quarantines were not effective and the mites rapidly spread across the continent. Unlike the American chestnut, however, honey bees did have the defense of modern pesticides and a committed cadre of beekeepers to ensure application. How long these chemicals will work or be available, however, is not known, and already resistance appears to be developing⁶.

For honey bees, like chestnuts, the long-term solution to an introduced, exotic organism like Varroa appears to be breeding. Thus, as in the chestnut story, Asian honey bee strains are being screened for resistance or tolerance to the mite. This research is being conducted at the Baton Rouge Bee Laboratory, where about 100 queens from eastern Russia soon will be studied extensively. Some American bees in Mexico, however, appear to be tolerant already⁷. The Africanized honey bee in Brazil has also been shown to be resistant to the full effects of Varroa. One of the reasons for these differences may be different mite reproductive levels, as seen in various parts of the world⁸. What the apicultural world needs now is the equivalent of the American chestnut hypovirus, which, in conjunction with breeding efforts, will help beekeepers gracefully step off the pesticide treadmill. ■

First International Geospatial Conference

THE FIRST INTERNATIONAL CONFERENCE on Geospatial Information in Agriculture and Forestry will be held at Disney’s Coronado Resort in Lake Buena Vista, Fla. It will focus on trends in the development and use of geospatial information technology by the agricultural and forestry communities. Special emphasis will be given to applying advanced geospatial data and information techniques in order to improve today’s decision making while defining future research requirements and implementation strategies. This technology will probably be used by beekeepers of the future in several ways. See the March 1998 *APIS*⁹.

The three-day technical program (June 1–3, 1998) will offer over 300 presentations in general and poster sessions, with extensive interactive workshops, demonstrations, and exhibits of products and services. Registration is available online¹⁰ and is \$425 for the whole conference or \$245 daily.

The conference is organized in partnership with the U.S. Department of Agriculture, U.S. Department of Energy’s Idaho National Engineering and Environmental Laboratory (INEEL), Lockheed Martin Idaho Technologies Company, Disney’s EPCOT Strategic Partnerships, *Modern Agriculture* magazine, NASA Commercial Remote Sensing Program, and other leaders in the agriculture, forestry, and geospatial technology communities. ■

⁴ <http://chestnut.acf.org/>

⁵ <http://www.ifas.ufl.edu/~mts/apishtm/threads/varroa.htm>

⁶ <http://www.ifas.ufl.edu/~mts/apishtm/apis98/apapr98.htm#1>

⁷ <http://www.ifas.ufl.edu/~mts/apishtm/apis97/apmay97.htm#2>

⁸ <http://www.ifas.ufl.edu/~mts/apishtm/apis95/apaug95.htm#T2>

⁹ <http://www.ifas.ufl.edu/~mts/apishtm/apis98/apmar98.htm#4>

¹⁰ <http://www.erin-int.com/CONF/ICGIAF/Aghome.html>

¹¹ <http://WWW.IFAS.UFL.EDU/www/agator/hm/GCREC.htm>

¹² <http://www.ifas.ufl.edu/~mts/apishtm/apis90/apnov90.htm#3>

¹³ <http://www.watermelon.org/mrepor16.html>

¹⁴ <http://agnews.tamu.edu/stories/HORT/melon.htm>

¹⁵ <http://www.ifas.ufl.edu/~mts/apishtm/apis95/apdec95.htm#T4>

¹⁶ <http://www.ifas.ufl.edu/~mts/apishtm/apis87/apdec87.htm#1>

¹⁷ <http://www.ifas.ufl.edu/~mts/apishtm/apis94/apdec94.htm#3>

Seedless Watermelons on the Rise: The Pollination Connection

PRODUCTION of seedless watermelons in Florida may be on the rise, according to Dr. Don Maynard at the Gulf Coast Research and Education Center (REC), Bradenton, Fla.¹¹ However, he concludes, only time will tell whether this actually happens. In the March 1988 *Citrus and Vegetable Magazine*, Dr. Maynard says that California, Georgia, Texas and Florida made impressive yield increases in watermelons between 1985 and 1995, as the industry shifted from open-pollinated to hybrid varieties. At the same time there were some advances in producing seedless varieties, and in 1995 a shift occurred. California's production, although lower by almost 20 percent than Florida's, was higher in value for the first time. And there was a significant difference, with California registering a total value of \$91 million to Florida's \$63 million. On closer examination it is difficult to determine the exact cause of this, according to Dr. Maynard, but there seems to be a consensus that a major reason was California's switching to seedless varieties.

Seedless watermelons, once a novelty and more recently a specialty crop out of Mexico, have now become dominant, according to Dr. Maynard. Shippers are sending a proportion of 75 percent seedless to 25 percent seeded to market, exactly the reverse of five years ago. In addition, Dr. Maynard says, since 1990 there has been a steady increase in watermelon consumption from 13.3 pounds to 17 pounds per person. Thus, Dr. Maynard concludes that increasing the proportion of seedless watermelons in the production mix in Florida may result in higher prices per unit and increased consumption because of enhanced quality of seedless watermelons.

ALL THIS adds impetus to a discussion of growing seedless watermelons in the November 1990 *APIS*¹². In that article I urged beekeepers to be proactive in supplying watermelon growers with information on the advantages of growing these varieties. This was in conjunction with a possible new role of the beekeeper as a pollination consultant. As it turns out, honey bees are needed in more numbers for seedless varieties than for watermelons that have seeds! This require-

ment translates into one to five colonies per acre, the goal being an average one bee per hundred flowers.

In an interview reported on the World Wide Web, William Watson, executive director of the National Watermelon Promotion Board (NWPB), was asked:

"What percentage of seeded versus seedless watermelons do you plan to promote this year?"

His answer: "We've found this response changes dramatically from region to region. Many Northeast retailers responded that the percentage of seeded/seedless is 60/40. Several retailers commented that 'seedless has become a big item in select (mostly upscale) areas and outsells seeded.' In the Southeast, the split is much greater at 80/20 with seeded being much more dominant. On the West Coast, the averages are closer to 50/50. Some retailers view seedless as more dominant and believe the percentage of seeded seedless is even as high as 30/70. Nearly all retailers agree that the popularity of seedless watermelon is continuing to grow."¹³

The 'Sticky Board': A New Apicultural Tool

MOST TECHNOLOGICAL ADVANCES in beekeeping occurred before the 20th century. One, instrumental insemination, is a child of the early 1900s and took many years to perfect. Another was a change from feeding sugar to high fructose corn syrup as that material became more available. Introduction of parasitic mites in the 1980s signaled several more paradigm shifts in beekeeping technology. Discovery that vegetable oil appeared to interfere with transfer of tracheal mites among bees led to greater use of extender patties¹⁵. Introduction of *Varroa* caused beekeepers to move toward pesticide applications inside a living beehive¹⁶. Both mites appear to have spawned a brand new disease, honey bee parasitic mite syndrome (BPMS)¹⁷.

Varroa mite detection resulted in a new technology called the "ether roll," used extensively in Florida by the bee inspection service. This one-step, read-immediately test is relatively inexpensive. A video describing it is published by this office. VT 249 *Varroa Mite Detection* is available by sending a blank VHS tape to this

According to Kathleen Davis at Texas A & M, "Watermelon growers are within spittin' distance of switching to a seedless version that's sure to boost U.S. consumption, even through the fall and winter months."¹⁴ The popularity of seedless watermelons stems from the fact that they are smaller and better fit today's consumers, according to researchers and others interviewed by Ms. Davis. Watermelons are now being used as liquid replenishers at sporting events and in other non traditional venues, like nursing homes, for their food value and ease of consumption. Other advantages include the fact that consumers are willing to pay more for smaller melons that fit in the modern refrigerator. Another reason larger melons are being replaced is that the size of families has decreased. The bottom line is that growers can earn twice as much per hundred weight growing seedless melons as they can varieties with seeds. One of Ms. Davis's interviewees suggests that within a decade, only seedless watermelons will be grown. This appears to be an excellent opportunity for the beekeeper/pollination consultant to make growers aware of this paradigm shift in watermelon production and marketing. ■

newsletter's address asking for a copy to be mailed back.

Another tool in *Varroa* detection is the "sticky board." This is placed on the bottom board of colonies during chemical experiments to determine the number of *Varroa* that fall off bees. Usually a bottomboard insert is used, sprayed with some kind of oily material like PAM®. For further information on making this board see <http://pw2.netcom.com/~griffes/HIP1.html>. The insert is then covered with a screen, which allows the mites to fall through, but keeps the bees from getting into the mess. Many circumstances besides chemical treatment can lead to *Varroa* falling off bees and brood it seems, including routine manipulations, grooming and smoking. However, without a sticky board, the mites are free to get back on the bees. Therefore, it makes good sense that the sticky board become a permanent fixture in the beehive as a help in reducing the free movement the external mite, *Varroa jacobsoni*. ■

Mosquito Control Conference: Urban Growth And the Future of Mosquito Control

OVER THE PAST TWO years, the Florida mosquito control and environmental communities have developed a white paper on mosquito control in Florida. The intent of the document is to provide a "snapshot" of this activity in 1997. Now the goal is to develop recommendations on how mosquito control chemical use and risk can be reduced in the future. The forum to accomplish this is a conference titled "Urban

Growth and its Impact on Future Mosquito Control Problems and Opportunities." This event will take place May 18-21 at the International Drive Holiday Inn in Orlando.

The issues addressed at this meeting appear to coincide with mosquito control issues discussed at the latest Honey Bee Technical Council meeting as reported in the March 1998 *APIS*¹⁸. This event, according to publicity for the conference, in-

cludes invited speakers, panels of experts, and opportunities for all participants to express their opinions about the future of mosquito control in the state. There is probably no better forum for beekeepers to bring up their concerns. Early registration for this conference is only \$15, if received by April 18, 1998. After that, the fee is doubled to \$30. Send a check, payable to Florida Mosquito Control Association, to FMCA, P.O. Box 60005, Fort Myers, FL 33906. A substantially reduced room rate has also been arranged at \$89/night double or single. Contact the hotel directly for reservations at (407) 351-3500. ■

Queen Rearing Classes at Ohio State University

TWO QUEEN REARING classes will be held at the Ohio State University's Rothenbuhler Honey Bee Lab. The first will be on the fine art of queen rearing on May 21 and 22, 1998. This intensive course, one of the best of its kind, is shepherded by renowned apiculturist Susan Cobey. Ms. Cobey has taught this subject all over the world and is constantly in demand for her expertise on the subject. The cost is \$100 and the registration cutoff date is May 1, 1998.

A second course in queen breeding and instrumental insemination will be taught June 17-19. Again, there is no better place to learn this than at the facility named after the renowned bee geneticist Dr. Walter Rothenbuhler. The cost is \$300 and registration cutoff is May 15. Registration fees do not include lodging in the Columbus area. For further information, contact Susan W. Cobey, 1735 Neil Ave., Columbus, OH 43210, (614) 292-7928, fax (614)292-5237, e-mail: Cobey.1@OSU.EDU. The courses for both syllabi and other details are available at <http://IRIS.biosci.ohio-state.edu:80/honeybee/breeding/class.html>. ■

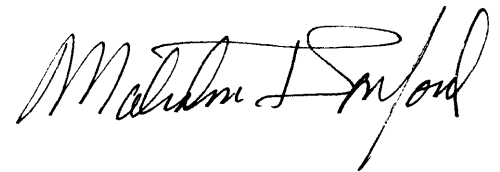
¹⁸ <http://www.ifas.ufl.edu/~mts/apishtm/apis98/apmar98.htm#3>

¹⁹ <http://www.ifas.ufl.edu/www/county/Hills.htm?>

May Seminar Reminder

A REMINDER that 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 33584¹⁹. 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. ■

Sincerely,



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