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June Cover Picture

Honey bee collecting nectar from a black locust flower (*Robinia pseudoacacia*). Black locust can provide a nice honey crop if spring weather conditions cooperate. Photo by Tibor I. Szabo, RR 1, Puslinch, Ontario, Canada N0B 2J0.

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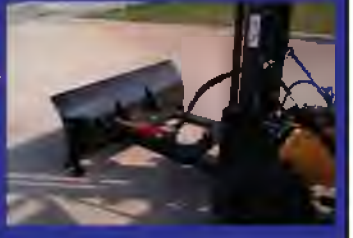

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Due to size and content, we may be unable to publish all information received. Thank You!

NEW YORK BOY SCOUT TROOP HIGHLIGHTS FORMER BEEKEEPING MERIT BADGE

Got Milk?

That's what Boy Scout Troop 16 of Stone Ridge, NY asked when they decided to educate their community about Honey Bees and Beekeeping. The boys needed to come up with an idea to celebrate the Boy Scouts of America's 100th anniversary at the annual Boy Scout show at their local mall where other troops would also be displaying Scout memorabilia, Scouting traditions and games. Troop 16 chose to display the old Beekeeping Merit Badge that was earned by Boy Scouts from 1911 up until 1995.

First, the boys learned about honey bees and beekeeper's equipment from local beekeepers Jim Ayers, John Petit and Teresa Eggers. Then, the boys decided to create a display that would help teach others what they had learned. They made some posters and planned to set up an empty hive for people to examine. They also had jars of honey for people to see and some beekeeping literature.

But it needed to be fun for younger children. That's where the milk came into play. The boys collected 80 half gallon milk and juice cartons, cut away the folded lid area and reshaped them into a six-sided box. Then, by crushing the 4 bottom corners in slightly, they were able to staple them together to created a giant honey comb. This was suspended above a table. Placed throughout the mall were cardboard flowers with "pollen and nectar" balls inside. Children and adults collected the pollen and nectar and brought it to the giant honey comb. Once they came to Troop 16's display with their forage, they were given more information about the role of the honey bee in our food production, pesticides and other threats to the honey bee, and the life cycle of the bees. The children then had the pleasure and challenge of throwing their pollen balls into the giant honey comb. Their reward was a sample of honey in the form of a "honey stix" donated to the troop by Nature's Kick Corporation.

The Scout Show was a great success for Troop 16 with many interested Scouts and non-Scouts passing by and asking multiple questions about the honey bees and beekeeping. Currently, the Beekeeping Merit badge is not offered by the Boy Scouts of America. Perhaps with more interest by other young Scouts, it will be reinstated.

Teresa Eggers
New York

BOY SCOUT CHRISTOPHER STOWELL CAMPAIGNS FOR RE-INSTATEMENT OF BEEKEEPING BADGE

My name is Christopher Stowell. I am 13 years old. I am a Boy Scout in Troop 250. I am also a Beekeeper in Skiatook, OK. I am a member of both the North East Oklahoma Beekeepers Association (NEOBA) located in Tulsa, OK, and The Oklahoma State Beekeepers Association.

I have recently learned that the Boy Scouts of America discontinued the Beekeeping merit badge in 1995. I have contacted the National Council and asked why they discontinued the merit badge. They explained that there were not enough beekeepers in America who were able to teach scouts beekeeping. They also informed me that the reinstatement of the merit badge had been brought up several times since to no avail.

It seems to me that it would only make sense to encourage beekeeping if there are not enough beekeepers in our country. I believe that now more than ever before the survival of the honey bee is important to all. If other boys are not encouraged to learn how to become beekeepers, then there will be even fewer beekeepers in the future. The reinstatement of the merit badge will lend validity to the art of beekeeping.

I have started a campaign to persuade the Boy Scouts of America to reinstate the Beekeeping Merit Badge. I have a goal set to send in my proposal to the Council by July 15, 2010. At that time, I would like your endorsement of my proposal, as well as your help in getting as many beekeepers and people who believe in the importance of youth learning how to keep bees as possible involved in this effort.

This is what I need from you:

1. Please go to the Haagen Dazs web site and sign the petition and write a few words to the Boy Scout Council telling them why YOU believe that teaching the youth about honey bees is important. Click on THE BUZZ and you will find a picture of me there. Haagen Daz has offered to help by making an online petition so everyone can help. Here are the site links for the Haagen Daz Petition:

http://www.helpthehoneybees.com/#buzzlove

Some of the Scouts who helped with the Boy Scout Troop 16 Stone Ridge, NY Mall beekeeping display.

http://www.experienceproject.com/beepetition

2. If you are a beekeeper, please go to **www.beesource.com** and look under the "Resources." There will be a link to resources for the Beekeeping Merit Badge Project. One of the documents listed there is a form resolution that your local beekeeping club or association could pass in support of this effort. Also, there are form letters and sample petitions that you could sign or take to your friends who keep bees. If you have a beekeeping club, you could pass out copies of those documents to the members. Boy Scouts of America is concerned that there are not enough beekeepers to support the merit badge. We need to prove that there are plenty of beekeepers who would help.

3. Please tell all the other beekeepers or other persons you know about this project and my requests for help. For example, you could copy this letter and send it to your friends and to other beekeepers, gardeners, or business members in your community. If you have friends who you send emails to, please send all of your friends an email asking them to go to the Haagen Daz website and sign my Petition. Also, please tell them that this is not a Boy Scout project. I am doing this on my own. All expenses are paid for by my parents. So, please help get the word out.

If you have any other ideas on how you could help, please feel free to contact me. I would appreciate anything you can do to help. I look forward to hearing from you. There is also a forum devoted to this project on Beesource.com, which you can look at by going to Beesource.com forums

Christopher Stowell
BSA Troop 250, Skiatook, OK
e-mail ***kstowell6@aol.com***

PAPA'S LITTLE BEE GIRL

Four-year-old Gabi Driggers loves helping her papa work the bees.

Billy Driggers
Tifton, GA

Gabi Driggers, "Papa's Little Bee Girl"

STATIONARY APIARY MONITORING PROJECT QUESTIONED

The interesting and expensive CAP project reported by Marla Spivak in the March, 2010 issue of the *American Bee Journal* leaves unanswered key information.

The article states there are seven apiary study sites "situated in a variety of urban, suburban and rural landscapes including areas surrounded by agricultural fields, organic farms, wooded areas and nature reserves." Since there are seven study sites, does this mean each apiary has a forage area of only one environment condition?

If foraging area for an individual apiary encompasses more than one environmental condition, this research will be compromised. How can a researcher make valid comparisons of some data if the bees from one apiary are permitted to forage on both an organic environment and an agricultural area that uses pesticides, insecticides, and/or herbicides? What does an analysis of pollen samples from such a condition really prove?

This article also states the research will start again in 2011 with a new set of 210 colonies. Does starting over mean 100 percent replacement of everything. Old comb will have pesticide residue!

I believe we could have been told what the environmental conditions were for the colonies that had high rates of supersedure and also for Texas and Pennsylvania where 14 and 18 of the 30 colonies were lost.

I fully realize that this is a preliminary report, but the information desired is available.

Lawrence DuBose PhD
Retired Civil Engineer
with almost 40 years beekeeping experience
Carol Stream, IL

NEW YORK REPEALS BEEKEEPING PROHIBITION

Perhaps it's been noted, but I'm making sure you know about the good *USA Today* article on March 17: "Health board votes to open New York to honeybees". I thought

His American Bee Journals are "beat up" by the U.S. Post Office. *(Photo courtesy of Eugene Lehrke)*

it may be useful for others who are struggling with their city's ordinances.

Also, I'm disappointed with the delivery of my *Bee Journal* since you discontinued plastic envelopes. Most every month they are coming all beat up as per the photo of the last one.

Eugene Lehrke
Minnesota

USE OF ACRONYMS

I am a new subscriber to *American Bee Journal* (ABJ) and am absolutely thrilled about becoming a beekeeper. I began reading "The Classroom 2010" and began to run across acronyms that had no meaning to me. Please pardon my ignorance, but would it be possible to request that acronyms are defined? Just off the top of my head, "CCD" and "HFCS or sucrose" were the first two that hit me. I have no clue what they mean, but would really like to. Please don't get me wrong, I'm not trying to be a critic - but do struggle with acronyms.

Richard Mechler
Seguin, TX

CLINCH VALLEY BEEKEEPERS PUBLISH HONEY COOKBOOK

Our first printing was 300 cookbooks and they sold out in 6 weeks. Our club started three years ago with five men and one woman. Our present membership is over 130 members with almost equal amounts of men and women. Seventy-five percent of our members are new beekeepers. We are very heavy in education. We have started a youth program this year that our club will fund. We sponsored a two-day seminar, April 23 & 24, 2010 with Dr. Richard Fell from Virginia Tech.

We sell our book for $10.00 + shipping of $4.00.

Jim Rice, President
Clinch Valley Beekeepers
P.O. Box 706
Sneedville, TN 37869
www.clinchvalleybeekeepers.org

The Clinch Valley Beekeepers Association Cookbook, *Recipes From the Hive*, sells for $10.00 plus shipping. It is spiral bound and is 223 pages in length. In addition to the recipe section, it also has a Health and Beauty section.

"BOTTOM BOARDS DO NOT MAKE HONEY"

It was in the late 1930's and up until the declaration of war that a young fellow by the name of Gladstone H. (Bud) Cale, Jr. from Illinois enrolled as a student at Iowa State College. He majored in entomology, which included the study of Honey Bee Genetics. He earned his degree under the supervision of Dr. O. Wallace Park, who for many years directed the investigations of Honey Bee research at Iowa State College. He also enrolled in classes on beekeeping taught by Prof. Floyd B. Paddock, who was Iowa's State Apiarist from 1919 until his retirement in 1960.

I had the good fortune and the great privilege of getting to know Bud Cale while he was at Iowa State. Occasionally, we would get together for short visits. Then, came the declaration of WWII and we both entered the military service.

It was always a pleasure to get information about bees and beekeeping from Dr. Cale and he was always straight forward and willing to pass along a bit of his knowledge. It was during one of those visits that he told me that whether bees were kept in Louisiana or in Minnesota, along the Canadian border, the bees were inclined to swarm during the months of May and June. After keeping bees from that day until the present, I find that to be so true.

Dr. Cale also told me and even demonstrated how to determine the age of larvae that was ideal for grafting. Dr. G. H. Bud Cale had become one of the outstanding bee geneticists of that era. He worked at Dadant & Sons, Inc., in Hamilton, IL, and was the geneticist who developed the first two commercial hybrid bees, the Starline and Midnite lines.

The major problem among beekeepers today, particularly in the Midwest, is wintering of colonies. Far too many are having to deal with tremendous losses. Those who do winter their colonies well tend to split them apart in small units to eliminate swarming. This can be done, but in doing so they are also eliminating an even reasonable honey crop. Prof. Paddock once said in that regard, "Bottom boards do not make honey."

No matter where you reside throughout the Midwest just SIX weeks before you anticipate the main honey flow to begin, colonies should be equalized and have four combs of brood or approximately 400 square inches of brood. Certainly, such colonies will be inclined to swarm, but most can be prevented from doing so by the elimination of swarm cells. This can be accomplished and is fairly quick and easy. Our swarming was reduced to less than two percent. Any colony that has no tendency to swarm is not up to par and certainly not up to average or above in honey production.

Dr. Cale's teachings, as well as those of Dr. O. W. Park and Prof. Paddock, have likely been the difference between success and failure in my many years of beekeeping beginning in 1938 until the present.

Glen L. Stanley
Iowa State University (Emeritus)
2615 Aspen Rd, Ames, IA 50014

RUSSIAN BEE TRAILERS

Another beekeeper's trailer with workshop and sleeping area. This photo was taken near the village of Mostovskiy, Krasnodar Region, Russia. (John Klapac photo)

Beekeeper's trailer in Anapa, Russia (John Klapac photo)

Enclosed are some photos of interest that were taken during our annual tour to Russia.

John Klapac
Russian American Bee Co.
Frederick, MD

REPELLING SMALL HIVE BEETLES WITH LIGHT

I have been plagued with hive beetles for several years, and had tried everything I could think of to rid my hive of them. In discussing the problem with my friend, Archie Matthews, a local beekeeper, he relayed an observation that he and Tom Dowda, a retired Florida apiary inspector, made.

While visiting our local Dadant & Sons store, owned by Jerry Latner, they noticed his observation hive had no hive beetles present, while outside hives did have beetles. They speculated that the beetles don't like light. I also confirmed this idea; each time I removed the cover of one of my hives and watched the beetles run for the bottom of the hive.

I had a theory that if I put an opaque plastic cover on my hives that the beetles would move out. I made a short trip to the hardware store and purchased a while opaque piece of Lexan plastic to try as a cover on one of my infested hives, in place of the normal wooden cover. After about only one week, I was amazed to find no hive beetles.

I then tried the Lexan cover on the other hives and got the same results—no hive beetles. As my apiary seemed to be the breeding ground for all the hive beetles in Florida, I was very impressed with the results!

I would like to share my discovery with the beekeeping community to rid ourselves of this disgusting pest. I would also encourage other beekeepers to try it in their apiaries and write the editors of the bee journals on their findings. I believe in this way we could build a database of results and put sound scientific principles to work on the eradication of this pest from our colonies without the use of chemicals and or beetle traps.

Again, I was amazed at how quick, simple and effectively this opaque white plastic cover eradicated the beetles in every single hive. I hope other beekeepers will try it and confirm whether they get the same results.

Stephen Homewood
Gainesville, FL

CONCERN ABOUT YELLOW JASMINE TOXICITY TO HONEY BEES

This plant is being sold by the thousands at Lowe's and Home Depot. We need to

have a warning label on this plant that says it kills honey bees.

Gerald Dunbar

Side Effects of Jasmine Flowers

by Judy Wolfe
eHow Contributing Writer

There are more than 200 varieties of plants belonging to either the Oleaceae family of true jasmine or the Loganiaceae family of false jasmine. The flowers of the former are nontoxic if eaten. Within the Loganiaceae family, the flowers of *Gelsemium sempervirens* Loganiaceae, also known as yellow jasmine, yellow jessamine or Carolina jasmine, are highly poisonous. When eaten they may cause a wide range of side effects in humans, animals and bees.

Carolina jasmine (*Gelsemium sempervirens*) is a native plant common across the southeastern states. Blooming between December and May, its pleasant fragrance, climbing habit and abundant yellow trumpet-shaped flowers make it desirable enough as a garden plant that it's been named South Carolina's official state flower. However, every part of Carolina jasmine contains gelseminine, gelsemoidin and gelsemine, alkaloids of the strychnine family, with the highest alkaloid concentrations found in the roots and flowers. The honey made from the flowers' nectar, according to both the Medical Toxicology of Natural Substances and the Mississippi Department of Wildlife, is potentially toxic to humans.

Side Effects in Humans

The alkaloids in Carolina jasmine flowers can cause both paralysis and death if ingested. Other side effects include weakness, pupil contraction, impaired vision, severe giddiness which impairs balance, drooping eyelids and depressed respiration. During the late 19th century, Carolina jasmine was used to treat cases of neuralgia, especially that associated with toothache.

Side Effects in Bees

According to the USDA handbook "Diagnosis of Honeybee Diseases," exposure to *Gelsemium sempervirens* nectar has side effects for the young adult bees, as well as the larvae and pupae in the hives. The young workers die quickly, while the pupae die and mummify within their cells. Although the older adults appear unaffected, the hive is left greatly weakened by exposure to yellow jasmine nectar.

Editor's Note: Nectar collected from a few yellow Jasmine blossoms would not be a problem when mixed with other non-Jasmine nectar. Only large concentrations of the nectar collected from numerous yellow Jasmine flowers would be of concern.

News Notes

WEST VIRGINIA PASSES BEEKEEPER IMMUNITY LAW

West Virginia has become the first state in the nation to pass a law giving beekeepers immunity from liability for ordinary negligence. This law came about as a result of strong support by the leadership of both the House and Senate. We are fortunate to have a State Senate President, Earl Ray Tomblin, whose father is a beekeeper. Additionally, House Speaker Richard Thompson was raised by a grandfather who was a beekeeper. Finally, it helped that the honey bee is the state insect!

The law requires that beekeepers register their hives. It also mandates the WV Department of Agriculture to promulgate Best Management Practices for beekeepers. All beekeepers who abide by these two provisions will have absolute civil immunity from ordinary negligence. The Department is working on a set of emergency rules they hope will be in effect soon. Governor Joe Manchin signed the bill into law the first of April, making this the first state to protect its beekeeping industry. (Dan O'Hanlon, President – West Virginia Queen Producers **danohanlon@mountainstatequeens.com**)

HUGE SOURCE OF COMMERCIAL BEEKEEPER'S INCOME THREATENED?

Self-Pollinating Almonds Key to Bountiful Harvests

by ALFREDO FLORES

Reprinted From April 2010 Agricultural Research Magazine

California has more than 600,000 acres of almond orchards. At the beginning of each new year, these almond trees burst into bloom. That's when growers will need many millions of robust bees to ferry pollen from one cream-white blossom to the next.

Hive-rental costs to almond growers are high, ranging from $125 to $180 per hive. But in the future, these costs may be avoidable because bees may no longer be needed for almond pollinating.

This possibility could prove true as a result of the work of Agricultural Research Service geneticist Craig Ledbetter, in the Crop Diseases, Pests, and Genetics Research Unit in Parlier, California. He has developed new and improved self-pollinating almond trees—ones that can produce a bountiful harvest without being pollinated by insects.

Geneticist Craig Ledbetter examines the nuts of a self-pollinating almond selection in a California test plot.

Self-pollinating almonds are not new. The Tuono variety, originally from Spain, has been around for centuries. But it has few of the characteristics that have made California almonds beloved domestically and internationally. Almond breeders will tell you that Tuono is simply not as attractive as California's most popular almond, Nonpareil, because Tuono has a hairy texture to the seed coat.

"You can feel that hairiness with your tongue," says Ledbetter. "That can turn off U.S. almond consumers, who are used to the smooth texture of Nonpareils."

Another strike against Tuono—it has a very thick, hard shell, so only 32 percent of the nut is edible kernel. Nonpareil, however, is 60 to 65 percent kernel.

One good thing about Tuono's thick shell is that it gives the nut more resistance to the dreaded navel orangeworm, the primary pest of almonds in California. At Parlier, an areawide integrated pest management program is under way to reduce navel orangeworm damage and broad-spectrum insecticide use throughout the San Joaquin Valley. The program is being led by Joel Siegel, assisted by fellow entomologists Bas Kuenen and Chuck Burks.

Eight Great Almond Selections

Though both Tuono and Nonpareil almonds have their strong points, the ideal almond would have the best traits of each. In 1993, Ledbetter started his work to breed a desirable self-pollinating almond. Seedlings were first planted in 1996 and every year thereafter.

Tuono was used as the male (pollen) parent in conventional hybridizations with California-adapted almond cultivars and selections. Ledbetter and his team made the crosses at bloom time and came back at harvest time to collect the nuts. The scientists grew out those nuts into seedlings and then surrounded the branches with insect-proof nylon bags to exclude insects that could serve as pollinators. The seedlings bloomed, and some produced fruits inside the bags. The scientists knew that these seedlings were the self-pollinators, because no foreign pollen had been introduced into the bags.

At first, harvests from the seedlings were small, but by 2006 the trees began producing excellent harvests. In November 2008, after a very good fall almond harvest, Ledbetter and his Parlier team brought eight very promising self-pollinating selections to the California Almond Board for evaluation of taste and appearance. The testers were pleased with the skin color, oil content, and—most importantly—the flavor. The new almonds have many of the same characteristics of Nonpareil, which has been grown in California since the 1880s and accounts for 37 percent of all almonds grown in the state.

"What separates the Parlier-developed selections and Nonpareil, of course, is that these ARS almond trees need no external pollination," said Ledbetter. "Ours is a very good-looking kernel that's very comparable to that seen in Nonpareil."

HONEY IMPORTER ARRESTED FOR ALLEGEDLY CONSPIRING TO EVADE U.S. IMPORT DUTIES FOR CHICAGO OFFICE OF GERMAN FOOD DISTRIBUTOR

CHICAGO - A Taiwanese executive of several honey import companies was arrested in Los Angeles in March on federal charges filed in Chicago for allegedly conspiring to illegally import honey that was falsely identified to avoid U.S. anti-dumping duties.

Hung Ta Fan, 41, was arrested without incident when he arrived at Los Angeles International Airport on a flight from Taiwan, announced Patrick J. Fitzgerald, U.S. Attorney for the Northern District of Illinois, and Gary J. Hartwig, special agent in charge of U.S. Immigration and Customs Enforcement (ICE) in Chicago.

Fan, also known as "Michael Fan," of Taiwan, is president of Blue Action Enterprise Inc., a California-based honey import company. He was also an executive of other similar companies, including 7 Tiger Enterprises Inc., Honey World Enterprise Inc., both of which are now defunct, and Kashaka USA Inc., all of which he allegedly used to import Chinese honey into the United States. Fan was charged with conspiracy to illegally import honey in a criminal complaint and was expected to appear on April 1 in U.S. District Court in Los Angeles.

Between July 2004 and June 2006, Fan and others allegedly used Blue Action and 7 Tiger to fraudulently import about 96 shipments of Chinese honey falsely declared as originating in South Korea, Taiwan, and Thailand on behalf of and for the benefit of

a German company and its worldwide affiliates, including an American subsidiary that operated in Chicago. The 96 shipments of honey had a total declared value of more than $4.5 million. By falsely identifying the honey as coming from South Korea, Taiwan, and Thailand, they avoided anti-dumping duties applicable to Chinese honey totaling nearly $9.9 million.

On May 10 and 11, 2006, U.S. Customs and Border Protection seized 384 drums of Chinese honey that were falsely declared as Korean by 7 Tiger, according to the complaint. After Fan and 7 Tiger sought permission to export the honey from the United States, it was ultimately forfeited without contest.

"Anyone who breaks our nation's customs laws seeks an unfair financial advantage over law-abiding competitors," said John Morton, Department of Homeland Security assistant secretary for ICE. "ICE will not tolerate products being illegally imported into the U.S. marketplace. We aggressively investigate those who thwart the laws and regulations that are put in place to protect U.S. businesses and the American public."

According to the ICE affidavit filed in Chicago, the charges against Fan stem from an ongoing investigation of the honey importing practices of Alfred L. Wolff Inc. (ALW), and other corporate affiliates of Wolff & Olsen, headquartered in Hamburg, Germany. Two Chicago-based executives of ALW, Stefanie Giesselbach and Magnus Von Buddenbrock, were arrested in Chicago on federal conspiracy charges in May 2008. They are cooperating with the investigation while the charges against them remain pending, the affidavit states. ALW's Chicago office imported millions of dollars of honey into the United States, it adds.

In May 2009, Yong Xiang Yan, the president of a honey manufacturer in China was arrested and he pleaded guilty last October to conspiring to illegally import Chinese honey that was falsely identified as coming from the Philippines to avoid a total of nearly $4 million in domestic anti-dumping duties. Yan is also cooperating in the ongoing investigation while awaiting sentencing, according to the affidavit against Fan.

In December 2001, the U.S. Commerce Department determined that Chinese honey was being sold in the United States at artificially low prices and imposed anti-dumping duties. The duties on Chinese honey ranged between about 212 and 221 percent between June 2004 and October 2005, and then were imposed in the amount of $2.06 per net kilogram through at least June 2006. Honey originating in South Korea, Taiwan and Thailand was not subject to any anti-dumping duties.

The government is being represented by Assistant U.S. Attorneys Andrew Boutros and William Hogan, Northern District of Illinois. If convicted, the conspiracy charge carries a maximum penalty of five years in prison and a $250,000 fine. The Court, however, would determine a reasonable sentence to be imposed under the advisory U.S. Sentencing Guidelines. The public is reminded that a complaint contains only charges and is not evidence of guilt. The defendant is presumed innocent and is entitled to a fair trial at which the government has the burden of proving guilt beyond a reasonable doubt. **(US Immigration and Customs Enforcement News Release)**

GROEB FARMS BUYS MILLER'S AMERICAN HONEY

Groeb Farms Inc., a portfolio company of Horizon Partners, has acquired **Miller's American Honey Inc.**, a Colton, Calif.-based honey producer. No financial terms were disclosed. Houlihan Smith & Co. advised Miller's American Honey on the deal. Houlihan Smith & Company, Inc. (Houlihan Smith) acted as the exclusive financial advisor to Miller's American Honey, Inc. in their sale to Groeb Farms, Inc., a portfolio company of Horizon Partners Ltd. The announcement was made by Charles Botchway, group managing director and vice chairman of Houlihan Smith. The transaction was led by Houlihan Smith Managing Director Lester (Jay) Rodgers. Terms of the deal were not disclosed.

George Murdock, Miller's American Honey's Board Chairman, issued the following statement: "The deal team at Houlihan Smith made extraordinary efforts to work towards "win-win" solutions in effecting our sale to Groeb Farms. Their approach cautiously avoided hyperbole, relying instead on honest, straightforward presentation of facts, supported by their ability to communicate complex financial data into evidence of true value."

In announcing the acquisition, Ernie Groeb, Groeb Farms president and chief executive officer said, "Merging these two businesses who share a common family legacy of commitment to the production of high-quality products will benefit our customers and their consumers." He continued: "We are honored that the Murdock family has entrusted the Miller legacy to us."

Houlihan Smith Vice President Matthew Thomason stated: "We are pleased to have had the opportunity to assist the Murdock family achieve their goals and realize an outcome fitting of the rich, 116-year heritage of Miller's American Honey."

About Groeb Farms, Inc.

Groeb Farms, Inc. (http://www.groebfarms.com/) began as a family-owned business in 1973. In 2007, the company joined forces with private equity company, Horizon Partners. Groeb Farms is the world's largest Industrial and Foodservice processor of honey, selling approximately 70M pounds of honey in 2009. In addition to honey, Groeb Farms also distributes peanut butter, molasses, mustard and vinegar. These Groeb Farms products are used for direct consumption or as ingredients in products such as salad dressings, sauces, snacks, bread, cookies, crackers, beverages, and meat. Groeb Farms, Inc. is headquartered in Onsted, MI, with locations in Belleview, FL and Baytown, TX.

About Miller's American Honey Company

Miller's American Honey Company is a family owned business which began in 1894. From humble beginnings as a Beekeeping enterprise, Miller's has grown into a $30M operation, with domestic as well as international customers. The Company's primary product line is honey; however, customers are also serviced with products, such as peanut butter, molasses and agave syrup. Products range from retail packages for grocery store shelves to tanker loads of honey for bakeries. Miller's American Honey Company is headquartered in Colton, CA with a second location in Oakland, CA. **(Company Press Release)**

GOLDEN HERITAGE ANNOUNCES COMPANY CHANGE

HILLSBORO, Kansas, April 9, 2010 – Golden Heritage Foods today announced plans to divest ownership of its Ohio plant and equipment assets to a private investment group headed by Dwight Stoller, current owner and Vice Chairman of Golden Heritage Foods' board of directors. As part of the transaction, the parties will enter into a long-term contract packaging agreement. The transaction is scheduled to close by June 30, 2010.

This divestiture will allow Golden Heritage Foods to increase its emphasis in their core competencies of marketing and packaging honey, molasses, and complimentary liquid sweeteners.

"This change will be seamless to our customers and suppliers," commented Brent Barkman, majority owner and chairman of the board, Golden Heritage Foods. "Under the strategic contract packaging agreement we will continue to have two plants from which to competitively operate across the United States and retain the ability to immediately transfer production to either facility should that become necessary. Golden Heritage Foods will be able to further optimize its efficiencies in fixed cost plant and equipment, and ensure that our customers continue to receive the highest quality, competitively priced products."

Dwight Stoller added, "In addition to our continued strategic relationship with Golden Heritage Foods, this will allow our Ohio investment group to aggressively pursue contract packaging opportunities within the food industry that do not compete with Golden Heritage Foods' product offerings."

Golden Heritage Foods is a leading food packaging and marketing organization that has served national food service distributors and major grocery chains throughout North America for nearly 50 years. Its

product lines include pure honey, molasses and other complimentary liquid sweeteners.

LANCE ARMSTRONG JOINS HONEY STINGER OWNERSHIP TEAM

Seven-time Tour de France champion partners with natural foods company

April 28, 2010 (Steamboat Springs, Colo.) - Honey Stinger, the manufacturer of honey-based nutritional foods, announces a partnership with professional cyclist Lance Armstrong. In addition to future product development and endorsement of Honey Stinger energy gels, bars and organic chews, Armstrong becomes part of the ownership team in the Steamboat Springs-based company.

"I first tried Honey Stinger products during a mountain bike race in Colorado," says Armstrong. "I was impressed with the great taste and energy they provided. Honey Stinger works for me in training and racing because you want to eat them and they work. I like the whole team - they understand what athletes need and they're great to work with. I'm excited to be part of the Stinger team and work with them on expanding the products and business."

Armstrong first met Len Zanni, Honey Stinger's Marketing Director, when they teamed up to race the 12 Hours of Snowmass mountain bike race outside Aspen in 2008. The foundation for a new business partnership was hatched over the course of long bike rides and get-togethers with company leaders.

Bill Gamber, an athlete/ entrepreneur, teamed up with his father William, a honey industry veteran, Bob Stahl, a food product developer, and John Miller, a professional beekeeper, to found Honey Stinger in 2002. Today, the company produces over 20 honey-based energy products that are distributed internationally at specialty sporting goods retailers and natural food grocers.

"We're thrilled and honored to have the opportunity to work with an athlete of Lance's stature. Beyond his athletic achievements, Lance is an inspiration and a leader in the fight against cancer," states Bill Gamber. "Our relationship with Lance comes at a time when Honey Stinger is riding a wave of momentum and this partnership is a major step for our brand."

UC DAVIS HONEY BEE RESEARCH RECEIVES BIG BOOST

DAVIS, CA-The Harry H. Laidlaw Jr. Honey Bee Research Facility at the University of California, Davis, has received a $10,000 donation from Gimbal's Fine Candies, San Francisco, in support of its outreach and research activities.

Extension apiculturist Eric Mussen, member of the UC Davis Department of Entomology Faculty, accepts an enlarged check for $10,000 from chief executive officer Lance Gimbal of Gimbal's Fine Candies, San Francisco. The company, seeking to help save the embattled honey bees, is donating 5 percent of proceeds from its newly launched line of Honey Lovers to UC Davis honey bee research. (Photo by Kathy Keatley Garvey)

The family-run, fourth-generation company founded in 1898, is donating 5 percent of all future proceeds to UC Davis honey bee research from its newly launched line of Honey Lovers' candies, heart-shaped fruit chews made with natural honey.

The first check, issued March 8, will be used in support of outreach and research activities at the facility. Extension apiculturist Eric Mussen, member of the UC Davis Department of Entomology faculty, recently accepted the check from Lance Gimbal, president and chief executive officer.

"The UC Davis bee biology program is extremely appreciative of the generosity of Gimbal's Fine Candies," Mussen said. "Their contribution will enable us to reach more people with factual information about bees and beekeeping. It also is possible that their support of our research efforts may help uncover better methods of dealing with pests, parasites, and diseases of honey bees and honey bee colonies."

The line of Honey Lovers, featuring 16 different flavor combinations, includes pomegranate honey, honey-dipped strawberry, honey vanilla and huckleberry honey. Seeking to help save the bees, company officials expressed concern about the declining bee population. "Approximately one-third of our food supply depends on honey bees," said CEO Lance Gimbal. "Honey bees are in the middle of a crisis."

Much of the concern for the declining bee population is linked to colony collapse disorder (CCD), a mysterious malady characterized by adult bees abandoning the hive. The bees fly off and leave behind the queen bee, immature brood (eggs, larvae and pupae) and stored food. "CCD is still very much with us and is continuing to take a significant toll on honey bee colonies, both in California and across the country," Mussen said. "Hopefully, researchers will determine the cause and suggest solutions before too long."

The honey bee research program at UC Davis, one of the oldest in the country, dates back more than 76 years. The 8,200-square-foot facility on Bee Biology Road, located west of the UC Davis campus, is named for Harry Hyde Laidlaw Jr. (1907-2003), considered the father of honey bee genetics.

Among those working in honey bee research at UC Davis are Mussen; bee-breeder geneticist Susan Cobey, manager of the Laidlaw facility; bee breeder-geneticist Kim Fondrk; and insect virus researcher Michelle Flenniken, the Haagen-Dazs Postdoctoral Scholar. Native bee specialists are Neal Williams, assistant professor of entomology, and Robbin Thorp, emeritus professor, who both maintain offices and research quarters at the Laidlaw facility. Also at the facility are beekeepers Elizabeth Frost, research assistant, and undergraduate student Tylan Selby, majoring in entomology. ***(Courtesy UC Davis Dept. of Entomology News Release)***

BASF AND NOD APIARY PRODUCTS PARTNER FOR BEE HEALTH

Breakthrough in fight against *Varroa destructor* mite Companies pledge to bring product to European Beekeepers

LUDWIGSHAFEN, Germany and ONTARIO, Canada March 29, 2010 - BASF and NOD Apiary Products have announced a partnership to bring to European beekeepers a new product that controls the *Varroa destructor*, a parasitic mite that has been identified by independent institutions as a major contributor to the declining number of bee hives on a global scale. BASF and NOD are investing in "Mite Away™ Quick Strips" (MAQS), which target Varroa mites while they feed on developing baby bees. The backbone of this easy-to-use strip is a film made of BASF's biodegradable plastic Ecoflex®, which is filled with the miticide formic acid in a saccharide (plant sugar) formulation. The strip's secret: Designed to penetrate the brood cap, it stops the mite where it reproduces.

"Through our work with scientists, farmers and beekeepers in the Bee Biodiversity Network in France, we have gained a broad understanding of the factors impacting bee health," says Sandrine Leblond, France-based BASF bee expert. The Network has delivered practical, tested solutions to improve bee nutrition, but to date there is no easy way to control the Varroa mite. Bringing MAQS to the market will help fill this gap, supporting beekeepers and BASF's farmer customers.

The strips reproduce a defense mechanism observed in nature. Formic acid occurs in the venom of bees and the sting of many insects, such as ants. Nonetheless, it is the convenience and effectiveness of MAQS that gives beekeepers peace of mind. The strip can be applied right through the season

and beekeepers also enjoy the benefit of a single application product with a short treatment period (7 days versus 42). In product trials in the US, Canada and France, MAQS have controlled up to 97 percent of Varroa mites.

Paying tribute to NOD's entrepreneurial spirit, Markus Heldt, president of BASF's Crop Protection division said, "We are pleased to be part of a positive solution that addresses the important issue of bee health, which is of central importance to beekeepers and farmers. This is a great example of partnership on many levels. The solution was co-designed not just by BASF and NOD, but importantly by the people who experience the problem first hand - beekeepers. Within BASF, we also used expertise and products from across a number of different divisions."

David VanderDussen, CEO of NOD Apiary Products said, "I am excited about this relationship and I am very pleased with BASF's great support. While our companies are very different in terms of size and focus, we share common values and are both passionate about the importance of biodiversity and the protection of the honey bee." The strips are already on the market in Canada, and authorities in Hawaii requested and received a "Special Local Needs" registration to ensure that beekeepers obtain access to the solution as quickly as possible. BASF and NOD plan to work with registration authorities in Europe to make MAQS available to the European beekeeping community within 2 years.

According to the terms of the agreement, BASF will provide substantial support to facilitate a global product launch, including on-going technical and regulatory assistance over a five year period. Both companies currently co-own the patent, with BASF committed to providing support for product registration and distribution within the EU.

SOCIAL BEES HAVE BIGGER BRAIN AREA FOR LEARNING, MEMORY: SMITHSONIAN REPORTS

Who's in charge? Who's got food? The brain region responsible for learning and memory is bigger in social bee queens who may have to address these questions than in solitary queens, report scientists at the Smithsonian Tropical Research Institute who study the tropical sweat bee species, *Megalopta genalis* in Panama. Their study is the first comparison of the brain sizes of social and non-social individuals of the same species.

"The idea is that to maintain power and control in groups you need more information, so the bigger the group, the bigger individuals' brains need to be." says William Wcislo, Smithsonian staff scientist. "This is called the 'social brain hypothesis' also known as the 'Machiavelli hypothesis'."

Previous studies compared brain sizes among social and non-social animals. However, different animal species may be different in so many ways that it's hard to make a direct connection between brain size and sociality. This study focuses on a single species in which some individuals are social and others are not.

Megalopta bees exhibit a very primitive form of social behavior. Either a bee lives as a solitary queen, going out from her nest to forage for her own food or she can be a social queen--a stay-at-home mom. In that case, one of her daughters goes out to forage for her, so she rarely leaves the nest. Her daughters' ovaries don't develop, and she never leaves her mother to become a queen.

"It was surprising to us that even though the social queens don't have bigger brains overall, the fact that the area associated with learning and memory--the mushroom body-- was more developed in the social queens than in the solitary bees suggesting that social interactions are cognitively challenging, as predicted by the social brain hypothesis," said Adam Smith, postdoctoral fellow at STRI. "It's interesting to see that a characteristic like brain development changes so immediately, even with this simple mother-daughter division of labor."

This study was done in STRI's new insect neurobiology laboratory, built to take advantage of diverse tropical insect groups with a variety of brain sizes to understand how brain size and behavior are related.

RESEARCH NOTE

New Record for Reproductive *Tropilaelaps* Mites from Colonies of *Apis cerana* in Northern Thailand

by PRAPUN TRAIYASUT[a], MICHAEL BURGETT[b] and PANUWAN CHANTAWANNAKUL[a*]

Summary

The first record of *Tropilaelaps* mites reproducing in coloines if *Apis cerana* in Northern Thailand.

Thailand, as a part of Southeast Asia, is a biologically rich country which displays a diversity of honey bees species and associated parasitic mites. Four indigenous species of *Apis* are known from Thailand: the two dwarf honey bees (*Apis florea* and *A. andreniformis*), the giant honey bee (*A. dorsata*) and the cavity-nesting honey bee (*A. cerana*) (Oldroyd and Wongsiri, 2006). Additionally, in the latter part of the 20th century, the introduced European honey bee (*A. mellifera*) gained popularity as a commercial bee species throughout SE Asia and most especially in Thailand.

Asian honey bee species are associated with host-specific parasitic brood mites that infest the immature stadia of the host honey bee. All of the parasitic brood mites of indigenous SE Asia honey bee species are normally host-specific. The introduction of the European honey bee (*A. mellifera*) to SE Asia saw several of the Asian brood mites utilize this non-native species as an alternative (non-adapted) host. The parasitic brood mite genus *Tropilaelaps* was previously thought to parasitize *A. dorsata* and/or *A. laboriosa* brood only, but has been shown to readily parasitize *A. mellifera* following the bee's introduction to SE Asia.

A report by Anderson and Morgan (2007) has shown that an additional species of *Tropilaelaps* is extant in SE Asia and neighboring regions (*T mercedesae*), which means three species of *Tropilaelaps* are now recognized as brood parasites of the giant honey bees *A. dorsata* and *A. laboriosa*.

In a study concerned with brood parasitism, fifteen *Apis cerana* colonies were collected in Northern Thailand in 2009. In examining the brood combs from 14 of the 15 sampled colonies, *ca.* 250 brood cells/colony, no *Tropilaelaps* brood parasitism was noted. In one colony, however, where a total 660 sealed brood cells were opened, 2 pupal cells revealed 2 *Tropilaelaps* protonymphs. This very low prevalence rate shows that it is obviously rare for *Tropilaelaps* to parasitize *Apis cerana* brood. However, this is the first report from Thailand of *Tropilaelaps* reproduction in colonies of *Apis cerana*. This reaffirms the earlier finding in 1982 that *T clareae* was capable of reproducing in brood cells of *A. cerana* in India (Delfinado-Baker, 1982).

Since the adapted host of *T clareae* and *T mercedesae* is *A. dorsata*, (Burgett *et al.* 1983, Anderson and Morgan 2007), our observation of *Tropilaelaps* reproducing on *A. cerana* brood confirms the earlier finding that the mite can utilize additional *Apis* species, but we postulate this host switch to *A. cerana* on the part of *Tropilaelaps* is a rare occurrence *in situ* while another cavity nesting honey bee, *Apis mellifera*, is much more vulnerable to *Tropilaelaps* infestations in Thailand. The natural control mechanisms used against *Varroa* by *Apis cerana* may also provide, as well, resistance to *Tropilaelaps*.

REFERENCES

Anderson, D.L. and Morgan, M.J. 2007. Genetic and morphological variation of bee-parasitic *Tropilaelaps* mites (Acari: Laelapidae): new and re-defined species. *Experimental and Applied Acarology*, 43:1-24.

Burgett, D.M., P. Akratanakul, and R.A. Morse. 1983. *Tropilaelaps clareae* Delfinado and Baker: a parasite of honey bees in Southeast Asia. *Bee World.* 64: 25-28

Delfinado-Baker, M. 1982. New records for *Tropilaelaps clareae* from colonies of *Apis cerana indica*. *American Bee Journal*, 112(5):382.

Oldroyd, P.B. and Wongsiri, S. 2006. *Asian Honey Bees: Biology, Conservation, and Human Interactions*, Harvard University press. London, pp. 13-35.

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JAPANESE MINISTRY AIDS IRAQI PROVINCE WITH BEEKEEPING

COS KALSU, Iraq – The minister of the Japanese Embassy in Iraq signed a contract at Contingency Operating Site Kalsu March 24, 2010, to provide funding for two grassroots projects, which will benefit widows in Babil Province in Iraq.

The Seddah Women's Center and Jurf As-Sakhr Humanitarian Society both received grants that will help Iraqi widows learn to maintain and run honey-producing farms.

"The two projects we signed today will provide equipment and training for 100 women, but 40-times that number will ultimately benefit in the long run," Katsuhiko Takahashi, minister of the Japanese Embassy in Iraq, said through an interpreter. "Japan and the United States jointly contributed to these projects and they will aid in the development of Babil Province."

According to Takahashi, the Japanese government has funded 85 similar projects since 2003 and will continue to do so.

"The Japanese Embassy has been very active in supporting the reconstruction of Iraq," said Capt. Bryce Wunder, a member of the 1411 Civil Affairs Company. "They have offered a great source of funding for non-governmental organizations, called 'grassroots' human security project grants."

The funded projects tap into an abundant natural resource in the province: honey bees.

"The honey industry in Iraq is a lucrative one," Wunder said. "The excellent taste and quality is due to its high level of cedar and eucalyptus. This makes for a solid opportunity for the local people.

"Honey offers beekeepers a solid income each year," Wunder said. "We have established programs which offer war widows the ability to become beekeepers."

The commander of the 3rd Heavy Brigade Combat Team, 3rd Infantry Division, Col. Pete Jones, thanked Takahashi and the Japanese government for their support to the people of Iraq.

"I truly believe these grants will make a great impact on the economy and further advance women's initiatives in this area," he said.

Established in 2008, the Seddah Women's Center provides sewing jobs, training and humanitarian aid. It benefits the lives of 89,000 people, including 3,000 widows and 4,000 orphans.

The Jurf As-Sakhr Humanitarian Society was established in 2003 and helps approximately 750 widows and 317 orphans. The Society teaches literacy, sewing, and human rights courses to over 50,000 people.

"Japan intends to continue to provide assistance as it pertains to the life of the people in Iraq," said Takahashi.

by Sgt. Ben Hutto
3rd HBCT, 3rd Inf Div PAO
United States Division - South
U.S. Army

Katsuhiko Takahashi, minister of the Japanese Embassy in Iraq, speaks to female Iraqi leaders at Contingency Operating Site Kalsu, Iraq, March 24, 2010. Takahashi was at COS Kalsu to sign an agreement that will provide Japanese funding to help train and equip over 100 widows as beekeepers. (U.S. Army photo by Sgt. Ben Hutto, 3rd HBCT, 3rd Inf Div PAO)

MASSACHUSETTS BEEKEEPER RECEIVES AWARD

Howard Crawford, 86, from Akin-Bak Farm, Franklin, MA was awarded the Massachusetts Beekeeper of the Year on March 27, 2010 at the Massachusetts Bee Association Spring Meeting in Topsfield, MA. Mr. Crawford was unable to attend the meeting, but Paul Desilets from the Mass. Bee Association presented him the award on April 5, 2010 at the Norfolk County Beekeepers monthly meeting. He was surrounded by his wife, Sandy, his son Michael, and his many beekeeper friends.

Howard has been keeping bees for over 40 years. One of the most amazing things about Howard, which isn't about his many awards or achievements, is his untiring dedication to beekeeping. I do not know another beekeeper who works as hard as Howard, has such a wealth of knowledge, and such amazing stories to tell. There is not a single member of the Norfolk County Beekeepers Association whose life has not been impacted by one of the most giving and gracious people in the history of our club. His life as a husband, father, friend, farmer, and beekeeper has touched so many lives and continues to do so. Though he has slowed down a bit in the past few years, he continues to help fellow beekeepers. Call him up some day. Ask him a question. Go visit him. He is a jewel in our crown and

Howard Crawford was awarded the Massachusetts Beekeeper of the Year, March 27, 2010.

we value the time we have with him. *(Tony Lulek, Norfolk County Beekeepers Association)*

MASSACHUSETTS

July 29- Aug 1

2010 Northeast Treatment-Free Beekeeping Conference
Leominster, MA

The focus of this year's conference is "What is the smaller beekeeper to do?" We will be hearing from several commercial beekeepers who have eliminated treatments in their operations, how they achieved their goals, and what they can recommend to smaller beekeepers who don't have the advantage of hundreds of hives to start with.

Hands-on hive openings, top bar hives, panel discussions, and innovative increase methods will be highlighted.

Kirk Webster: Treatment Free Commercial Beekeeper/Breeder, VT
Dee Lusby: Treatment Free Commercial Beekeeper/Breeder, AZ
Sam Comfort: Former Commercial Beekeeper/Current Top Bar Beekeeper /Breeder, NY/FL
Mike Palmer: Commercial Beekeeper/ Breeder, VT
Erik Osterlund: Treatment Free Commercial Beekeeper/Breeder and Journal Editor, Sweden
James Fearnley: Propolis Expert/Author and founder of BeeVital, UK
Yoon Sik Kim: Treatment Free Beekeeper/Writer/Poet, OK
Corwin Bell: Treatment Free Beekeeper /Bee Activist, CO
Bruce Brown: Hive Product Merchant (Owner of C.C. Pollen), AZ
Laurie Herboldsheimer: Treatment Free Beekeeper/Author, MA
Dean Stiglitz: Treatment Free Beekeeper /Author, MA

The venue is the beautiful Doyle Conservation Center in Leominster, the cost is $190 and includes 10 home-cooked meals.

The material here will be intermediate to advanced in nature…nothing difficult for a beekeeper with a couple of years experience. If you are new to beekeeping, we strongly recommend that you either come for the Beginning Treatment-free Beekeeping Intensive, or read our book for a background in the basics.

This year, we are also adding:
July 28-29, Beginning Treatment Free Beekeeping Intensive.

This is a 2-day course in beginning beekeeping from a treatment-free perspective. Thursday evening dinner will be shared with attendees arriving for the conference and we will have a program after dinner. Classroom instruction and course materials are provided. There will be hive openings, and an observation hive on site.

We are especially lucky to have Sam Comfort of Anarchy Apiaries join us. His expertise in top bar hive management places him in high demand as a speaker and teacher. Sam has wide ranging skills and experience (from bee breeding to almond pollination).

No Previous Experience Necessary.

The venue is the beautiful Doyle Conservation Center in Leominster, MA the cost is $60 and includes 6 home-cooked meals.

http://beeuntoothers.com/2010Conference.html

MASSACHUSETTS

Massachusetts Beekeeper's Association Field Day Saturday, June 26, 2010 UMass Agronomy Farm, South Deerfield, MA Field training stations for new and experienced beekeepers.

Subjects: inspections, seasonal hive management, IPM, hive products, mentoring, splits.

Hosted by the Franklin County Beekeepers Association

Massachusetts Beekeeper's Association Fall Meeting Saturday, October 2nd, 2010 Knights of Columbus Hall, Leicester, MA Hosted by the Worcester County Beekeepers Association

Joe Latshaw PhD will be our speaker for the fall meeting. Check out www.latshawapiaries.com for more information on Joe's work.

He is an expert on instrumental insemination and honeybee genetics specifically as used in breeding programs.

NEW HAMPSHIRE

Tracheal and Varroa mites are notorious killers of bees in New England. American Foulbrood disease is on the increase as dead hives are being robbed. Beekeepers must take timely steps to control these pests to SAVE THE BEES! Charles Andros, former NH/VT Apiary Inspector, will hold a beekeeping workshop from 1 - 3:30 p.m on Saturday, July 10, at 18 MacLean Road, Alstead, NH 03602. Look for the "BEE" sign on the south side of Walpole Valley Road. The topics of discussion will be taking off and extracting honey, wax processing, treatment of mites and foulbrood, and making propolis tincture. Bring a veil, if you have one, as we shall be opening some colonies. We'll be inside if it is a rainy day. Water and chair may also come in handy. Registration required. email: **lindena@sover.net** or call 603-756-9056.

VERMONT

The Vermont Beekeepers Association will hold their annual summer meeting Saturday, July 24, 2010 at the Long Trail School in Dorset, VT. Registration & refreshments begins at 8:30 a.m. Meeting runs from 9:15 a.m. - 4:00 p.m. A potluck lunch will be served. Guest speaker: Prof. Marla Spivak of the University of Minnesota. For more information call Bill Mares 802-863-4938 or email: **bill.mares@gmail.com**

NEW YORK

Here is an updated list of organic beekeeping events at the Pfeiffer Center this spring and summer. PLEASE NOTE that the date for the summer workshop has changed; it will be on June 19, not June 26. And we are delighted to announce that Ross Conrad will give an additional workshop on Apitherapy on June 20. This may be taken by itself, or in combination with the June 19 workshop for a 10% discount on both.

June 19, Chestnut Ridge, NY. Summer Organic Beekeeping, with Ross Conrad. Focuses on seasonal tasks including working with swarms and preparing for the honey harvest. 9 am to 6 pm, $95 ($135 combined with June 19 workshop). 845-352.5020 x 20 **info@pfeiffercenter.org www.pfeiffercenter.org**

June 20, Chestnut Ridge, NY. Apitherapy: Health and Healing from the Hive, with Ross Conrad. Focuses on seasonal tasks including with swarms and preparing for the honey harvest. 9 am to 1 pm, $55 ($135 combined with June 19 workshop). 845-352.5020 x 20 **info@pfeiffercenter.org www.pfeiffercenter.org**

NEW YORK

Apprentice Level Fall Course 2010

The Cornell University Master Beekeeper Program will conduct its one-day Apprentice Level Fall Workshop twice this year. This is a comprehensive course that picks up where the spring class left off. It covers summer, fall and winter management; honey removal, extraction and processing; and IPM for honey bee pests, parasites, pathogens and predators. New beekeepers and experienced beekeepers looking for a refresher course are encouraged to attend. Class runs from 9am-6pm and includes 2 hrs of field work. Cost is $85.00. A workshop manual and refreshments are provided. For registration materials, go to **masterbeekeeper.org**. Classes limited to 24.

Offered at these times and places:

Saturday, August 14th
Dyce Lab, Cornell Univ. - Ithaca, NY

Saturday, August 21st
Betterbee - Greenwich, NY

PENN STATE POLLINATION CONFERENCE

The Penn State Center for Pollinator Research is Sponsoring an International Conference on Pollinator Biology, Health and Policy

Pollinators are essential for both plants and animals in agriculture and natural ecosystems, but there have been dramatic declines in pollinator populations worldwide. Pollinator decline has not only alarmed the scientific community, but gained prominence in the popular press, raising the public's awareness about threats to our ecosystem. The causes for pollinator decline are complex, and it is thought that a combination of many stressors are responsible, including pests, pathogens, environmental toxins, and disruptions in landscape ecology resulting in reduced nutrition and habitat. Addressing these issues will require multidisciplinary research approaches, the development of novel management and conservation practices, and a strong commitment to disseminate the results of these studies to students, the public, and policymakers. As part of its commitment to address pollinator health and conservation, Penn State has recently established a Center for Pollinator Research, comprising 26 independent research, extension and outreach groups across the university. One of the first goals of this Center is to bring together researchers, policymakers, and conservationists in an international conference on pollinator biology, health and policy, to begin to bridge the gaps in our knowledge that are necessary to address this complex issue.

When: Saturday, July 24, 2010 12:00 p.m. -Wednesday, July 28, 2010 p.m.
Where: The Nittany Lion Inn, State College, Pennsylvania 16803. 800-233-7505

For Registration Questions Contact:
Office of Conferences and Short Courses, The Pennsylvania State University, College of Agricultural Sciences, 301B Ag Admin Building, University Park, PA 16802
Toll free: 877-778-2937 or local 814-865-8301
Email: **csco@psu.edu**

For Program Questions Contact:
Christina M. Grozinger, Associate Professor, Department of Entomology, Director, Center for Pollinator Research, Center for Chemical Ecology, Huck Institutes of the Life Sciences, Pennsylvania State University, Chemical Ecology Lab 4A, University Park, PA 16802

Phone: 814-865-2214
Fax: 814-863-4439
Email: **cmgrozinger@psu.edu**
Webpage: **http://www.grozingerlab.com**

PENNSYLVANIA BACKYARD BEEKEEPERS ASSOCIATION

A newly formed bee association has emerged called the "Pennsylvania Backyard Beekeepers Association" or the PBBA. The PBBA is administered under the non-profit corporation status of Pennsylvania Apiculture Inc. (PENNAPIC). The association membership is open to all beekeepers, those interested in helping the honey bees, and all nature-loving individuals. We invite everyone to join the PBBA. The PBBA is focused on helping the backyard beekeeper with quality interactive social events, education, and support of the honey bee industry. We participate and support many other gardening, agriculture, environmental, and nature oriented groups.

The PBBA will be assisting in hosting of the annual summer picnic scheduled for July 31, 2010. The (7th annual) picnic, regularly hosted by Bjorn Apiaries and Oxbow apiaries at 180 Century Lane, Dillsburg, Pa. 17019, is open to all beekeepers from across the region and outside the state. A round table discussion of the coming events and programs of the PBBA will be offered.

More information on the Pennsylvania backyard beekeepers association, details of the upcoming picnic, as well as other programs administered by PENNAPIC can be found at www.pennapic.org or by calling 717-938-0444

PENNSYLVANIA

Delaware Valley College Summer Beekeeping Course

Delaware Valley College will present its annual summer Beekeeping short-course July 16, 17 and 18 (9 a.m. to 4 p.m. daily).

This course is suitable for beginners and as a refresher course for more experienced beekeepers. This three-day course will combine lectures with hands-on experience in our bee yard. Topics to be covered include honey bee biology, communication (dance language and pheromones), beekeeping equipment, how to obtain and hive bees, how bees make honey, important nectar plants, harvesting and processing honey. Additional topics will include summer splits, spring, summer and fall management techniques and over-wintering nucs.

This course will be offered by Dr. Vincent Aloyo, a beekeeper with over 40 years of experience and Dr. Christopher Tipping, assistant professor of biology.

The cost of the three-day course is $160. To register and for more information contact the Department of Continuing Education at Delaware Valley College.

Phone: 215-489-4848, Fax 215-345-1599
Email: ContEd@delval.edu Or visit our web site: **http://delval.edu/cms/index.php/delval/departments_sn/continuing/C251/**

WEST VIRGINIA HONEY FESTIVAL

August 28-29, 2010
Wood County, City Park, Parkersburg, WV

Honey Princess, Baking Contest, Honey & Wax Show, Honey Extracting, Beebeards by Steve Conlon & Family, American Honey Queen plus more! A family event at a family park.
http://www.wvhoneyfestival.org

Contact: Tom Riddle, President 304-481-6941, **teber1029@suddenlink.net**, or Wood County Visitors Bureau 1-800-752-4982, or (304) 424-1960 (WVU Ext. Service), WV Honey Festival, P.O. Box 2149, Parkersburg, WV 26102

Driving directions from major highway/interstate **3 miles West of 177 off US Rt 50 (7th St.) or 4 miles East of US 50 bridge to OHIO: follow signs**

Parking availability and fees: **NO fee for parking**.

Fee/Admission charges **$2.00 adults and $1.00 children**

Gospel, country and pop-live music, antique car show PLUS anything you want to know about honey, beeswax and bee products! Wonderful crafts and good food too!

TENNESSEE

The Heartland Apiculture Society (HAS) annual conference will be held July 8-10, 2010 on the campus of Tennessee Technological University (TTU) in Cookeville, TN. For more information contact Jim Garrison, president of HAS at **jimg1850@live.com**, or go to the HAS website at **www.heartlandbees.com**

The Tennessee Beekeepers Association (TBA) annual convention will be held October 29-30, 2010 on the campus of Tennessee Technological University (TTU) in Cookeville, TN.

For more information contact Ray Turner, Exec. VP for TBA at **rturner-bee@wmconnect.com**, or Jim Garrison, president for TBA at **jimg1850@live.com**

MICHIGAN

2010 Queen Rearing Classes at the Connor Farm in Galesbug, MI

June: Queen Rearing and Bee Breeding
June 25, 26 and 27
9776 E. HJ Ave, Galesburg
Instructor: Dr. Larry Connor
Friday- 2 pm – 8 pm, Sat/Sun-9 am-3 pm
Fee: $275, includes Queen Rearing Essentials and supplies, breaks. Limited enrollment. Pre-enrollment required

This course is for the beekeeper with queen handling experience who wants to raise queens and start a bee breeding pro-

gram. We will use the frozen brood method of screening for hygienic behavior, and look at other methods of resistance. All the basic aspects of queen rearing: starters, finishers and mating nuclei, will be set up and put into operation by students. This is hands-on beekeeping instruction in a small group environment!

July: Introduction to Queen Rearing
July 23, 24 and 25
2010, 9776 E. HJ Ave, Galesburg
Friday- 2 pm – 8 pm, Sat/Sun-9 am-3 pm
Fee: $275, includes Queen Rearing Essentials and supplies, breaks. Limited enrollment.

This course is for the beekeeper with minimal queen handling experience who wants to raise a few queens to several hundred over the course of the season. EMPHASIS ON MAKING SUMMER INCREASE NUCS (NUCOLOGY) AND USING YOUR OWN QUEEN STOCK.

All the basic aspects of queen rearing: starters, finishers and mating nuclei, will be set up and put into operation by students. This is hands-on beekeeping instruction in a small group environment! We will spend time discussing queen management from finding, replacing, introducing, using cells, virgins and mated queens and a whole lot more.

Camping at Fort Custer and Motels in Kalamazoo and Battle Creek, some as low as $30/night.

To Register, click on the Wicwas Press Website **www.wicwas.com**, or send payment to Wicwas Press 1620 Miller Road, Kalamazoo, MI 49001 Phone (203) 435 0238

OHIO

Latshaw Apiaries 2010 Instrumental Insemination three Day Course

Join us September 8-10, 2010, for the second annual instrumental insemination course taught by Dr. Joseph Latshaw. This course is designed to help individuals learn the *science* of instrumental insemination and the *art* of perfecting the benefits this valuable technique. The course will be limited to six participants to maximize the benefits of a small group setting. Ample opportunities for individualized instruction and plenty of practice will be provided.

Dr. Latshaw has over 20 years of beekeeping experience and specializes in the design and production of instrumental insemination equipment. Dr. Latshaw has designed two insemination devices: the Latshaw Instrument and the new Latshaw Micro Instrument. Dr. Latshaw's insemination skills and his extensive background in honey bee genetics have allowed him to significantly contribute to the beekeeping community by providing exceptional breeder stock to commercial queen and honey producers across the United States.

Dr. Latshaw has hundreds of hours of teaching experience, and he is a frequently sought after speaker. Join him for this great opportunity to learn the instrumental insemination technique. Applications are required. Enrollment will be closed when the course is full. Please visit **www.Latshaw Apiaries.com** for additional information and an application. We look forward to working with you.

INDIANA

The Indiana State Beekeepers Association summer meeting will be held June 19, 2010 at Purdue University Bee Lab in conjunction with Beginning Beekeeping School (hands-on training). Featured speaker will be Dr. Keith Delaplane, professor of Entomology at the University of Georgia, head of UGA bee research and author of numerous articles and books.

Dr. Greg Hunt will be holding his 3rd annual queen rearing course on June 17 and 18.

For more information visit www.indianastatebeekeepers.org or contact Pres. Dave Shenefield 765-981-4443 or V Pres Larry Kemerly 317-539-7697

ILLINOIS
QUEEN REARING CLASSES

The Illinois Queen Initiative will be holding two queen rearing workshops across Northern IL on June 5 at the Heller Nature Center in Highland Park IL and another one at Byron Forest preserve in Byron IL on June 19th. Both locations have beautiful conference facilities for learning and over 25 hives to work with. The class will begin at 8:30 a.m. with classroom study on queen rearing and bee breeding. The afternoon we will be teaching the various steps of the process including setting up cell builders, grafting, handling queen cells and establishing mating nucs. This will be an intensive one-day class and will consist of a combination of classroom and hands-on beekeeping.

Each beekeeper will take home a cell bar, cups, grafting tool and started queen cells. The cost is $75 and includes lunch. To register for the class contact: Phillip Raines, Raines Honey Farm, 16566 Best Rd., Davis, IL 61019 815-248-3321 **phillip@raineshoneyfarm.com**

KANSAS

The Northeast Kansas Beekeepers will have their annual Beekeeping Funday on Saturday June 5th in Lawrence, Kansas at the Douglas County Fairgrounds. Guest speakers will be Kim Flottum, editor of *Bee Culture* Magazine and Lloyd Spear, owner of Ross Rounds Inc. There will be a swarm demonstration and workshops for all levels of beekeepers, including many value-added presentations. For more information call Joli at 913-856-8356 or visit our website at **nekba.org** for a reservation form. Fee includes lunch and homemade honey ice cream and this year a birthday cake to celebrate Lorenzo Langstroth's birthday!

KANSAS AWARD

While most beekeepers have experienced a loss in bees lately due to disease, mites, moths, beetles, etc., Richard Harvey of Arkansas City, Kansas just keeps growing his hives. Here he receives an American Gold Coin from Dean McGrath of the South Central Beekeepers Association for his efforts.

Harvey is current president of the Association and has enjoyed beekeeping ever since he got his start over forty years ago with 120 hives. The gold coin signifies Harvey moving up from Hobbyist to Commercial status in the Association.

With the death of another local beekeeper last August, Harvey was able to expand his operation by purchasing his friend's bees and keeping those hives going. All the mites and beetles that have plagued the beekeeping business lately haven't slowed Harvey's business down at all. He is looking forward to the spring and summer seasons and harvesting his honey.

SOUTH DAKOTA

The South Dakota Beekeepers meeting will be held in Aberdeen South Dakota on July 9 and 10 of 2010 at the Ramkota Inn. To make reservations call 605-229-4040 before June 8th. The rooms will be held for us to this date and be sure to ask for the South Dakota block. The rates are $84.99 + tax.

The general meetings will start at 1 p.m. Friday the 9th with speakers and other information. The banquet and auction will be held Friday evening. Saturday morning will be speakers and an informal session with the business meeting starting around 10:30 am. Advisory board meeting will start at 10 a.m. Friday prior to the general meeting.

NEW MEXICO

June 12, 2010 Seeds of Change Experimental Farm in El Guique, NM (northern Rio Grande Valley) will be offering an Intro to Queen Rearing Workshop conducted by Zia Queenbee Co. This one-day, hands-on workshop will share the artistry of rearing one's own queens covering introductory concepts and different steps of the process of queenbee rearing. From se-

lection of breeders and establishment of genetic pool to cell-building styles, grafting, mating nuc establishment, drone supports and harvesting of mated queens. An additional introductory queen rearing workshop will be offered in July at ZQB's home farm in Truchas, NM at 8300 feet in the southern Rockies (this workshop will focus on rearing queens for fall requeening and for overwintering nucs). For more info Tel. 505/689-1287
email: **ziaqueenbees@hotmail.com** or visit: **http://ziaqueenbees.com/zia/2010/intro-to-queenbee-rearing-workshop-june-12-2010-seeds-of-change/**

ALBERTA

The 57th Annual Beaverlodge Beekeepers' Field Day will be held on Friday June 25, 2010 at the Agriculture & Agri-Food Canada Research Farm in Beaverlodge, Alberta, Canada.

The program will begin at 10:00 a.m. and will include outdoor demonstrations, as well as talks from professionals on the latest findings in bee research. Our guest speaker this year is Dr. Tom Webster of Kentucky State University. Also in attendance will be Provincial Apiculturalists and representatives from the Canadian Honey Council, the Alberta Beekeepers' and the Alberta Honey Producers' Cooperative.

Don't miss the FREE noon BBQ sponsored by honey industry members. For more information contact Dr. Steve Pernal at: **Steve.Pernal@agr.gc.ca**

BEES FOR DEVELOPMENT HELPS AFRICAN BEEKEEPERS TO TRADE THEIR WAY OUT OF POVERTY

First Minister, Carwyn Jones, last week visited Bees *for* Development's Cameroon Honey Trade Project underway in partnership with the Welsh company Tropical Forest Products Ltd.

Bees *for* Development is an international development organization based in Monmouth working to help African beekeepers trade their way out of poverty through selling honey and beeswax.

The Welsh Assembly Government Wales for Africa Grant Scheme is funding Bees *for* Development to work with Tropical Forest Products Ltd in this Project that aims to produce a Welsh-designed honeycomb separator that will assist Cameroonian beekeepers to improve the quality and yield of their honey and beeswax. Michael Tchana, the Director of the Cameroonian organization Guiding Hope, visited Wales in March to work on the honeycomb separator, with the aim of increasing honey and beeswax exports to Wales in the forthcoming months.

The products will be sold through

Michael Tchana of Guiding Hope, Cameroon with the beeswax separator. ©Bees for Development

Tropical Forest Products Ltd., Wales' only registered Fairtrade importer. The Project outcomes will be shared widely with other beekeepers in Africa and Wales through the information network of Bees *for* Development.

With the UK producing less than one third of the honey we eat, honey trade presents a real economic opportunity for people in developing countries endowed with natural resources, but with limited financial capital. Bee diseases are highly prevalent in industrialized countries and some beeswax produced is contaminated with the chemical residues of bee medications. African beekeepers have a strong comparative advantage, as they are custodians of the largest remaining wild honey bee populations in the world, thriving free from introduced pests and diseases.

PRELIMINARY RESULTS: HONEY BEE COLONY LOSSES IN U.S., WINTER 2009-2010

BY DENNIS VANENGELDORP[1], JERRY HAYES[2], DEWEY CARON[3], AND JEFF PETTIS[4]

Note: *This is a preliminary analysis, and a more detailed final report is being prepared for publication at a later date.*

The Apiary Inspectors of America (AIA) and USDA-ARS Beltsville Honey Bee Lab conducted a survey to estimate winter colony losses for 2009/2010. Over 22.4% of the country's estimated 2.46 million colonies were surveyed. A total loss of 33.8% of managed honey bee colonies was recorded. This compares to total losses of 29%, 35.8% and 31.8% recorded, respectively, in the winters of 2008/2009, 2007/2008 and 2006/2007.

In all 4,207 beekeepers responded to the on-line survey and an additional 24 were contacted by phone. This response rate is orders of magnitude greater than previous years efforts which relied on phone or email responses only (2008/2009 n=778, 2007/2008 n=331, 2006/2007 n=384).

On average responding beekeepers lost 42.2% of their operation, this is an 8 point or 23% increases in the average operational loss experienced by beekeepers in the winter of 2008/2009.

Average losses were nearly 3 times greater than the losses beekeepers reported that they considered acceptable (14.4%). Sixty-one percent of beekeepers reported losses in excess of what they would consider acceptable.

Colony Collapse Disorder (CCD) is characterized, in part, by the complete absence of bees in dead colonies and apiaries. This survey was not designed to differentiate between definitive cases of CCD and colonies lost as the result of other causes that share the "absence of dead bees" symptom. Only 28% of operations reported that at least some of their dead colonies were found dead without dead bees. However, this group lost a total of 44% of their colonies, as compared to the total loss of 25% experienced by beekeepers who did not report losses indicative of CCD.

Responding beekeepers attributed their losses to starvation (32%), weather (29%), weak colonies in the fall (14%), mites (12%), and poor queens (10%). Only 5% of beekeepers attributed CCD as the major cause for their losses.

It is also important to note that this survey only reports on winter losses, and does not capture the colony losses that occur throughout the summer as queens or entire colonies fail and need to be replaced. Preliminary data from other survey efforts suggest that these "summer" losses can also be significant. All told, the rate of loss experienced by the industry is unsustainable.

1. Dennis vanEngelsdorp, The Pennsylvania State University/Apiary Inspectors of America (AIA), Past-President **dennis.vanengelsdorp@gmail.com** 717-884-2147
2. Jerry Hayes, Florida Department of Agriculture, AIA Past President, **hayesg@doacs.state.fl.us** 352 372-3505
3. Dewey Caron, Oregon State Univ., **carond@hort.oregonstate.edu** 302 353-9914
4. Jeff Pettis USDA-ARS Bee Research Laboratory, Beltsville, MD, **jeff.pettis@ars.usda.gov**, 301 504-8205

USDA SETS DATES FOR U.S. HONEY PRODUCER RESEARCH, PROMOTION, AND CONSUMER INFORMATION ORDER

USDA Agricultural Marketing Service News Release

WASHINGTON D.C. – The U.S. Department of Agriculture has announced that

it will conduct a referendum May 17 to June 4, 2010, for eligible producers of U.S. honey to determine whether a new national U.S Honey Producer Research, Promotion, and Consumer Information Order should be established.

The program will be implemented if approved by a majority of producers voting who also represent a majority of the volume of U.S. honey produced during the representative period. To be eligible to vote in the referendum, producers must have produced 100,000 or more pounds of honey from Jan. 1, 2008 through Dec. 31, 2008.

If implemented, the program would be administered by a seven-member board and its alternates – from seven regions – who will be responsible for carrying out activities intended to strengthen the position of the U.S. honey industry in the marketplace. In addition, the board will work to develop, maintain and expand domestic markets for U.S. honey.

The national coordinated generic program would be financed by a mandatory assessment of two cents per pound paid by U.S. honey producers; a U.S. producer who produces less than 100,000 pounds would be exempt from paying assessments.

The proposed order, referendum order, and referendum procedures for the program were published in the April 12, 2010, Federal Register, and posted on the Internet at **http://www.ams.usda.gov/FVPromotion** and **http://www.regulations.gov**.

The proposed order, as published in the *Federal Register* **http://www.abfnet.org/associations/10537/files/USHoneyProdBd_04_12_2010.pdf**

The referendum procedures, as published in the Federal Register **http://www.abfnet.org/associations/10537/files/USHoneyProdBd_ref_proced.pdf**

On April 19, 2010, AMS mailed the ballots, voting instructions and a summary of the proposed program to all known eligible producers of U.S. honey. Eligible producers who do not receive a ballot should contact Kimberly Coy, Research and Promotion Branch, Fruit and Vegetable Programs, AMS, USDA, Stop 0244, 1400 Independence Avenue SW, Washington, DC 20250-0244; by calling (888) 720-9917; faxing (202) 205-2800; or e-mailing **Kimberly.Coy@ams.usda.gov**.

UNITED STATES

A new survey of U.S. colony losses conducted by the Apiary Inspectors of America and the USDA-ARS Honey Bee Lab estimates a 33.8% loss of managed colonies during the winter of 2009-2010. This compares to total losses of 29%, 35.8% and 31% recorded, respectively, in the winters of 2008/2009, 2007/2008 and 2006/2007. The survey was extensive covering over 22.4% of the country's estimated 2.46 million colonies.

According to the colony loss report, "It is also important to note that this survey only reports on winter losses, and does not capture the colony losses that occur throughout the summer as queens or entire colonies fail and need to be replaced. Preliminary date from the other survey efforts suggest that these "summer" losses can also be significant. All told, the rate of loss experienced by the industry is unsustainable."

Package bee, nuc and queen availability has again been an issue for new and established beekeepers. A prolonged cold snap in the Southeast and long periods of cool, rainy weather in California delayed some bee and queen shipments. In addition, some beekeepers, who were late in ordering, were told that no more bees were available, and queens would only be available again in late spring or early summer. The bad part about this is that these delays often affect the new beekeepers because they are the ones who do not realize that they must order bees during the winter in order to secure them for spring delivery.

Our reporters over much of the United States continue to indicate a lot of new interest in beekeeping at short courses and club meetings. This is very encouraging in view of the fact that colony numbers have been declining for a couple decades. New beekeepers often cite interest in the environment, pollination and simply preservation of honey bees in their area as reasons for their interest in beekeeping.

The U.S. honey shortage remains a major topic for commercial and sideline beekeepers since they are being inundated by calls from packers, food companies and individual consumers looking for honey. In the case of individuals, many say that they are having trouble finding locally produced honey due to poor crops last year. Wholesale honey prices have remained strong with many buyers commonly quoting $1.50 to $1.70 per lb. for white honey. Some small lots of white honey are still selling as high as $2.00 per pound. Amber grades are selling about 10 to 25 cents lower.

NORTHEAST—Beekeepers were busy in April and early May as they continued to install new packages, nucs and make divides to recoup their colony numbers. Cold weather delayed build-up and foraging at times, but a nice two-week warm spell in April allowed many colonies to make great progress. In addition to fruit bloom and dandelions, many wildflowers and trees were in bloom. Major flows had not begun yet, but as black locust, tulip poplar, sumac and early clover begin to flower, beekeepers will have to be vigilant about swarming and adding supers in a timely manner. Since much of this area has had adequate ground moisture, their main concern now is for warm, clear foraging weather during the major spring and early summer honey flows. A New England snowstorm in late April put a temporary hold on bee work until warmer weather returned. A number of larger beekeepers were still very busy with spring pollination contracts on berries and fruit trees. Locally produced honey remains in very short supply with packers offering good prices for remaining unsold stocks.

MIDEAST—After a usually cold, long winter, beekeepers received a nice spring break in April with a couple weeks of warm, clear weather that provided ideal bee build-up conditions. Many colonies really needed this weather and it helped beekeepers as they continued their apiary work. This work included feeding surviving colonies and cleaning and restocking deadouts. Many beekeeping associations in this area are working to increase beekeeping in their states and beekeepers in some states are even receiving a nice boost from their state governments who realize the importance of having a healthy managed honey bee population in their states.

The big flows coming on soon include black locust, tulip-poplar, sumac, thistle and white Dutch clover. Beekeepers are hoping for clear, warm weather during this important honey flow period. In addition to their other work, beekeepers were wrapping up the spring pollination season for various berries, apple, and other fruits. As we have indicated for several months now, locally produced honey is just about nonexistent until new crop honey is extracted and bottled.

SOUTHEAST—Conditions have improved significantly since earlier in the spring when cool, rainy weather put colonies into a holding mode with little nectar or pollen being available. However, bees seem to be making up for lost time at last report and beekeepers were more encouraged about later honey flows. Florida beekeepers are generally happy with their orange flow this year. However, it was a very late flow and some beekeepers said they missed other flows such as black gum in the woods due to the late and prolonged citrus flow. One correspondent called this year's orange crop "the best quality in many years." Prospects in Florida and Georgia look encouraging for later gallberry and palmetto flows since moisture has been adequate and bee populations are good. Weather remains the big factor for these later flows. If it is clear and warm during the flows, honey crops could be excellent. Due to the weather, the Florida tupelo flow was about two weeks late in some locations.

In Mississippi, colonies have been working many wildflowers, shrubs and trees. Redbud, ti ti, blackberries, tulip-poplar and other sources were providing the first surpluses of the season, but should be followed shortly by privet hedge, clover and tallow along the Gulf Coast. Demand for colonies for pollination rental at fruit, berry and vegetable farms continues to be strong in this area with prices averaging in the $45 to $50 range, according to some of our reporters. The costs of maintaining colonies continue to grow due to disease and pest losses every winter. Then, too, queen viability is an issue since queens are not lasting as long and do not seem to be as prolific as in the past.

The wholesale and retail honey markets remain strong, but little honey remained unsold. Beekeepers were just beginning to extract their first new supers of orange and wildflower honey as this was written. Offering prices are varying from $1.60 or more for orange and white honey to $1.40 or more for amber grades. Even prices for so-called "bakery grade" honey are at $1.20 or more. An encouraging sign at area beekeeping meetings and short courses has been the

U.S. HONEY, BEESWAX AND POLLEN PRICES FROM OUR REPORTERS

	North-east	Mid-east	South-east	South-west	East Central	West-Central	Inter-Mountain	West
Wholesale								
White lb. Blk.	$1.40-$2.20	$1.45-$2.00	$1.30-$1.70	$1.35-$1.70	$1.50-$2.00	$1.40-$1.75	$1.30-$1.60	$1.25-$1.60
Amber lb. Blk	$1.25-$1.60	$1.20-$1.75	$1.20-$1.50	$1.20-$1.60	$1.35-$1.75	$1.20-$1.60	$1.25-$1.50	$1.20-$1.50
1 lb. CS 24	$50.00-$80.00	$45.00-$82.00	$48.00-$90.00	$51.00-$85.00	$52.00-$75.00	$55.00-$81.00	$60.00-$95.00	$57.00-$92.00
2 lb. CS 12	$59.00-$80.00	$58.00-$72.00	$60.00 $68.00	$58.00-$73.00	$59.00-$79.00	$51.00-$78.00	$57.00-$76.00	$60.00-$77.00
5 lb. CS 6	$72.00-$88.00	$58.00-$87.00	$60.00-$76.00	$57.00-$75.00	$57.00-$86.00	$60.00 $84.00	$59.00-$85.00	$59.00-$88.00
Retail								
Jars 8 oz.	$.96-$2.50	$1.00-$2.25	$.89-$2.50	$.90-$2.25	$.95-$2.75	$1.05-$2.50	$.99-$2.20	$1.00-$2.75
Squeeze Bear 12 oz.	$1.89-$3.50	$2.00-$3.75	$1.75-$3.20	$1.40-$3.25	$1.99-$4.45	$1.59-$3.75	$1.55-$3.50	$1.50-$3.60
Jars 1 lb.	$2.50-$5.50	$2.55-$5.25	$2.40-$4.75	$2.50-$5.00	$2.45-$5.25	$2.95-$5.25	$2.75-$5.00	$2.70-$5.25
Jars 2 lb.	$3.99-$6.75	$3.95-$7.00	$3.99-$5.49	$3.00-$6.25	$3.25-$8.00	$3.29-$6.50	$3.25-$6.25	$3.50 $6.50
Jars 1½lb. (Pint)	$4.50-$6.75	$4.25-$6.00	$3.50-$6.00	$3.58-$6.50	$3.25-$5.50	$3.50-$5.50	$3.75-$6.00	$4.75 $7.00
Jars 3 lb. (Quart)	$5.50-$9.75	$5.95-$15.00	$5.79-$10.00	$5.25-$9.25	$5.00-$11.50	$4.50-$10.00	$5.10-$9.75	$5.00-$10.50
Jars 4 lb.	$7.50-$9.25	$5.00-$10.00	$7.00-$8.75	$6.00-$9.70	$8.00-$12.00	$5.50-$13.00	$6.00-$9.00	$5.95-$9.25
Jars 5 lb.	$8.99-$19.00	$7.00-$19.50	$7.50-$17.50	$7.25-$18.00	$8.00-$21.00	$7.75-$18.00	$8.00-$19.25	$8.50-$18.00
Creamed 12 oz.	$2.50-$4.25	$2.50-$4.00	$2.49-$3.20	$2.25-$3.99	$2.00-$3.90	$1.99-$4.00	$1.75-$3.75	$1.75-$3.85
Comb 12 oz.	$3.00-$5.00	$2.50-$5.00	$2.25-$4.25	$2.50-$5.50	$2.50-$4.75	$2.50-$5.50	$2.50-$4.75	$2.75-$5.50
Round Plas. Comb	$3.00-$5.50	$2.25-$4.50	$2.50-$4.00	$2.00-$5.25	$2.25-$4.99	$2.00-$5.50	$2.25-$5.00	$2.50 $5.50
1 Gallon	$15.00-$25.00	$12.50-$26.50	$14.50-$25.00	$15.00 $25.00	$15.00-$30.00	$15.00-$27.00	$15.00-$30.00	$15.00-$30.00
60 lb.	$115.00-$145.00	$84.00-$125.00	$85.00-$120.00	$80.00-$130.00	$82.00-$140.00	$80.00-$135.00	$85.00-$130.00	$80.00-$130.00
Beeswax								
Light per lb.	$1.70-$3.50	$1.70 -$2.75	$1.70 -$3.00	$1.70 -$2.50	$1.70 -$2.50	$1.70 -$2.50	$1.70 -$2.50	$1.70 -$2.50
Dark per lb.	$1.60-$3.00	$1.60 -$2.35	$1.60 -$2.25	$1.60 -$2.25	$1.60 -$2.25	$1.60 -$2.25	$1.60 -$2.25	$1.60 -$2.25
Pollen								
Wholesale per lb.	$3.50-$6.50	$3.50-$8.00	$3.00-$6.00	$3.00 $5.00	$3.25-$6.00	$3.25-$6.00	$2.50-$6.00	$2.50-$5.50
Retail per lb.	$5.50-$15.00	$7.00-$15.00	$6.00-$15.00	$6.00-$10.00	$7.00-$15.00	$7.50 $15.50	$7.00-$12.00	$7.00-$15.00

The above prices are not meant to provide a realistic picture of prices in all states of the particular area. They are intended merely to show what a few beekeepers are receiving for their honey, beeswax and pollen and we realize prices may vary tremendously, even within individual states. The bulk prices for honey are stated per pound, delivered buyer's warehouse, containers exchanged or furnished by buyer, unless otherwise noted. Where prices are not shown, insufficient data were available.

tremendous amount of new hobbyist interest in starting beekeeping.

SOUTHWEST—As in the Southeast, the season began slowly due to late cool, rainy weather. However, since then, colonies seem to be making up for lost time and beekeepers have been kept very busy making divides, replacing deadouts, as well as transporting bees for pollination work and upcoming honey flows. The brush flow reports have been mixed, but a number of beekeepers were able to secure surplus honey from the numerous wildflowers in the area such as rattan, huckleberry, partridge pea, horsemint, etc.

Along the Gulf Coast, Chinese tallow is blooming and beekeepers always look forward to making a nice honey crop from this source, even though the honey is often darker and high in moisture. In West Texas, New Mexico and Arizona beekeepers have been securing honey from spring wildflower flows and hope to obtain regional flows from sources like mesquite, catsclaw, huajillo and other semi-arid and arid honey plants.

In Louisiana and Arkansas, numerous wildflowers, shrubs, trees and berries are blooming and have provided nice honey flows where colonies were strong enough to take advantage of them. In the eastern half of this area clover flows should be starting soon and then cotton and soybeans, in areas where these crops are grown, will follow.

Interest in beekeeping continues to be excellent, according to local associations. Honey also continues to sell well at both the wholesale and retail levels, but no old crop honey was still available, so buyers are seeking lots of new crop honey to restock their inventories.

EAST CENTRAL—After an unusually long, hard winter, beekeepers welcomed a warm, clear early spring. This helped bee build-up and allowed beekeepers more time in their beeyards to feed, make divides, and install nucs or packages of bees. A big problem was finding enough bees and queens to recoup colony losses. The bee shortage has been especially frustrating for new beekeepers, many of whom have attended short courses and want to start their own colonies.

Conditions are bit dry in parts of Wisconsin and northern Illinois, but no acute ground moisture shortages have been reported yet. In fact, as this was written, the East Central area was receiving drenching rains. Early build-up flows from fruit bloom, dandelion, wild mustard and other sources have been good. Overwintered colonies should be strong enough to take advantage of flows from black locust and yellow sweet clover that were coming on in May.

Keeping colonies alive and strong enough to take advantage of these main flows from black locust, clover, basswood and alfalfa has been a major hurdle for honey producers trying to take advantage of higher wholesale and retail honey prices. Last season, cool, rainy weather hurt the main honey flows causing many very poor honey crops. With excellent demand for honey, beekeepers would like to be able to produce average or better honey crops this season.

WEST CENTRAL—Commercial beekeepers continued returning from almond pollination in California or build-up flows in the South. Due to the cool spring in the South some reporters said that their bees were not as strong as they normally are at this time of year. Winter losses in the West Central area were quite variable. We have heard of losses as low as 5% to as high as 75% per cent with no apparent differences in bee health or stores when the colonies began last winter. Some beekeepers felt that winter wrapping and control of mites provided the edge that their bees needed to survive the long, cold winter.

Beekeepers were either working to rebuild their decimated apiaries or, on the other hand, were making splits and selling nucs in order to prevent early swarming. Colonies had been working dandelions, wild mustard, fruit bloom and numerous wildflowers and shrubs. With plenty of ground moisture, reporters suggested that this could be a bumper clover and alfalfa year if the weather cooperates. Last summer promising flow prospects were hurt by cool, rainy weather during the crucial flow period. As this was written, black locust was just coming into bloom in many locations and beekeepers were hoping to make some surplus honey from this source. Unfortunately, rainy weather often interrupts this potentially excellent flow.

Beekeepers who rent colonies for polli-

2009 Average pollination fees, east & west coasts

PNW* 13 commercial beekeeping operations				EAST 19 semi & commercial Beekeeping Operations		
Crop	No. Rentals	Avg. Fee	Fee +/-1	No rentals	ave fee	Fee +/-1
Pears	5,862	$51.40	+21.4%	none		
Cherries	15,605	$51.50	+21.6%	95	$50.90	+11.5%
Apples	23,858	$49.70	+ 9.5%	1812	$38.90	+2.6%
Berries2	2,844	$38.40	+26.9%	36	$48.30	--
Blueberries	7,100	$42.50	+15.2%	5794	$67.80	+12%
Cranberry				4295	$73.40	--
Cucumber				4777	$58.90	+14.5%
Melon& Watermelon				2094	$65.70	+ 7.9%
Veg. seed	6,652	$53.75	+13.6%	none		
Clover seed3	3,435	$46.20	+48.3%	none	61.80	na
Squash & Pumpkin	2,636	$47.30	+ 2.3%	507	$60	+11.5%
Meadowfoam	1,336	$47.30	+ 4.3%	none		
Strawberry	206	$67.80	+5.2%			
Almonds	49,318	$150.30	+1.5%	2129	$75.80	
	122,310	$89.80	+10.9%	21,745	$64.40	9.5%

*Pacific Northwest

(Table courtesy of Dewey M. Caron via the April 2010 USDA National Honey Report)

nation of fruit and berry crops in this area generally reported warm, clear weather during the bloom, which should translate to good crops for growers. Demand for honey at both the wholesale and retail levels remains excellent, but little honey remains unsold. Offering prices continue to be very attractive and beekeepers hope that they will remain strong through this fall.

INTERMOUNTAIN—Beekeepers were continuing their preseason apiary work, which included feeding, making divides and nucs and cleaning up deadouts. Many commercial colonies were just being moved back to their home locations in various Intermountain states after almond pollination and early build-up in California. Colonies overwintered at Intermountain locations were being unwrapped and fed. Overwintering success has been fair to good. Correspondents were encouraged by the increased hobby beekeeper interest that they are seeing at short courses and club meetings. As this was written, bees were working dandelion, willow and early wildflowers. Fruit tree bloom was coming on as this was written and commercial beekeepers with pollination contracts will need to move colonies to orchard locations. In Utah, colonies in desert locations were still working numerous desert flowers and mesquite where this source was available. The next major flow for many Intermountain beekeepers will be sweet clover and alfalfa on irrigated land.

Demand for honey at both the wholesale and retail level continues to be very strong and prices are still increasing. Unfortunately, as is the case elsewhere, little honey remains unsold in the hands of beekeepers.

WEST—After experiencing a rainy, cool spring, weather conditions in California were settling down and warmer temperatures were returning. Beekeepers are more encouraged about spring and early summer honey flows this season because more rain and snow was received, which has helped ground moisture and replenished reservoir levels. Bees earlier were working assorted wildflowers including rosemary, borage, bottlebrush, poppies, wild mustard, vetch and lavender. In the foothills, buckwheat, sage and eucalyptus should provide some nice surpluses if the clear, warm weather holds.

Commercial beekeepers were continuing to pollinate various crops in California including plums, peaches, cherries, strawberries and blueberries. In Oregon and Washington, many beekeepers had moved colonies back to these states from California for cherry, peach, pear, berry and apple pollination duties. Early wildflowers are also starting to bloom in these states as beekeepers continue their early season beeyard work. Some locations in the northwest remain on the dry side, despite receiving later precipitation in the form of rain or snow.

The almond pollination season went well despite some localized shortages of bees for growers. The 2010 almond crop looks very good, according to several sources. Deciding on 2011 pricing will be tough. Some pollination services are planning to keep their prices unchanged for 2011. On the other hand, some beekeepers who lowered their prices this year due to the feared glut of bees, may increase their prices in 2011 to reflect the better almond prices and more water availability for irrigation.

An article written by Eric Mussen, California extension apiculturist, says that the cost to keep a commercial honey bee colony healthy and strong in the state is now estimated to be as high as high as $240 per year. This means that beekeepers must not only make top dollar from almond pollination, but also must go on to pollinate other crops or make up the remaining deficit with honey production.

Honey prices and demand at both the wholesale and retail levels remain strong, so some beekeepers may elect to place colonies on honey flows and forego some later pollination opportunities, especially where adequate ground and irrigation water is available for plant growth.

ARGENTINA

During the first quarter of 2010 (January, February and March) Argentina exported 15,188 metric tons of honey for US$45.22 million. This represents a C&F price per MT of US$2,977. Compared to the same first quarter of year 2009, the total volume exported is only 2% higher, but the price increased 11.5% from a previous US$2,664 per MT. The most relevant difference between these two quarters is the amount of honey imported by U.S. buyers. U.S. buyers paid on average US$3,100 per MT. There is no ground for antidumping accusations against Argentine exporters given the current level of prices.

During the first quarter of 2009, American importers bought 7,434 MT of honey, but during the same period of 2010 their market share doubled after importing 14,600 MT. It is evident that the United States will again replace Chinese honey with Argentine imports.

Germany, which is the traditional leading importer, still keeps its number one position, but with some changes. During the first quarter of 2009, German imports from Argentina represented 18,000 MT, while during the first three months of 2010 this volume dropped to 15,900 MT. By the way, German importers during 2010 have paid only US$2,900 per MT.

Although some sources forecast a substantially larger honey crop this year in Argentina, beekeepers report mediocre crops in most of the country, with the exception of a narrow strip which extends from the central part of Buenos Aires province to its southeast. The good crop in this region does not compensate the poor yields reported all over the territory.

The total honey crop is now estimated at slightly over 60,000 MT and unsold stocks at this time probably represent 35,000 MT. Most exporters are looking forward to a devaluation of the Argentine Peso, which is the local currency. Several economists agree that the current exchange rate should be adjusted by 25%, so Argentine exports turn out to be more competitive. The U.S. dollar is fixed to the Argentine Peso at a 3.90 parity, but inflation is rampant at an annual level of 30%.

Beekeepers are finding great difficulties in purchasing both granulated sugar and diesel. In the case of sugar, because of worldwide bad crops last year, the wholesale price in Argentina increased by 100% since June 2009. Therefore, beekeepers are extremely prudent when deciding the amount of sugar for winter stores. On the other hand, diesel not only increased 25% since January 1st, but it also became unavailable at many gas stations. The reason is that the huge soybean crop requires more and more quantities of diesel for all the agricultural machinery needed.

American Bee Journal Editor

Dr. C. C. Miller

"The Nestor of Beekeeping and Sage of Marengo"

by M.G. DADANT and ROY A. GROUT*

Although the name of Dr. C. C. Miller appeared on the masthead of the *American Bee Journal* only as "Associate Editor," he had a great influence on the beekeeping industry at a time when commercial keeping of bees was developing. Kent Pellett[1] puts it this way: "Dr. Miller was not an inventor like Langstroth. He was not an observer compared with Charles Dadant—not a businessman like A.I. Root. Yet he found his way closer to beekeepers than did any of these men. Free of contentions into which all three of these great leaders fell, and more widely read than any other beekeeper of his time, he was able to sift out the best that beekeeping had to offer, and with a ready pen and cheery voice to plant it in the minds of the bee men."

Dr. C. C. Miller was associate editor of the American Bee Journal from 1909-1918, but he continued his popular question and answer column for 26 years.

Thus, we would be remiss were we not to include him in our story of former editors of the *American Bee Journal*. Probably no beekeeping individual of recent times has had more published about him, although he did not seek publicity. In addition to the excellent two-issue article by Pellett, there is his own autobiography,[2] written at the request of C. P. Dadant, and there are several others. Thus, the story of his life and accomplishments have been told quite well. In this article, we hope to throw enlightenment on a few things that have not been told, or, perhaps, set down in sufficient detail. Nevertheless, a brief review of his life is in order.

Charles C. Miller was born in the little town of Ligonier, PA., in 1831. His father was a physician and Charles was the only son of a family of six. His doctor father was of such mellow disposition that Charles determined to be like him. His mother confined her reading to the Bible and Charles, through her remarkable good judgment, was influenced by this. His father died when Charles was 10 years old and, when the estate was settled, little remained to take care of the family. Consequently, the story of his education, for Charles was determined to follow in his father's profession, is that of a poor boy's struggle to get an education. He worked his own way through high school and college and finally obtained his M.D. degree, graduating from Michigan University with highest honors, and as a member of Phi Beta Kappa, honorary scholastic fraternity.

Dr. Miller enjoyed his beekeeping, specializing in comb honey production. However, it soon became apparent through his writing and speeches at many beekeepers meetings that he was an excellent beekeeping teacher.

With diploma in hand, he was encouraged by a friend to go to Marengo, Illinois and there he began his practice.[2] The local doctor tried to talk him out of settling there, and suggested he go farther west, but Charles stayed and established his office and set up his practice. These were the days when doctor, went on calls, either by buggy or on horseback and, inasmuch as the local doctor had more than he could handle, he began turning over to Dr. Miller those calls at a distance.

Dr. Miller took care of these patients, but on his long rides home, often late at night, he would worry over whether he had made the right diagnosis. When he got home, he

*Former ***American Bee Journal*** editors

would look up the case in his medical books and, almost without exception, he had made the right diagnosis. Nevertheless, this continued to happen. It also should be noted that Charles' self-denial, his poor diet and underexercise in his determination to finish medical school had broken his health. It is told that he didn't speak to a woman during this time because he was so dedicated to what he had set out to accomplish. So, within a short time, he decided that taking care of the ills of others was not for him.

During the years that followed, he alternated his time between school teaching, teaching of piano and vocal music, and traveling for music publishing houses. He maintained his home at Marengo, although work requiring his being away from home irked him.

In August 1857, he married Mrs. Helen Maria White, a widow with one child, and to that marriage were born two children, but only a son was to survive. It then happened on July 4, 1861, when Dr. Miller was away in Chicago, that his wife collected a swarm of bees that settled after flying over the house and, though stung severely, put them in a sugar barrel. This was the beginning of Dr. Miller's interest in beekeeping that stayed with him throughout life. He harvested 39 pounds of honey from the barrel and reports that he sold it for 12½ cents a pound.

In the spring of 1880 his wife died and, in the autumn after the honey was harvested, he took his son and fled the Marengo home to spend the winter with his sister. He returned the following spring to take up the broken thread of his life. In the fall of 1881, he married Miss Sidney Jane Wilson who lived on a farm where he had one of his apiaries. Her sister, Miss Emma, came to live with them; she is the one who was his only helper in the bee yards when he was producing record crops of comb honey. She also wrote extensively for the *American Bee Journal*.

Dr. Miller's writings first appeared in the *American Bee Journal* in 1870[3] and he also wrote under the penname of B. Lunderer,[4] which he continued on occasion for several years.

In 1894, editor York made the following announcement:[5] This "department in the BEE JOURNAL will hereafter be 'Generalized' by the hard-working, practical, and prolific apiarian writer—Dr. C. C. Miller of Marengo, Ill. He needs no formal introduction to our readers, we know, and yet we feel that we ought to call attention to the fact that in accepting the position of 'General Nutcracker, . . . he thus consents to having 'fired' at him all the hard questions that may trouble any beginner in bee-keeping or even one who is beyond the ABC class."

With the first issue in January 1895, this became a department entitled "Questions and Answers," conducted by Dr. C. C. Miller, Marengo. With the exception of the last two issues of 1900, Dr. Miller's answers continued until his death in 1920, although the heading of the department usually was entitled "Dr. Miller's Answers." It is of interest to note that one of his frequent answers was: "I don't know," for he always had an honest answer. At the time of his death, there was found in his typewriter copy for "Dr. Miller's Answers" for the next issue of the Journal.

AMERICAN BEE JOURNAL

Published Monthly at 75 cents a Year, by George W. York & Company, 146 West Superior Street,

GEORGE W. YORK, Editor.
DR. C. C. MILLER, Associate Editor.

CHICAGO, ILL., AUGUST, 1909 Vol. XLIX—No. 8

Removal Notice

The American Bee Journal office has been moved once more. And now we hope it will be many years before it will be necessary to change again. We are located at 146 E. Superior St., Chicago, but after Sept. 1st it will be 146 W. Superior St., owing to renumbering certain Chicago streets at that time. So we have used this latter new street number throughout this copy of the American Bee Journal rather than to make another change within about two weeks.

So kindly remember that the American Bee Journal will be located at 146 W. Superior St., Chicago, Ill., hereafter.

THIS ONE THING WE DO

By the way, we have severed our connection with all other kinds of business, and from now on expect to devote our time wholly to the old American Bee Journal. We again invite the hearty co-operation of all its readers in our endeavor to make it the best bee-paper possible. We wish to thank all who have so kindly helped us in the past, and we trust that we shall merit the continued patronage of all bee-keepers.

A LOOK AHEAD

What is needed first, last, and all the time, is more subscribers. For some time we have been issuing a little over 9000 copies each month. We would like to make it 10,000 copies by Oct. 1st, and 12,000 by Jan. 1st. It can be done if only about one in each 10 subscribers will send in one new subscription before Oct. 1, and then 2 new ones between Oct. 1 and Jan. 1. Why not? It works this way:

The larger the subscription list we have the more advertising patronage we can secure. And then the more of both subscriptions and advertising money we can have the better bee-paper we can publish each month. So in the end it all tends to the benefit of all concerned.

If just half of our present number of readers would each send in one new subscription besides his own renewal between now and Jan. 1st, just see how the list would increase! But every one can secure more than one new reader.

On several pages of this issue we offer liberal premiums for getting new subscriptions. We don't want any one to work for us for nothing. You can't afford to do so, and we want to pay well for the work of securing new subscriptions.

Now, please see what you can do about getting your neighbor bee-keepers to subscribe. It is not our aim to make more bee-keepers, but to make more intelligent those who already have bees. The American Bee Journal will always do this if given a fair chance. But it must be taken and read carefully, and then its teachings put into actual practice in the apiary.

Editorial Notes and Comments

Dr. C. C. Miller, Associate Editor

Saturday, July 31st, we had the very great pleasure of being with Dr. C. C. Miller, of Marengo, Ill., who is so well known to the whole world of beedom. Although in his seventy-ninth year, the Doctor was feeling very well, and enjoying life about as much as he ever did. He has only the home apiary to look after this year, which contains about 125 colonies. There was no white clover in his locality this season, and not very much of anything else, so that his honey crop will be a very small one. His bees seem to be gathering some honey-dew also, which, of course, spoils the white honey.

While Dr. Miller has been assisting us in various ways in connection with the American Bee Journal for years, we have now arranged with him to take the position of Associate Editor, then putting here in a little closer touch, if possible, with its contents. Some 20 years ago he filled a similar position, we believe, on the American Bee Journal, and during all the intervening years he has written more or less for its columns, besides conducting the "Question-Box" regularly the past 15 years.

Perhaps no other bee-keeper in the whole world is so widely and so favorably known as is Dr. Miller. He has been a close student of bees and bee-keeping for almost half a century. His book on "Forty Years Among the Bees" stands alone as to its character and practical value to the honey-producer. He possesses not only a rich bee-keeping experience, but also exceptional literary ability to express in plain and concise terms anything he wishes to relate touching the subject of bee-culture.

Not only are we fortunate in having Dr. Miller associated with us in the conduct of the American Bee Journal, but all its readers will profit by the new arrangement.

The Doctor will continue to reside in Marengo with his bees, and will also answer questions for the American Bee Journal as heretofore.

Old vs. Young Queens

"Our preconceived notions and ideas often get rudely jolted when we are the least expecting it."

Thus says J. L. Byer, in the Canadian Bee Journal, and he then goes on to tell what good work he got from a lot of queens that had by a sort of accident been left without renewing, although he does not approve of having queens generally more than 2 years

Editor York announced Dr. Miller as associate editor in the August 1909 issue of the magazine.

In 1917, the *American Bee Journal*[1] published "A Thousand Answers to Beekeeping Questions," that contained the best of Dr. Miller's answers in the *Journal*. This was compiled by M. G. Dadant who had cataloged some 2,000 answers and had selected the best of them; it went through three editions.

In 1909, Dr. C. C. Miller first was listed on the masthead as Associate Editor of the *American Bee Journal*, and this was continued in 1912 when C. P. Dadant took over the editorship from York. This continued until October, 1918 when Frank C. Pellett moved to Hamilton and became an associate editor, but "Dr. Miller's Answers" continued until his death. Thus, for almost 26 years Dr. Miller maintained his question-and-answer department in the *Journal*. For a similar period of time he wrote a department in *Gleanings in Bee Culture* entitled "Stray Straws."

Dr. Miller was a frequent contributor to the *American Bee Journal*, as well as to other bee publications. At first writing under the penname of B. Lunderer for several years, as previously noted, he continued writing until 1918—a period of some 48 years. In an article in 1875 he wrote: "I commenced with 19 colonies. Had 12 natural increases, and nine artificial. I took 400 lbs. extracted honey. Principal source of honey: fruit blossoms, white clover and buckwheat."[6] Such was Dr. Miller's terse way of

Dr. Miller's Questions and Answers column was a popular part of the *American Bee Journal* for 26 years.

conveying information.

His first book was entitled "A Year Among the Bees," a small but concise story of management of bees throughout the year. It contained no date of publication, but Wm. F. Clarke[7] announced Miller's new book in the *Journal* in the issue for May 26, 1886, and Newman, then editor, advertised it for sale in the next issue.

In 1902, a more comprehensive publication appeared entitled "Forty Years Among the Bees," by Dr. Miller. The preface of the book is dated December 1902. This was followed in 1911 by his book entitled "Fifty Years Among the Bees." The first was published by the George W. York Co. and the latter by the A. I. Root Co.

In addtion to his many writings for the journals, Dr. Miller was a frequent attender of the bee meetings and conventions of his time. Since he was one of the best read men of the day, a good speaker and made a fine impression wherever he went, it is not surprising that he played a prominent role in affairs. The following information can be found in Milum's History.[8]

The beekeepers of the Northwestern States met in Chicago, September 14-15, 1880, to form a permanent society. A constitution was adopted and Dr. Miller became the first president of the North American Beekeepers' Society. He was re-elected president of this organization in 1886 at its Indianapolis meeting, and again in 1892 at its Washington, D.C. convention. In between times, he served in other official capacities.

When the North American Beekeepers' Society was dissolved and the U.S. Beekeepers' Union was formed in 1897, Dr. Miller was a director, and when this organization became the National Beekeepers' Association in 1900, its list of directors included Dr. Miller through 1903. At its 1904 meeting in St. Louis, Dr. Miler prepared an interesting honey exhibit for public display. Milum records that, in September 1905, a letter from the office of the American Honey Producers' League showed Dr. Miller as president, but there is no record of this organization until it met in Kansas City, Jan. 6-9, 1920.

It is of interest to add that in his personal recollection,[2] Dr. Miller wrote: "I take great pride, personable, I hope, in having been one of the editors of the Standard Dictionary, and in having held the record for the largest yield of section honey from as many as 72 colonies."

There also is published in his own hand writing the following:

"My young friend: For best success, get pure stock, keep tab on every pound of honey taken from each colony, then breed from the best storers that are all right in color and temper. Cordially yours,

1/3/16 C. C. Miller"

The writer (M. G. Dadant) had the opportunity of visiting with Dr. Miller and Miss Emma at their home in Marengo, Illinois, and I never a more delightful day. I was with E. G. LeStourgeion, who then was editor of "The Beekeepers' Item," published in San Antonio, Texas.

Never have I in my efforts on behalf of beekeeping known of a more even judged, finer temperment man than Dr. Miller, either in personal discussions, in his public appearances, or in his writings than was the good old Doctor. He had a way, when he wanted to criticize some things, to do it in a manner that would be without offense whatever.

C. P. Dadant was named as a member of a committee to prepare a memorial for Dr. Miller. Two years after his death, in his own Presbyterian Church, a bronze tablet was unveiled and 350 beekeepers were assembled there. Well-known leaders such as C. P. Dadant, Prof. H. F. Wilson and Dr. E. F. Phillips gave addresses.

The wording on the tablet read: "This tablet is erected by the beekeepers to Charles C. Miller, a former resident of Marengo in appreciation of his services to beekeeping and as a mark of esteem. A library of beekeeping literature has ben endowed at the University of Wisconsin to this memory."

Thus, the memory of the "Nestor of Beekeeping" and the "Sage of Marengo" is preserved for all time.

References Cited

1. **Pellett, Kent L. 1936.** Lives of famous beekeepers. Dr. Charles C. Miller. *Amer. Bee Jour.* **76**(6): 299-302, (7):350-351.
2. **Miller, Dr. C. C. 1916.** Dr. C. C. Miller's personal recollections. *Amer. Bee Jour.* **56**:10-11, 50-51, 85-86.
3. **Miller, Dr. C. C. 1870.** Introducing queens. *Amer. Bee Jour.* **6**(4):83.
4. **Lunderer, B. 1871.** Novice. *Amer. Bee Jour.* 7(4):75.
5. **York, George W. 1894.** The "general questions." *Amer. Bee Jour.* **33**(1):7.
6. **Miller, C. C. 1875.** Beekeeping in 1875. *Amer Bee Jour* **11**(11):250.
7. **Clarke, Wm. F. 1886.** Dr. Miller's new bee-book. *Amer. Bee Jour.* **22**(21):327-328.
8. **Milum, V. G. 1964.** History of our National Organizations. The American Beekeeping Federation.

Queen rearing, like most operations common to present day-bee culture, is of comparatively recent development.

In the first edition of Langstroth's book he discussed at length the methods of increase common to that time. He noted that Schirach was, apparently, the first to discover that the bees could rear a queen from worker brood. This discovery laid the foundation for the investigations and experiments which were one day to develop a system of management permitting the rearing of queen bees in large numbers.

Langstroth also commented on Huber's plan of increasing the number of colonies by dividing the colony into two parts and permitting the bees in the queenless section to rear another for themselves. This method offered little advantage over natural swarming and made no substantial advance.

Another early attempt was to start a new colony by placing a piece of comb containing eggs or young larvae in an empty hive placed where the parent colony had stood. With the old hive removed to a new location, the field bees would return to the old stand and queen cells would be started at once. With little comb space available and no queen present, the bees would build new combs of mostly drone cells and the result was disappointing.

Langstroth recommended, instead, the making of forced swarms. To accomplish this he turned the hive upside down and set an empty one over it. The bees were driven upward by drumming on the hive until bees and queen were mostly in the upper story. This was then set on a new hive stand and the old hive returned to its former position. Returning field bees and emerging brood provided enough of a force to carry on as usual. Queen cells would be started at once in the old hive, while the newly prepared colony was kept confined until the evening of the third day, usually being placed in the cellar to insure quiet.

With such forced swarms a few days ahead of the time when most increase was to be made, the beekeeper would find in his hives an excess number of queen cells. These extra cells provided the means of making divisions and supplying each with the material for a queen with a minimum of delay. The ripe queen cell was cut from the comb on which it was built and inserted in the comb of the newly prepared colony.

Henry Alley, who originated the first successful system of commercial queen rearing.

When ripe cells were available, it was easy to make increase by removing frames of brood to a new hive and giving such a cell with a queen nearly ready to emerge. The making of increase by the formation of nuclei appears to have been the result of experiment, by both Langstroth and Dzierzon working independently. While it provided the beekeeper a means of making substantial increase, it was practical only for use at home. There still remained the necessity of finding ways and means of meeting the needs of those at a distance who lacked the proper equipment until it could be purchased. The shipping of full colonies of bees was expensive and difficult. But let any imperative demand appear and human ingenuity will find a way to meet it.

Since a colony can be renewed quickly by means of the introduction of a new queen, it would be necessary only to buy a queen to change the entire stock in the colony within a few weeks of time. Hardly could the present-day demand for bees and queens be foreseen in the days of Langstroth.

Langstroth started the rearing of queens by depriving a colony of its queen until it had sealed queen cells. These cells were then removed and a queen given them from another hive. As soon as this second hive had performed in similar manner, the queen was moved into the third. By moving her back and forth between the three hives, alternately permitting her to lay for about a week at a time in each, he was able to secure a considerable number of queens. Since first one hive and then the other was queenless for a time, there was always a batch of cells coming on in one or the other. This beginning at queen rearing in 1852 had not been possible previously because of the lack of control of the combs prior to the invention of the loose-hanging frame.

Little advance was made from Langstroth's first method, here described, for many years. In 1876, when Cook published his "Manual of the Apiary", he had nothing better to offer in the way of rearing

***Former editor of the *American Bee Journal* and author of the book *History of American Beekeeping*.**

queens than to deprive a colony of its queen in order to start the bees to building queen cells. He stated that sometimes as many as fifteen or twenty would thus be provided. He did propose cutting off the edges of the combs, or cutting holes in them, to provide suitable spots for starting the cells.

A statement which appeared in the *National Bee Journal* to the effect that eggs of the honey bee could safely be sent by mail was responsible for starting A. 1. Root off on a new trail. In *Gleanings* for April, 1873, Root offered to send a piece of comb containing freshly-laid eggs from an imported Italian queen, for twenty-five cents. Root saw in this the opportunity to furnish Italian stock to the mass of beekeepers at small expense, and was much disappointed with its failure. When put to the test, he found that eggs would hatch and produce good queens when sent a short distance, but in no case did they retain any vitality when two or more days were occupied in transit. This experiment thus required but a very short time to demonstrate its futility.

Root's next move was to undertake the rearing of queens in the upper story of a strong colony. He separated the two divisions of the hive by means of a thick sheet of manila paper, and opened an entrance in the upper story to permit normal activity. In this way he secured forty-six queen cells in one hive. By cutting new comb into strips, he offered special inducements for the building of cells. The queens were cared for by placing them in small cages and placing them with the bees, much as Langstroth had done at the time of his first experiment in queen rearing.

The object, he stated, was to secure good queens which could be sold at a dollar each. To those who would offer such queens at this price, he offered to insert a card in *Gleanings* free. He also described the method, later commonly used, of establishing nuclei for the care of young queens until they were laying and ready to be shipped to fill orders.

It was not long after that reports of dissatisfaction on the part of purchasers of queens from advertisers began to creep into the magazine in the form of letters from readers. As is likely to be the case with any new undertaking, there were many difficulties to be met and many of the complaints were without proper foundation. Yet, in many cases the buyer never received anything for his money.

Although reporting failure when eggs were sent for long distance by mail, Root apparently continued to supply them on demand. Later we find in his magazine references to the removal of the larvae in natural-built queen cells and their replacement with larvae hatched from such eggs. The first reference to "grafting" is by E. C. L. Larch, who uses the word to indicate such a change. Apparently his idea was good, since the word later came into common use in connection with the transfer of larvae to artificial cups.

A man named W. L. Boyd seems to have been the first to suggest cups on the order of those afterwards developed by Doolittle, but he failed to appreciate his own discovery. In October, 1878, he wrote to *Gleanings* to suggest cutting out the acorns or rudimentary queen cells always to be found in every hive. He pointed out that one could thus have plenty of queen cells on hand and that, by taking a flat stick and transferring a newly hatched larva to the acorn, the bees would care for it and soon a nice sealed cell would be available. Root, as usual, appreciated the suggestion, and carried it further by outlining how artificial cells could be made by dipping a wet stick in melted wax. He even went so far as to publish a picture showing how these cells could be spaced along the strip of wood ready for use, and offered to sell them for ten cents per dozen by mail.

In view of later developments, it seems surprising that nothing came of this suggestion. Here was the modern system of queen rearing all but complete. Together, editor and correspondent had outlined it from the dipping of the cells to the transfer of the larvae, yet it appears that no one took any notice nor did they follow up the proposal to put it into use. How often does history thus repeat itself, with discoveries unappreciated and left for others to bring forward again at a later time. Root stated, however, that the idea had been suggested previously by someone else whose name he failed to disclose. One cannot but wonder whether this furnished Doolittle with the idea which he capitalized on so successfully a few years later.

The Alley home and apiary in Massachusetts.

In 1880, O. H. Townsend, of Michigan, described in *Gleanings* his method of queen rearing by fastening strips of new comb containing eggs in position with cells opening downward. To start with, he placed a clean white worker comb between two combs of brood in the hive containing his breeding queen. When this was filled with eggs, he was ready to start operations. From a strong colony he removed the queen, with two frames of brood and bees, to a new location. He then removed the rest of the frames containing brood by shaking the bees from them, and replaced the brood frames with empty combs. The new comb of eggs first mentioned was now cut into strips, and one strip was attached near the top of each of four or five of the empty combs and replaced in the hive. The bees, finding themselves queenless and broodless, would utilize this new material by building numerous cells.

It remained for J. M. Brooks, of Indiana, to propose an even better method of shaving down the comb nearly to the midrib and fastening strips to wood bars to be hung in a frame. He appears to have been the first to use cell bars for support of his embryo queens. The picture with his letter, in the August, 1880, *Gleanings*, shows a frame with three such bars, each filled with cells. The editor adds a footnote to the effect that his neighbor, Clark, raises cells for him on a somewhat similar plan.

Thus was the way prepared for the development of the first system of queen rearing published by Henry Alley, in 1883. At that time the lamp nursery was used by queen breeders who attempted to obtain a considerable number of queens. This nursery is described as a hive made of tin with double walls. The space between the walls, from one-half to one inch, was filled with water which was maintained at a temperature of about 100 degrees by means of an oil lamp underneath. Frames containing ripe cells were hung in this nursery and required very careful watching on the part of the beekeeper.

Alley came forward with some really new methods, although he made use of the strips of foundation cut down after the plan of Brooks. He offered the swarm box with a top and bottom of wire cloth, in which to confine a strong colony of bees without a queen or brood for several hours. The box of bees was placed in the cellar in preparation for cell building. After being thus left queenless for ten or twelve hours, they were in a mood to accept queen cells.

Four days previous to the making of this cell-building colony, he had placed a new comb in the center of the brood nest of his breeding colony. This comb then would be filled with eggs and newly hatching larvae. With a sharp knife he cut the comb into strips by cutting through every alternate row of cells. The cells on one side were cut down to within one-fourth inch of the midrib. To insure uniform distribution he then destroyed every alternate egg or larva. The strip was then fastened with warm wax to the lower edge of a comb which had been cut down to about one-half its normal size. These prepared combs were placed in an empty hive and put down on the stand from which the bees in the swarm box were taken. The bees were then released and immediately started giving attention to the newly prepared cells.

Alley also developed an improved nursery cage and described at length the care of cells, the formation of nuclei, the introduction of queens, etc. He was the first to devise a really successful system of queen rearing suited to commercial use. It soon became known as the Alley plan and was generally followed by queen breeders of his day. For a time it appeared as though Alley was destined to be recognized as the father of commercial queen rearing.

Alley did not remain the dominant figure for long, however. By this time G. M. Doolittle was becoming well known to the readers of the bee magazines. At first Doolittle followed the well-worn path of others of his time. He used the same plans as those described above, with such modifications as were suggested as he went about his work. Then, he wrote how he reared queens by saving the partially built queen cells, or acorns, to be found in every hive, as Townsend had done. In these cells he placed larvae by means of an implement which he whittled from a toothpick. These cells were fastened into openings in old combs where he had removed a portion as large as a man's hand. He had progressed only to this point when his methods were published in the small pamphlet issued by E. H. Cook in 1887.

In 1889 Doolittle gave out his new system of dipping artificial cells by means of a wooden stick placed in melted wax. Although Doolittle did not claim originality for his system, but stated in the preface of his book that he had picked it up a bit here and another there, he did refine the methods so as to make them workable. He published a system so complete, and which worked so satisfactorily, that the originators of most of the details were soon forgotten and it came to be known by his name. By bringing together the best of all that had appeared and combining it into a complete and workable system, he achieved a permanent reputation as the discoverer of a fundamental method of procedure. So well did he tell the story, and so fully did he test every detail in advance, that but little has been added since that time.

By means of making artificial cells in large numbers, transferring the larvae to these cells, and supporting them on bars in frames hung in the hives, he made it possible to rear good queens efficiently and cheaply. Thus, he became the founder of commercial queen rearing, succeeding Henry Alley for recognition among beemen.

G. M. Doolittle offered a new system of queen rearing by the use of artificial cells and revolutionized the industry.

Shipments of Queens

No sooner did beekeepers begin rearing queens than they began looking for some cheap and safe way of transporting them to their customers. The first queens to be sent by mail probably were sent in 1863, by C. J. Robinson, of Richfield, to Langstroth. Mr. Robinson had received Italian queens from P. J. Mahan, of Philadelphia, by express and was bothered about getting them as he lived twenty miles from an express office. In that day of horse and buggy movement, twenty miles was a considerable distance. He thought that queens might be sent by mail and wrote to Langstroth to get his opinion of the matter. Langstroth replied that he thought it was impractical. To prove his point, Robinson caught a black queen and confined her in a cage with several workers and dispatched them by mail carried in a stage coach to Langstroth's address. The bees reached Langstroth in good condition and, in return, he sent a fine Italian queen to Robinson. This mailing was not so fortunate, as the bees were daubed with honey and the queen soon died. A second attempt resulted in a safe journey.

In 1868, Moses Quinby advertised to ship queens short distances by mail. Such shipments did not become common, however, since they were soon excluded from the mails by postal officials. The matter was frequently agitated by the beekeepers from time to time and committees were appointed and petitions sent to Washington.

The matter was finally settled in section 372 of the postal laws, approved March 3, 1886, in which it was provided:

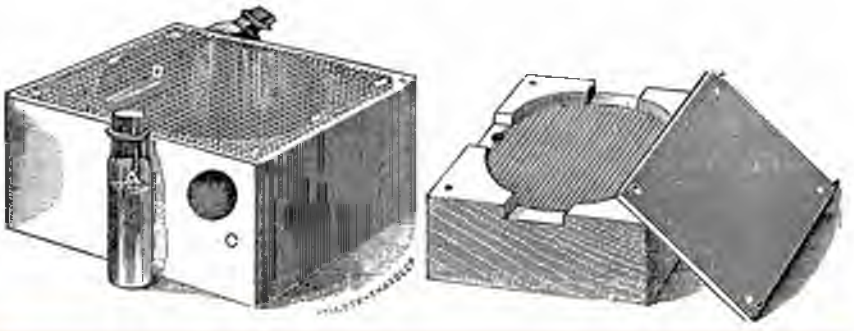
"Queen bees and their attendant bees may be sent in the mails, when properly put up so as not to injure the persons of those handling the mails, nor soil the mail bags or their contents."

Shipping Cages

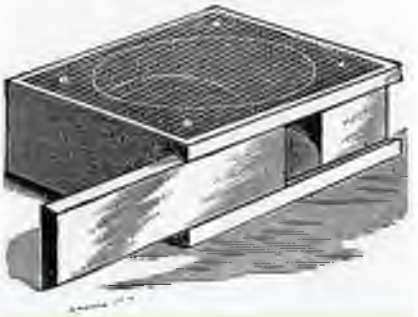
The first queen cages were very crude in comparison to those now in use. A block of wood two inches square and an inch and a half in thickness was used. A hole bored to within one-fourth inch of the bottom left a good-sized cavity for bees and food. A piece of capped comb honey was cut to fit the hole and this was placed on the alighting board of a hive to be cleaned by the bees. This was to prevent the occupants of the cage from getting daubed by the honey. The small piece of comb was fastened in place by means of a wooden pin passed through small holes which previously had been bored in the box. The open top was covered with wire cloth to prevent the escape of the queen and her attendants. Such cages were difficult to stock, and it was not easy to remove the queen for introduction to her new colony.

Many types of cages appeared, resulting from efforts of bee men to find something really satisfactory. A. I. Root offered a cage made in a square block of wood thinner than the above, provided with a slide cover for an opening in the side, and stocked with candy, which was a step in advance.

For a time A. I. Root shipped queens in cages made by placing a wire screen cover over both sides of a comb honey section



Early queen cages made no provision for stores in a compartment separate from that occupied by the bees.



Novice's queen cage, which was described as about one inch high and two inches square. 1878.

The Benton cage is still the one most commonly used.

filled with comb and containing a small amount of sealed honey. This permitted sending a considerable number of bees along with the queen.

The cage problem was finally solved by Frank Benton who used a small block of wood with most of its interior cut away. This left only a hollow shell open on one side. Part of this space was filled with candy for food. The open side was covered with wire cloth. A small hole large enough to permit the passage of a single bee was bored in each end. One of these holes was entirely filled with candy to permit the liberation of the queen when all the candy had been eaten away by the bees in the hive in which it was placed for introduction. The other hole permitted the beekeeper to put in the queen and her attendants, after which it was closed by a bit of metal nailed over it. This Benton cage, with slight changes, has remained in common use until now.

A great many variations in the candy used for stocking the cages appeared from time to time. Much space was given to this subject in the bee magazines. P. L. Viallon appears to have been the first to succeed with candy with the formula. Of course, others offered what they thought to be improvements by using a different mixture. The Scholtz candy was made by mixing fine sugar and honey together to make a stiff dough. I. R,. Good came forward with a mixture of granulated sugar and extracted honey. For many years, much was heard about the "Good" candy for queen cages.

The pioneers in the business of rearing and shipping queens suffered many embarrassments and much vexation. So many things could happen to the queens after they had left their hands that they were charged with losses entirely beyond their power to prevent. Too often the new queen would be lost in introduction, and the bees, finding themselves queenless, would rear another from their own brood. The buyer, unaware of what had happened and finding a black queen in the hive in which he had placed the newcomer, at once charged that he had been defrauded. The old bee magazines contain hundreds of letters from disappointed beekeepers who probably were unaware of their own shortcomings.

In 1877, Charles Dadant wrote: "During ten years of business in selling queens and bees we have received many praises, but we have also been greeted with accusations enough to make the business very irksome, without a compensating benefit. The bee breeder who has never been accused of misdealing is one who has never sold a bee."

L. L. Langstroth and Son were the first to advertise queens for sale and, for a time, appear to have had the field entirely to themselves. With the July, 1866 issue the *American Bee Journal* resumed publication after a suspension because of the Civil War. The Langstroths began using a full page of advertising, offering Italian queens bred from imported mothers. In the January, 1867 issue they began advertising Egyptian queens and, in March of that year, Ellen S. Tupper, of Brighton, Iowa, first advertised Italians.

In the April, 1867 issue C. B. Biglow, of Vermont, and Adam Grimm, of Wisconsin, entered the field to offer Italians, and A. Gray, of Ohio, offered both Italians and Egyptians. The same year, Wm. W. Cary, of Massachusetts, and K. P. Kidder, of Vermont, began advertising Italians, so the pioneers were not left without competition for long. Moses Quinby also appeared as an advertiser in the August issue and soon after, J. L. Hubbard, of New Hampshire, followed. In July, 1868, Charles Dadant, of Illinois, and J. H. Townley, of Michigan, added their names to the list. For a time, Dadant offered imported queens for sale, but he soon began to offer queens of his own rearing from imported mothers.

It was in April, 1869, that Henry Alley first published a modest little advertisement offering Italian queens sent by mail at $2.50 each, with purity and safe arrival guaranteed. At the same time others were asking $8.00 for tested queens. Adam Grimm was the largest user of space and seems to have then been in the lead in the queen breeding field. In the October issue, Grimm reduced his price to $3.00 per queen, which seems like a high price for so late in the season.

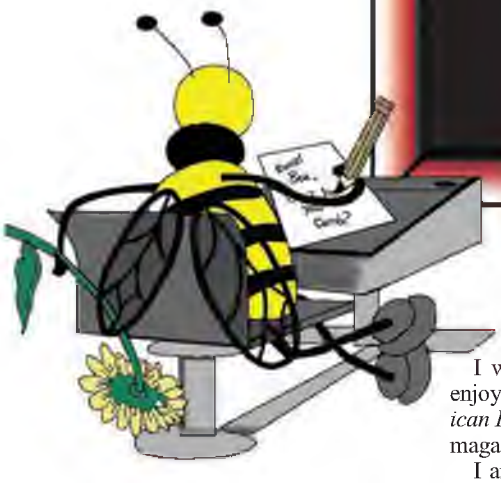
New names appeared from time to time, but the space used was modest, and the volume of orders received probably was likewise limited. The development of the queen advertising was the principal support of the magazine, although the May, 1872, issue contained only seven pages of advertising of all kinds, including hives, extractors, and miscellaneous items. After the first year with not more than a page or two of advertisements at most, this must have seemed a fine showing to the editor.

As soon as advertising support showed signs of prosperity, new bee magazines were launched and a long line of them followed. The advertising of queen breeders and, later, of shippers of live bees, has made possible the continuance of publications devoted to bee culture. The volume gradually increased until the peak was reached in the boom years following World War I.

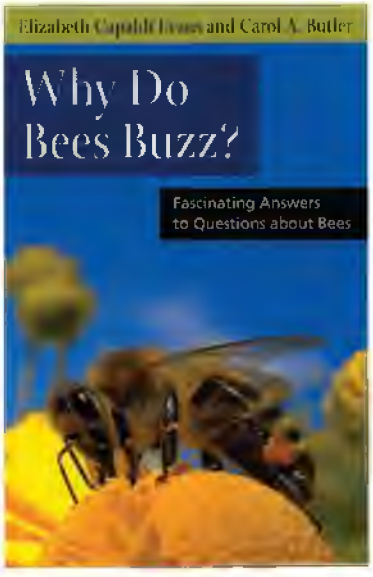
The business of queen breeding developed slowly, but steadily, until the time of the great expansion that came with World War I and the spread of sweet clover over the Plains Region. Since that time the growth has kept pace with the development of the package business, which has expanded so rapidly.

The Classroom
by Jerry Hayes

Please send your questions to Jerry Hayes,
17505 NW Hwy 335, Williston, FL 32696
Email: gwhayes54@yahoo.com



From the Shameless Commerce Division at the Classroom*



There is a "New" book by Dr. Elizabeth Capaldi Evans titled "Why Do Bees Buzz". This is a fun, very interesting book that answers lots of those fascinating questions we all have about honey bees. Dazzle your friends with your knowledge of honey bees. I found everything from basic honey bee biology, to African "Killer" Bees, Colony Collapse Disorder, Mayan Beekeeping and everything in between. It was a fun read.

And no, I don't get a commission ☺

**Shameless Commerce Div. title taken without permission from the "Car Guys" on NPR.*

Q CONFUSED

I would like to start by saying I really enjoy your "Classroom" section in the *American Bee Journal*. As a new subscriber to the magazine, I find it a must read every month.

I am new to beekeeping this year, and I am finding that I have a lot more questions than answers, as I'm sure it is with most new beekeepers, so I will go ahead and dive in head first with my first question.

I have read in several articles that it is suggested to feed Fumagilin-B to all newly installed package bees for the control of Nosema, and then on the other hand, I have been told not to feed it until you see signs of Nosema in your hives. So, my first question is: *Do I need to feed it or not?* I am starting out with 3 lb. packages in brand new 10-frame deep equipment. I am also using wood-bound 10-frame hive-top feeders with two chambers that are divided. If I need to feed Fumagilin-B, do I need to put it in both chambers, or just one? The mixing instructions that came with Nosema say to feed 1 gallon to each packaged colony. If I feed it in both chambers, that will be two gallons for each colony. I would also know how long to feed it to them before I stop.

The mixing instructions are this... 1/2 gal water + 8 lbs sugar = 1 gal syrup and then add 1 rounded teaspoon of Fumagilin-B. I forgot to mention that my feeders will hold 1 gallon in each chamber.

I'm sure these are some silly questions, but I really don't know how to proceed. Any help that you can offer would be greatly appreciated. Thank you for your time,

Mark Lawrence

P.S. Are there any ill effects to bees that are fed Fumagilin-B?

A

These are not silly questions at all Mark. I generally do not like to or suggest the use of "antibiotics" for prophylactic use such as feeding antibiotics to prevent a disease. As an example, are you now taking antibiotics because you are afraid of getting an ear infection? Probably not and it's the same thing with feeding antibiotics to prevent American or European Foulbrood. It doesn't work very well and has negative side effects.

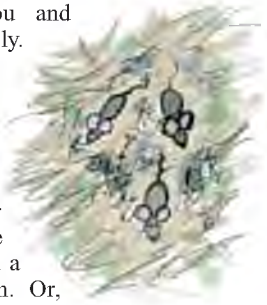
But, and in this world there are *buts*, *Nosema ceranae,* the predominant "Nosema", is almost an endemic 24/7/365 disease pressure. Fumagilin-B still seems to have some activity against *Nosema ceranae,* which has fundamentally replaced *Nosema apis*. So, I would suggest following label directions for mixing, dosage and time frame. If you have a partitioned 2-gallon feeder, only use one side to feed the Fumagilin-B to be sure that they get a proper dosage in the proper time interval. After this, you can use the feeder, both sides, to supplementary feed as needed.

Fumagilin-B, like any other chemical, is a stressor on honey bees. It is tough on them, but not more so than Nosema. Take care and enjoy the learning curve. It will be fun.

Q A Smelly Situation

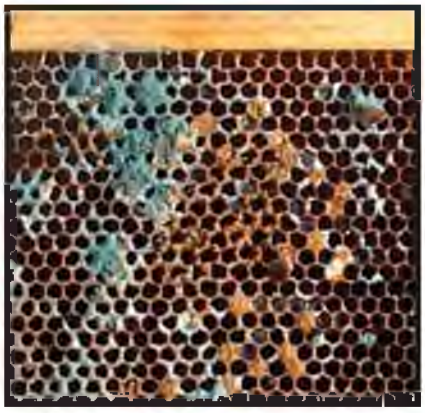
I have bee frames that were put away in plastic bags for the winter. When I opened the bags, I noticed they had a mouse nest inside. The frames are new and I would like to know how I could clean or disinfect the frames before putting on the beeswax foundation. Thank you and awaiting your reply.

A



Mouse urine is pretty stinky. Use soap, water and maybe some baking soda and a sponge or brush. Or, take the easier way out and buy some new frames. Even in tough economic times, they are still pretty cheap.

Q JUST MOLD... NOTHING EVIL



A neighbor had queen problems all summer, then failed to feed his hive sufficiently in late summer/fall. The colony starved, probably early in the winter. He had an in-frame beetle trap half-filled with vinegar and oil, and no upper exit to let the moisture out. There was a lot of moisture absorbed into the underside of the outer cover (looks like a thick sheet of old Formica) and mold formed on the woodenware and especially on the bees. It does not look like there is any kind of disease on any of the equipment, but the mold does have a rather pungent smell (not like foulbrood, but a bit like bread mold or *Penicilliny* smell if that's at all accurate). It is a light bluish-green dust and he explained it was thick and a little hairy over the dead bees, like something you would find on a tomato if you left it in the refrigerator too long.

He is very cautious and thinks he should throw out all of the equipment, but I am less concerned about bees coming in contact with the mold. I figure if he cleans out the bulk of the mold, a healthy colony (he wants to start fresh with a nuc of Russians in May) with better ventilation should do fine. They will clean up the mold residue and be just fine I would think. What's your take?

Thanks,
GiGi

A

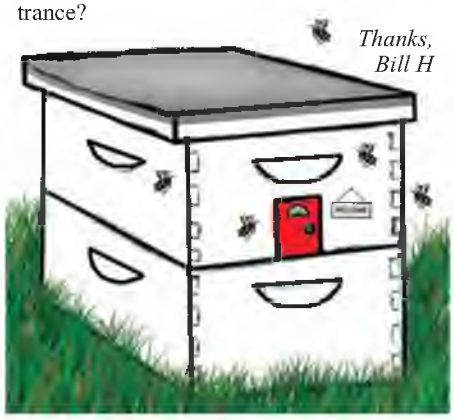
I agree with you 100%. Honey bees are great cleaners if given the opportunity.

Honeycomb, the hexagonal cells that are the containers that are foundational to the honey bee's existence, absolutely, positively have to be clean and relatively sanitary. If there is dirt, debris, crud, that isn't removable, then it can negatively affect brood rearing, honey ripening/storage, beebread storage, etc. Honey bees that don't do this hygienic cleaning die quickly. So, honey bees that don't do this basic level of hygienic behavior for various genetic reasons turn their existence over to Mr. Darwin and they die and dispose of their bad genes at the same time. The beekeeper should clean up the mess as best as possible and let the new package do the rest of the cleaning. Then, being a better beekeeper in a variety of ways is next.

Q Tempus Fugit

Jerry, during this last winter I've been reading a number of old articles on the Bee Source web site. I came across one from Aug 1985 that you authored titled "Queen Excluder or Honey Excluder?". It was interesting that your conclusion and final summary of findings focused more on the benefits of the upper entrance and less on whether or not to use a queen excluder. Did you ever do any follow-up experiments to determine the pros and cons of an upper entrance?

Thanks,
Bill H



A

Twenty-five years goes quickly, Bill. I can't remember exactly the whole article from 25 years ago, but I do remember that I wanted to look at the old beekeeper tales that queen excluders were or are honey excluders. So, in my mind, the easiest way to look at this was to place entrances below the excluder in their "normal" position and then entrances above the excluder.

In the process of this research years ago I did get intrigued with "upper entrances". If you found this simple research by mistake from the time when I had all dark hair and my wisdom level was lower than it is now, then it must not have caught on. ☺ Yes, others have tried this with good results, but it never was broadly adopted because changing hardware for a 10% increased honey yield just didn't make that much difference. Give it a try. That's what is fun about beekeeping.

Q Good Smells, Bad Smells

I really enjoy reading the Classroom in the *ABJ*. There are a lot of interesting Q and A 's. I have been a beekeeper in northeast Ohio for about 25 years. I have been doing quite well at it, but like most beekeepers in my area, we have a difficult time controlling varroa mites. I have been building my own boxes recently and would like to know if you know of any research or studies done on using certain species of wood to help control varroa mites? Do you know of any wood that may harm the bees and should not be used? I would appreciate your thoughts on this.

Thanks,
Dan

A

Hello Dan, thank you for the Classroom compliment. It has been found that some essential oils, from fresh cedar, and other woods that have a strong odor can be repellent to varroa mites. The problem in using these woods is that the bees do not like the odor either and coat the wood with propolis, effectively covering it up. Coat it with propolis and there is no odor and no repellent activity.

There is some lumber available now that is treated with heavy metals or even pesticides to stop rot and termites, but these should be avoided because they could harm your bees and possibly contaminate hive products such as honey and wax.

Using concentrated varroa controls such as Apiguard (Thymol or Thyme oil) that the beekeeper applies for an effective short-term treatment is a better more consistent way to go.

Q The Last Straw?

My two hives of Georgia bees died in spite of (or because of?) my buffering them from the winter gales with straw bales. They appear to have died early on because there is a LOT of honey left. Because it was so deadly cold and snowy for so long (3 months under 50 degrees, mostly way under), I couldn't open the hives to retrieve the Apistan strips I inserted late fall. I guess this means I can't extract the honey for our own use?

Should I give it to the new bees I have ordered? Should I leave the bottom supers empty (of honey) so they'll use that for brood? Should I dispose of old, really dark comb?

The good news is that the hive I established last year with an Ohio nuc, which I didn't protect with straw, survived the winter in great shape! The wild hive in the Hemlock tree did too. So, is the buffering (to cut the force of the wind and provide some insulation) with straw bales a bad idea? I left then room at the exit to get out.

Also, in some areas with piles of dead bees,

I saw what looked like fine sawdust or frass. What would that be? This is my eighth year as a beekeeper, the third after taking classes, and I know less and less. At this rate, I won't know anything at all in a few more years!

Thanks,
Spirit

A

Spirit, one of many frustrating things about getting old is that the more you know, the less you know, because there are more questions than answers. I would have done the same thing you did with the straw bales. Assuming everything you did to all your colonies was the same, I don't think straw bales did anything bad to your colonies unless they were treated with something toxic to retard mold or mice.

I suspect the "sawdust" you saw was the wax capping particles from uncapped honey that the bees consumed earlier before the colony died. Keep learning and before long beekeepers will be asking you questions that you can answer from your years of hard-learned experience.

Q Not a Bad Thing!

Hi, Jerry. I'm a very small beekeeper in northern Arizona and we typically harvest less than 200 pounds of honey each year from four hives. Is there anything I can do while extracting, filtering and/or bottling our small crop that would reduce or eliminate granulation?

We try not to heat the honey and generally only filter it to the 600-micron level. Thanks very much for your ABJ column and for any ideas/advice that you may have.

MikeEbersole
Grand Canyon, AZ

A

Mike, Granulation/crystallization is a natural process that happens to most pure honeys because of sugar ratios and the fact that it is a supersaturated solution. When there is more glucose than the other sugars, the glucose precipitates out in the form of glucose crystals. Heating the honey delays granulation by melting the starter glucose crystals, which initiate the process. But, heating also destroys enzymes and volatiles, which makes "real" honey appreciated. Why don't you consider using this natural process to your advantage by making a smooth, creamy honey spread? By controlling this natural process through the introduction of superfine sugar crystals or creamed honey starter, you will produce a valuable form of honey that can be sold as is in plastic tubs or mixed with different flavors, fruits or nuts to create an even more valuable product.

Making creamed honey is technically called the Dyce Process. Google it for more information. This value-added product has a great niche market and there are many marketing possibilities.

Mike Responds

Hi, Jerry. I know you must receive a zillion emails, but thank you very much for being able to reply so quickly. Sometimes granulation happens and sometimes it doesn't, depending I guess on the nectar source and the sugar ratios that you explained. When it does happen, the granulation usually occurs after we've bottled the honey for sale at bazaars, etc. Some customers are turned off despite our best efforts to explain what's going on.

So, we've been trying to determine if there was something we could do to prevent/slow granulation (without use of heat) either before or after bottling (e.g., maybe we're storing it at the wrong temperature). There is nothing we can do to improve on what the honey bees have already done with the honey except to try and get it to customers in as natural or original condition as possible. We really shy away from heating the honey for exactly the reasons you mention. We will definitely research the Dyce Process. I've heard about it, but never had the courage to actually give it a try. Thanks again!

Mike

Q Could It Be Honey Dew?

I don't know what we would do without all your answers. My bees produced very little honey last year. What I did harvest is extremely thick and quite dark. I have warmed it to no avail as it goes right back to the molasses thickness. I heated a pint of it up to 140 degrees F., but it still returned to its original thickness. Any ideas what they could have gotten into?

We all had the feeling that we had very little out there for the bees to forage on, but something sure is different around here.

Richard Largen

A

It is hard guessing about the floral source without being in your area. You probably have a better idea of what it might be. Thickness (viscosity) is a function of how much water is in the honey in comparison to the solids (sugars). The bees usually give up removing moisture from nectar when it gets around 17 or 18%. If the plants producing the nectar were in a dry period, the nectar would naturally have less water in it and/or if you had a dry period and natural ambient humidity was low, then moisture is pulled out of everything, flower nectar and honey-bee collected and ripening nectar as well.

As you may have heard before, beekeepers often worry about the exact opposite problem—high moisture honey, which can easily ferment and be ruined. So, between the two problems, you definitely have the least problematical one.

Another possibility (since you mentioned how dark the honey was) is that you have "honey dew", which is made from the excretions of aphids and plant lice as they feed on tree saps. In some years, these excretions are very heavy and are readily collected by the enterprising honey bee. In times of weather extremes and lack of flower nectar, honey bees will readily collect this "other" insect-produced material. Most of the time, it comes from these insects as they feed on trees such as oak, beech, tulip poplar, ash, elm, pine, etc. The moisture content of this honey, which has been processed by two insects, the aphid and the honey bee, is low, usually in the 15-16% range. Now you have a thicker, darker honey with a different profile of sugars. Some people do not like this "motor-oil honey", as they sometimes disparagingly label it, because it is darker and much stronger tasting than many traditional honeys. It is an acquired taste. In some parts of Europe, it is sought after as a premium product and sells for a higher price than regular honey.

If I had to guess on what you have, it would be that you have some "honey dew" honey. Thanks for the compliment.

Q Brood Comb Renewal Program

What makes brood comb darker than honeycomb? The bees do not remove the cocoons or feces from each generation of brood. Do the workers cover the contamination with propolis? Someone suggested that the workers dirty the comb as they traffic across the brood comb to the upper supers. Has anyone analyzed brood comb to see what darkens it each year? Comb is a chemical sponge as you point out. What do bees do naturally to keep it hygienic?

Gary VanCleef
Tampa, FL

A

These are all good questions, Gary. You are correct in observation/study of what darkens pure fresh beeswax comb.

1. A honey bee is an insect and going from

Magnified accumulated larval skins in old brood comb cells

larva to pupa requires a skin change. A dark larval skin is left behind from each honey bee raised in an individual cell.

2. Honey bees do prepare the cell for another generation by cleaning the cell and applying a thin coat of propolis as a sanitizer, sterilant.
3. Honey bees are environmental samplers and when they are foragers, they step in and on lots of stuff and track it back into the hive and comb surface. You probably have a mop, broom, vacuum—something in your home to clean your floors from stuff you track onto your home's floors. However, honey bees don't have this mechanical clean-up tool, so they either remove it with their mandibles or cover it with propolis.
4. Beeswax is a chemical sponge, larval skins are like paper towels and propolis is like car wax or varnish, an imperfect sealant.

Beeswax comb has been studied a lot. That is how we know about 1 through 4. Feral honey bee nests are deserted or more likely the colony dies every few years. That is why the secondary user of old combs and detritus, the wax moth, exists. Also, now with the more active small hive beetles acting as consumers of dead, dying honey bee colony resources, this process, at least in the wild, is efficient in removing old junk from the environment. Wax moths and small hive beetles use the nutrition in dark comb, leftover beebread and honey to raise their young and ensure survival of their species. This provides a great way to eliminate honey bee diseases and everything else sequestered in a honey bee nest.

These secondary predators are the vultures of the honey bee world. Beekeepers look on comb as the valuable commodity it is. It is the bees' home. Honey bees cannot exist long without it. But, their home gets old. It can become a reservoir for all sorts of negative influences. More beekeepers are now getting into the habit of rotating out three combs or so from the brood nest area yearly, allowing bees to construct new comb on new foundation. This keeps a significant amount of fresh, uncontaminated comb available to the colony. This way, over three years, the colony obtains a fresh, new uncontaminated hive body of combs for brood rearing without putting undue stress on the colony due to the resource-intensive comb-making process.

My Recipe for Successful Beekeeping

by JERRY FREEMAN
Hamburg, LA

After being away from beekeeping over 25 years, I started helping some friends with their hives in 2007. Because of the pest and health issues facing honey bees today, I had to re-learn beekeeping. It was difficult because there was too much information available.

Many beekeeping authors – even most – hesitate to say, 'This is how to do it.' And for good reason. There are so many variations in honey bee behavior, weather, diseases, pests, environment and everything else that it's impossible to be definitive. Details and possible variations are usually included to avoid misleading anyone. The unintended consequence is that people with only a few years experience in beekeeping can read stacks of beekeeping literature and still not know what to do in their bee yard. Too many details confuse people. Even with 20+ years of beekeeping experience, it was difficult for me to find a reasonably simply way to deal with today's beekeeping environment. After nearly two years of study, experimentation and hard work, Clyde Hammil (my partner) and I developed a simple procedure for successful beekeeping.

Instead of trying to cover all the possible variations, I will explain step-by-step what has to be done in the bee yard, why we have to do it and when we have to do it. Honey bees will no longer thrive on neglect. Some actions by the beekeeper are required. Those critical actions will be highlighted in red. I won't nag or call you a 'bee-haver', but if you do not have the time and discipline to take these few required actions at the right time, your colonies will be weak, will not produce surplus honey and are likely to die out. That's just the facts of today's beekeeping.

Certainly, this procedure is not complete. Read all the books you can, join a beekeeping club and talk to experienced beekeepers. Really good beekeepers want to know all we can about honey bees. But keep this simple guide close at hand. A lot of things can go wrong, but they usually go right!

My experience is in south Arkansas. People farther north will have to adjust the suggested actions to the calendar and conditions in their area. If you have corrections or suggestions, by all means, let me hear them. My email is: jfreeman1944@yahoo.com. My phone number is: 870-853-2412.

JULY – Extract honey and TREAT FOR VARROA MITES

For me, the beekeeping year begins in July. Our honey flow has ended and the VARROA MITE population is beginning to explode. **(for beekeepers farther north, you will need to move that month to sometime in August.)** I extract honey the first part of July and ***treat for Varroa beginning in the middle of July.*** The chart shows why Varroa mites are such a threat in summer and early fall. I realize some people still have a honey flow in July, Aug and even September, but fall treatment of Varroa is too late. ***The colony must raise healthy babies in the fall to produce honey next year!*** If the fall brood has been chewed on by Varroa mites, they will not be healthy enough to build a strong colony for next spring.

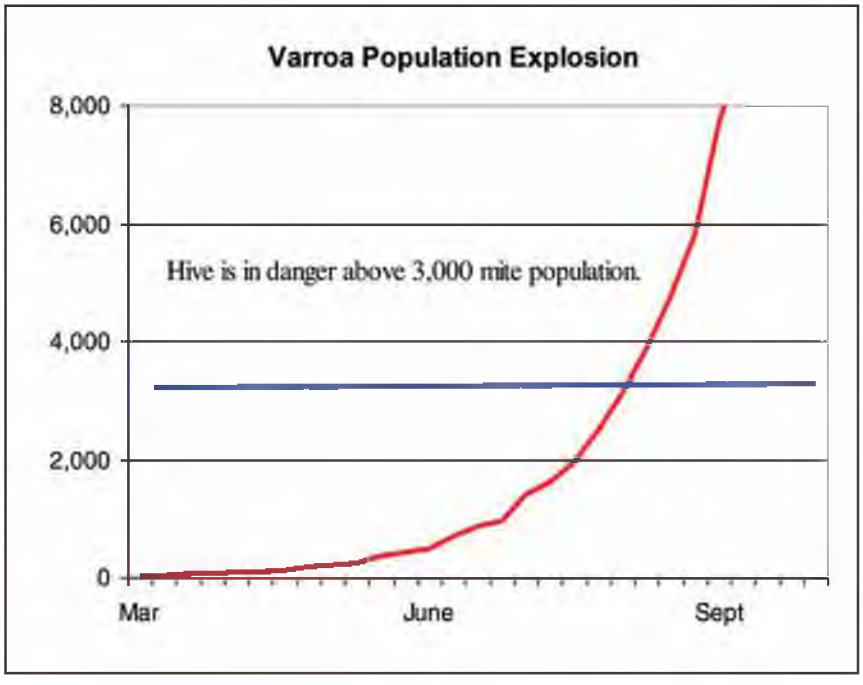
Hygienic queens may solve the problem for you, but you need to make sticky board counts to be sure the mites are under control. (I use the oil tray in our beetle trap for a sticky board.) Randy Oliver's web site, http://www.scientificbeekeeping.com/, provides more details.

Most of my bees are not hygienic enough to deal with Varroa on their own. I make two treatments with Apiguard – the first one in the middle of July and the second one two weeks later. I use Apiguard for two reasons. First, it is effective. Second, it is not a poison. The active ingredient in Apiguard is Thymol – made from the herb, Thyme. This is the only 'chemical' I use in my colonies. I believe chemicals and poisons are major contributors to the current decline in honey bee health.

Formic acid is also a natural ingredient, but is much more harsh than Apiguard. It kills some brood and may even damage the queen. **GOOD NEWS!** The makers of Mite-Away-II, formic acid pads, have developed a new product called MAQS – Mite Away Quick Strips. They claim it is so mild it can be used even when honey supers are on the hive. It has not yet been approved, but surely will be by next year. This means that even beekeepers with summer honey flows will be able to treat their colonies when the Varroa mite population is expanding

LATE AUGUST – Requeen every year (optional, but a great help)

Colonies with queens less than a year old are less prone to swarming than colonies



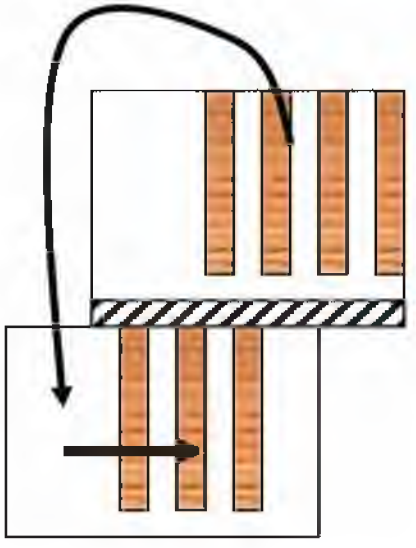
with older queens. Maybe this is because young queens produce more 'queen odor' or maybe they are more vigorous and lay better. To me, it doesn't matter why, I just don't want them to swarm next spring. Besides, it's really difficult to get queens early enough in the spring.

The problem with fall requeening is finding the old queen in a hive with lots of bees. To help with this, I put a cheap, plastic excluder on each hive body when removing the last treatment of Apiguard. Even Apiguard may cause the old queen to slow or stop laying. I wait two weeks to give her time to recover and lay a few eggs.

By the way, I clip the queen's wing, not to keep the hive from swarming (they will anyway), but to keep the old sister from flying from box to box while I'm looking for her! I can then look in each box until I find eggs or young larvae. That box has the queen.

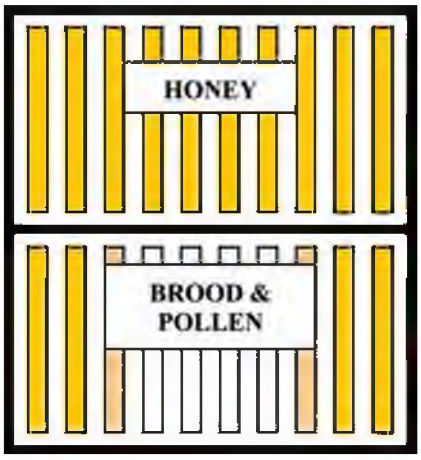
TO FIND THE QUEEN

Set an empty hive body on the top cover; put a wood or metal rimmed queen excluder on the hive body. Offset the excluder about 4 inches to one side. Then set the box with the eggs and larvae on top of the excluder. I inspect each frame for the queen and brush the bees off if I do not see her. I put that frame in the empty bottom box and push it under the top box. As the frames in the top box become crowded, the bees crawl through the excluder to the familiar combs in the bottom box. Eventually, you will see the queen somewhere in the top box because she cannot fly and she cannot get through the excluder. Finding her is still a hard job, but this is better than searching the entire hive two or three times and maybe still not finding her.



Kill the old queen and introduce the new one in a cage. Requeening before fall brood rearing starts also allows us to evaluate the new queen before winter. If you see any problems with the new queen, replace her or combine the hive with one that has a good queen.

SEPTEMBER – Raise healthy baby bees and store winter honey.



When the fall honey flow is over, remove and extract the ***surplus*** honey. The bees need 60 to 80 pounds of honey for the winter. Any amount of honey above 80 pounds is your surplus. Deep combs of honey weigh about 6 pounds. Medium combs full of honey weigh about 3 ½ pounds. The illustration shows how a hive with two deep hive bodies should look by Thanksgiving. Fourteen deep frames will provide about 80 pounds of honey. The bottom box has a little brood and pollen in the center.

Reduce the hive to two deep boxes or three medium boxes for winter. I want brood in the bottom and honey on the top. Medium boxes will have a similar arrangement, but there will be a little brood in the center of the bottom two boxes.

NOVEMBER – Run a sticky board count for Varroa and double check winter food stores

Again, I refer to Randy Oliver's web site. However, I have far less tolerance for Varroa than Randy does. ***If I see more than 25 or 30 mites on a sticky board after two days, I get out the Apiguard.*** It's not as effective in cold weather, which is good because it causes less stress on the bees and queen, but will still kill quite a few mites. Apiguard is also effective against Tracheal mites. If used, be sure to remove the Apiguard in two weeks.

If your hive does not have 60 to 80 pounds of honey for winter stores, feed 2:1 sugar syrup (2 quarts of sugar in one quart of water) until they do.

When enough combs are filled to equal 60 to 80 pounds of honey, lift the back of the entire hive about an inch and remember what the weight feels like. Lift the top box full of honey and remember what the weight feels like. (You won't forget.) Put a brick on the top, install a mouse guard and reduce the entrance. You and the bees are set for the winter.

VALENTINES DAY – Check honey stores

If the weather's bad, just lift the back of the hive and compare the weight to last November. It usually won't be much lighter. If the temperature happens to be 40^{0}F or above, break the top box loose and lift it just enough to feel the weight. It should still be heavy.

EARLY MARCH – *Check for honey stores, brood rearing and signs of swarming (Remember, I live in Louisiana, so my swarming season comes earlier than for you northern beekeepers, but later than in the southeastern U.S.)*

The busy season begins! ***Beginning no later than very early March, beekeepers must check their hives every eight or ten days to be successful.*** This is important. Mark your calendar and plan your next inspection. If your bees starve or swarm, you ain't gonna make no honey!

First, look for honey stores. Brood rearing is in full swing. Usually more honey and pollen is being consumed than is available for the bees to bring in. The honey may be scattered over several frames, but if the colony has less than 20 lbs. of food (about three deep combs combined, or about six medium combs), start feeding 2:1 sugar syrup. Don't be fooled into thinking that because the bees have three or four combs of honey left from winter, they've got it made. Not true. With heavy brood rearing and more flight activity, ***colonies can starve in late March***. Check the honey stores often!!

Next is brood rearing. I don't know if it's possible to have too much brood in the spring. If there's 'too much' brood, just make a split. But if there is no brood or very little brood, there is a major problem. It may be queen failure or disease. If you can't tell which, call your bee inspector for help. Tell him or her about your observations. Are the larvae any color other than pearly white? Are bees crawling on the ground? Schedule an inspection as soon as possible.

If you killed the Varroa mites last summer, requeened last fall, raised healthy babies for the winter and left plenty of food stores on the hive, the only problem you're likely to have is swarming. I won't go through all the details of swarm control, but here are the basics.

Bees swarm in the spring in order to create another colony of bees. It's like a cow having a calf. However, ***the bees are not likely to swarm unless the brood nest is crowded.*** Since bees tend to move upward, the first thing we need to do is reverse the boxes - ***we want the brood in the bottom box.*** Reversing the boxes keeps the queen and bees from 'bumping their heads on the ceiling' and feeling crowded. Just as soon as the bottom box has almost no brood, set that box on top. If the original bottom box has a frame or two of brood, take empty combs from the top box (or middle if you're using mediums) and exchange them. This will avoid separating the brood nest. Nights are still cold and ***all the brood must be kept together*** so the bees can keep it warm.

Also, move the frames with brood to the center of the box with pollen next to them and honey on the outside. After reversing the boxes, put empty combs in the center of the top box. This will give the queen a place

to lay as she moves upward. As the hive population increases, you can take an empty comb from the outside edges of the brood box and put it in the center of the brood nest. This will give the queen a convenient place to lay and keep the brood nest from becoming congested. If you see swarm cells after all this, make a split!

Finally, put honey supers on early. When bees and brood fill a little more than half of each brood box, adding supers gives the bees plenty of room so they do not feel crowded. This is helpful, but not as important as keeping laying space for the queen in the brood nest.

SMALL HIVE BEETLES

Hive beetles winter inside the honey bee cluster. Because the beetle larvae have to pupate in the ground, they do not reproduce in cold weather. ***Start trapping beetles early*** so they don't have a chance to overrun the hive. ***I do not recommend any type of chemical in the hive.*** Ground drenches and nematodes may reduce the area population of hive beetles, but they will not protect your hive. The larvae do their damage before they leave the hive to pupate.

Of course, I believe the Freeman Beetle Trap is the best on the market, but this is not a commercial. Go to our web site at http://freemanbeetletrap.com to get more information on it and a summary of the Clemson University trials they ran in 2009.

LATE APRIL – The Honey Flow

Again, this date is for southeast Arkansas. Your honey flow may begin and end at different times. The point is, there's not much to do other than keep enough honey supers on the hive. This is when all the preparations we've made since last July pays off. Nothing is more beautiful than combs of white, capped honey!

CAUTION: Opening your hives during the honey flow can cause a major problem with hive beetles. Read my article in the October, 2009 issue of ABJ: 'Things We Need to Know About Hive Beetles'. A condensed version called 'Hive Beetle Nightmare' is posted on our web site **http://freemanbeetletrap.com**.

QUICK REVIEW

CRITICAL

By whatever means necessary, the Varroa mite population must be reduced to very low levels ***before fall brood rearing begins*** so the fall brood will be healthy.

OPTIONAL: Requeen AFTER treating for Varroa mites and before fall brood rearing begins. This will provide a vigorous queen for next spring and reduce swarming.

CRITICAL

Make sure each hive has 60 to 80 pounds of honey by Thanksgiving. If not, feed 2:1 sugar syrup to get food stores up to minimum requirements. Reduce hives to minimum size if you haven't already done so.

CRITICAL

Beginning in early March, inspect your hives every 8 to 10 days. Carefully monitor food stores and brood nest congestion. Respond as needed. Add honey supers early.

Now, sit back and watch the miracle of the honey flow! Try to get a set of scales on at least one hive. Even in marginal areas like mine, a strong, healthy colony can bring in over 15 pounds of nectar in one day.

This simple procedure works for me, the members of our local bee club and anyone else who's willing to take care of the critical issues described. We often make presentations at bee club meetings. Mike Sayers from Ft. Smith, Arkansas called to tell me he followed our procedure after we visited their club last year. He said this was the first winter that he had zero losses! At last, beekeeping is fun again.

The Traveling Beekeeper

Stock Improvement in West Virginia

by LARRY CONNOR
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In April I was invited to talk on queen rearing and bee management at the West Virginia Queen Producers, a member-based organization that shared meeting facilities in Huntington, WV with the West Virginia State Beekeepers Association. My part of the program ran Friday morning to Saturday afternoon; the State group met on Saturday, with Florida State Apiary Specialist (and The Classroom author) Jerry Hayes serving as the featured speaker. Later on Saturday Jerry and I were able to tour the beekeeping facilities of WV Bee Inspector Wade Stiltner, of Wayne, WV.

For a number of years certain beekeepers in West Virginia have been dedicated to the idea of producing local queens and bees for use within the state. There have been some high and low spots in developing the program, a few setbacks, but with some talented grant-getting, dogged determination and intense dedication, the group has been able to make a significant impact on the production of West Virginia queens for use by West Virginia beekeepers. In 2009, the queen market in the state was estimated at 4,000 queens, and the members of the WV Queen Producers produced and sold nearly one quarter of those queens, providing income for local beekeepers, and more importantly, providing localized, adapted, and hopefully better fit queens for the variable conditions found in that state.

The leadership of the group falls into the hands of Dan O'Hanlon and Gabe Blatt. They steer the group around some dangerous spots while championing West Virginia bees and queens to the elected officials of the state. In fact, the state is the first in the country to pass legislation that indemnifies state beekeepers from lawsuits provided they keep bees using recommended practices. O'Hanlon is chief judge of the Cabell County Circuit Court (Huntington), and is politically connected to a wide range of elected officials, and knows who and when to call in a favor or ask for help from folks in the state. The State's governor sent his regrets that he could not speak at the state meeting because of the mining tragedy that was still unfolding while I was there. He had planned to have a ceremonial signing of the legislation during the beekeepers' meeting.

Dan O'Hanlon, is a driving force behind the West Virginia Queen Producers, writing grants and supporting new queen producers in the state.

Any non-Sunbelt state that fills a quarter of its queen market is on the right track toward self-sufficiently and genetic survivor ability. Blatt, O'Hanlon and other beekeepers in the state (and one Ohio beekeeper who lives near the state line), have formed a non-profit corporation to promote and develop a strong queen program. Membership is $100 per year, a fact that selects out the partially committed. The reality is that through grants these beekeepers have received breeder queens, equipment, incubators and training

Wade's empty half-frame mating box uses a small Boardman feeder.

(l) One of the West Virginia Queen Producers grafting indoors, using a head lamp to see the small larvae at the bottom of the cells. (above) Grafting tools, cups and supplies are in separate containers and arranged for easy use—no searching required.

Wade's grocery store display, with hand painted artwork and lettering.

Half frame mating nuc containing three frames for brood and food.

Wade's mating yard, which is located a few feet from the house and buildings. He makes metal hive stands which put the colonies off the ground and makes them easier to work.

that non-members do not receive. It has been a pretty good deal for these beekeepers. I hope that other states try to duplicate these efforts and reap the rewards of locally produced queens.

Some of the folks listening to my program in West Virginia were already established queen producers in their own right, and my function, as a presenter, was to provide them with a simple blueprint for queen rearing. With all the variation in queen rearing techniques around the planet, I stick to the simple Starter & Finisher system, one learned from Gordon Waller and Steve Taber, and shared by Minnesota's Marla Spivak and Gary Reuter. This plan is outlined in my latest book, *Queen Rearing Essentials*, and calls for a two-step queen rearing production method:

Starter Colony: A screened and flightless mass of young nurse bees (shaken from one strong colony) are given protein in the form of pollen in brood frames, carbohydrates as honey in the cells, and water, as held in a sponge or wet towel. Without a queen or brood, these bees use the emergency queen rearing response to feed a large number of young bee larvae with copious amounts of royal jelly. The grafted larvae are placed into cell cups and the cups are placed in the Starter colony overnight. The next day the started cells are moved to the Finisher Colony, and the bees and food are returned to the colony from which they were removed. **It is possible to produce a Starter, establish a Finisher and graft from larvae from a single colony!**

Finisher Colony or Cell Builder: This is simply a two-box colony with the queen confined to the lower box by a queen excluder. In the upper box, above the excluder, we place frames of open brood (eggs and larvae), food frames and a feeder. The brood serves as an attractant to young nurse bees, who move through the queen excluder to care for the brood. When the started cells are placed into the finisher, the bees respond to them as supersedure cells — a lower level of queen pheromone inside a well-fed colony.

The system uses the transferal of 12-24 hr larvae from worker cells to queen cups (called grafting). Transferring larvae is the single and most significant challenge to beekeepers. Those who have trouble grafting are usually better off finding another (younger) person to graft for them, hoping they have better vision and eye-hand coordination. But with good lighting and proper coaching, nearly all of the West Virginia classroom participants grafted successfully. In fact. The graft was excellent, and if all the started larvae end up as mated queens, that one graft more than paid for my expenses to travel to the meeting. There is money in bees—but I digress…

Most of the participants chose to graft inside the classroom using headlamps they held in one hand, while grafting in another, but some went outside and all seemed to have good results. The plastic cell bases had a nice amount of royal jelly at the bottom of the cups, with the transferred larvae floating near the center.

My overall impression is that the West Virginia Queen Breeders have one of the best potential opportunities to permanently establish a group of queen producers who will work to educate the state's beekeepers on the benefit of summer requeening and summer increase colonies.

Our visit to the home base of the beekeeping activities of Wade Stiltner was during the late afternoon of a beautiful spring day. A weeping cherry greeted us as we drove into the yard, in full bloom. If there is one lasting impression of the Wade's operation, it is that he has space for each activity in his operation, from grafting to mating, and from honey processing to honey sales. He does all of these things. A former coal mine worker himself, Wade works as one of the WV State Bee Inspectors. He has fish ponds, raised bed flower gardens, and some of the most brilliantly painted mating nucs I've ever seen—he says for visual orientation of the queens, but there is a suggestion of some influence of the 1970s in his color choices.

Wade uses welded hive stands to hold

Multicolored nucleus boxes stacked and ready for stocking.

four full-sized colonies or a large number of mating nucs. He uses half-frame nucs, so the colonies can be over wintered as entire colonies. To fill the mating nucs it only a matter of moving a frame or two of brood and bees from the over wintered colony and placing them into the small mating nuc. The advantage is clear when you realize that these colonies are well balanced and ready for the ripe queen cell from his cell-building colonies. Once the queens in the nuclei colonies have mated and been laying for several days, they are put into cages for shipment and delivery to queen customers. The nuclei can be equalized by moving extra frames of brood and placing them into weaker colonies, like the ones where the queen did not "take" and there has been no egg laying. Frames of food, honey and pollen, can be moved to strengthen these units the same way. The entrances can be closed off by a metal closure on a screw.

Boardman feeders with smaller jars provide food for the colonies. The boxes are ventilated and have a cover that overhangs on the front and back, but not on the sides. This allows for better stacking for storage. Wade has not experienced any difficulty with the Small Hive Beetle using this system. This has been reported in some of the Sunbelt states as the reason why the bee-

Framed by the fruit trees, Wade's rock garden and the brilliant green spring grass, three colonies hold breeding stock for the apiary queen rearing program.

The author holding one of the grafting frames with the cells grafted by the students. Most of the students did very well. Dan O'Hanlon took the photo and was to finish the cell development in his cell-building colonies located a few miles away from the class.

Zac and Jerry Hayes with Wade (r) in his honey-extracting room. Zac will be writing a report on his visit to West Virginia.

keepers are no longer able to operate smaller units. Wade credits the heavy soils of West Virginia as a factor in deterring SHB development.

Honey is sold at the door and in a local chain of supermarkets. Wade had developed an isle stand that he has painted white like a beehive and also painted with colorful artwork that includes "Fresh from the Farm" and "Bee Healthy Eat Local Honey." The honey is dark from the abundance of tulip popular, but has a nice taste and made excellent banana bread when I used a sample I was given back in Michigan.

As mentioned before, the colonies are organized by their function—breeder queens, mating nucs, cell builders. In a series of buildings he has separate areas for honey processing, comb storage, honey warming, tool setup and much more. He has all his small power tools on one rack in the workroom, eliminating the usual chase for equipment when it is needed. He has a grafting area setup in his basement where all the pieces of equipment are stored on a rack in separate containers. The grafting table is well lit and has a frame rest so the beekeeper can look for the right aged larvae rather than holding the frame on his/her knee while grafting. In all, Wade has a setup many of us less-organized types only dream about.

The subject of queen rearing will be discussed in detail by Dr. Connor in programs in Connecticut, Lansing, MI, Calgary and Edmondon, Alberta and at the Connor Tree Farm in Galesburg, Michigan. Check www.wicwas.com for contact information and links.

The Mystery of the Hive

Part Two of Three Parts

The Scent of the Lady

by PETER LORING BORST
Ithaca, NY

Despite its role in science fiction books and films, many years would pass before the actual mechanism behind trophallactic communication and control in insects would come to light. In 1954, Colin G. Butler demonstrated that queen honey bees exude on the surfaces of their bodies a substance ('queen substance') which worker honey bees seek to obtain. He wrote:

> The extensive food sharing which continually takes place amongst the adult members of every honey bee community and the worker bee's desire for queen substance are factors which are important in the maintenance of a cluster once it has formed.

Butler and his associates applied for a patent on "9-oxodec-2-enoic acid". In his patent application he claims that his product will be useful for the manipulation of bees in various ways which will lead to an improvement in honey production and the profitability of beekeeping. Since it was easily demonstrated that the presence of queen substance is essential for the smooth running of the colony and that in its absence, queen rearing is initiated within a matter of hours, it was further supposed that the amount of this substance could control swarming and supersedure (queen replacement). In other words, it was thought that if a reduced amount of this queen essence reached the bees, that the organization of the hive would begin to break down, and queen cells would be built by the workers. This could lead to reproductive swarming, where the old queen and half the bees leave to form a new colony in a new location, or the colony could simply raise a new queen and get rid of the old one, having determined that she is no longer satisfying the needs of the colony.

Butler himself was the first to show that the regulation of the colony was not a simple matter of how *much* queen substance was getting to the various workers. In 1960 it was revealed that:

> Queens in swarms from crowded colonies contain no less queen substance than queens in nonswarming colonies. Assuming that the rate of release of queen substance by a queen is proportional to the amount of queen substance extractable from the queen, it thus appears that signal production does not change with increasing crowding. Butler also tested for a difference in inhibitory response to fixed amounts of queen substance between workers from swarming and nonswarming colonies and found no difference. This suggests that the inhibitory power of queen substance does not decline in crowded colonies.

By further study it was determined that the substance is quickly distributed throughout the colony. The bees in the queen's immediate vicinity lick and groom her. Then, by mutual food sharing or trophallaxis, the queen's signal is rapidly dispersed throughout the colony. There can be no doubt that queen substance is the glue that holds the colony together, but it may be the medium of communication rather than the message. The specific messages that the workers receive from the queen may in fact be contained in this material. New work has shown that queen substance contains many different ingredients, the proportions of which can presumably vary from hive to hive, giving each colony a distinct odor. Additionally, the hive's bees may receive cues from the queen regarding her reproductive status, which could cause them to behave in particular ways or carry out definite tasks, such as queen cell building.

Just plain vanilla?

Researchers have identified one such component, homovanillyl alcohol. Evidently, the queen substance affects dopamine pathways in the bee's brain, which relate to behavioral regulation and motor control. Homovanillyl alcohol is a key contributor to these effects. Kyle T. Beggs and Kelly A. Glendining, two of the authors of recent work on this topic write:

> This study offers exciting insights into the mechanisms through which QMP [queen mandibular pheromone] operates and a deeper understanding of the queen's ability to regulate the behavior of her offspring.

As early as 1959, dopamine was discovered to be a neurotransmitter in the central nervous system. Dopamine is commonly associated with the pleasure system of the brain, providing feelings of enjoyment and reinforcement to motivate people to perform certain activities. It occurs in a wide variety of animals, including both vertebrates and invertebrates. There is a growing body of evidence that dopamine plays a critical role in aversive memory formation in insects. In humans, drugs that reduce dopamine activity have been shown to reduce motivation. Researchers have shown that the presence of the queen substance slows the worker bees' shift from hive tasks to foraging, and that the foragers have higher levels of dopamine. The substance apparently regulates their moods and ability to learn.

Are we to now believe that the queen is controlling the hive? Isn't that what the ancient Greeks thought in the beginning and we have spent so much time deconstructing? Weren't we supposed to think of a colony as a superorganism where all the members are like cells of an animal, motivated by the perpetuation of the colony and not of its individuals? Doesn't this explain why it is possible to replace a queen in one colony with one from another — that the bees themselves are only interested in keeping

the colony alive and care not what queen they labor for? If the survival of the colony is not the purpose, then what is?

It certainly appears that insects produce and consume a variety of substances and the idea that these somehow regulate activity seems to be fit neatly with our observations. The chemicals so far identified have a fairly universal effect; that is, they are attractive and have regulatory functions. We find floral essences and various flavors to be indispensable to our lives, and many of these entice animals as well. Homovanillyl alcohol is found not only in queen substance, but also in olive oil and champagne; it is described as having a mild, sweet, balsamic, vanilla-like odor. Bees produce geraniol which is a key component of the scent of roses. Evidently floral scents are crucial to reproduction of a variety of species; it was discovered that sperm have odor receptors and they are attracted to Bourgeonal®, a perfume not unlike lily of the valley, evidently the scent of fresh human eggs. Further, it is known that the ovulatory cycles of women living in proximity often synchronize.

Bumble bees again

Perhaps we should look more closely at the origin of the colony again. Observing the bumble bee queen is instructive here. We know that she raises a small group of workers to support her activities in the nest. This number can reach several hundred, however, so it begins to less resemble a family and more a colony. Shall we speculate for a moment that these miniature bumble bees also aspire to have families of their own? The queen has stunted them by short rationing during their development, but their mothering instincts remain intact. An interesting parallel occurs in some wasp (*Polistes*) colonies. Here the queens raise hundreds of workers, but then late in the summer, the workers themselves undertake to raise new queens. All of these eggs have the same genetic makeup; that is, they all have the potential to become full blown queens, but according to how or what they are fed, they can be stunted or redirected to fulfill other tasks required by the queen's colony.

The honey bee has vastly enlarged the concept of the colony which is expressed in the tiny bumble bee nest and little nests of wasps numbering in dozens rather than hundreds or thousands. And yet, these creatures with their small nests also prevail from year to year, just as small tribes of humans thrived in the New World, while whole civilizations collapsed from disease, war and famine. Even the honey bee queen is not always the head of a huge colony. *Apis florea*, a tropical honey bee, builds colonies consisting of one small comb and workers numbering in the hundreds. In a hot climate being small has advantages.

However, our honey bees have lived for millions of years in colder climates where the ability to produce very large colonies and store massive amounts of honey is a decided advantage. To this, one would add the bees' talent for locating suitable nests. Honey bees rarely nest in the ground like ants, bumble bees, or wasps. Damp holes,

Moonflower

Lily of the Valley

Orange

Orchid

Wild Rose

Vanilla

Many of the pheromones used by bees to communicate are produced by common flowers.

prone to flooding and predators, don't attract them. They prefer to live nearer to the forest canopy, high in hollowed out trees. This has been demonstrated by work done by Tom Seeley. He placed boxes of a variety of sizes at various distances from the ground and proved that bees prefer to be up in the trees. Of course, in the tropics it is common to see many hundreds of colonies of *Apis dorsata* occupying the upper branches of giant trees, living as they do in the open air.

She's the Queen!

The queen is *not* the unwitting tool of the colony but rather the worker bees are her slaves, raised from the beginning to feed, house and protect her. In exchange for this, they receive the same benefits, as long as they are of use to her. As they age, they pass through a variety of in-house tasks, to the point where they are no longer needed inside and they begin the risky work of guarding the hive and flying to distant fields to look for food and water, or new nesting sites. Many guards quickly die in defending the hive, and even more scouts and foragers are lost to hazards such as birds, wind, cold and rain. Some researchers have suggested that the older and in some cases, sickly bees deliberately take on risky tasks since they are no longer highly valued members. Like soldiers, they are ready to die for the prosperity of the hive.

The workers in the honey bee colony perform herculean undertakings. They provision the queen's nest with pollen and nectar gathered from millions of flowers, scattered many miles from their comfortable home. They ceaselessly clean and varnish the interior surfaces of the hive, purge it of intruders, and fearlessly defend its stores against creatures ranging from wasps and skunks, to huge bears that it has nearly no chance of defeating. The queen, on the other hand, seems to be an expert in finding the safest part of the hive, and the other bees cover her with their own bodies to protect her so that even if the hive is rent to pieces, she almost always survives.

Honey bees care, too

Without the queen, the colony's vigor quickly diminishes. Queenless bees are known to be less committed to defending the hive and are less apt to build comb and do needed repairs. They even exhibit what some students of the honey bee refer to as "mournful behavior". Now, bees are certainly not sentimental about each other, ruthlessly ejecting the infirm, or intruding bees from neighboring hives, and famously they *slaughter the males* at the end of the season. Our playwright Maurice Maeterlinck describes it thusly:

> Before the bewildered parasites are able to realise that the happy laws of the city have crumbled, dragging down in most inconceivable fashion their own plentiful destiny, each one is assailed by three or four envoys of justice; and these vigorously proceed to cut off his wings, saw through the petiole that connects the abdomen with the thorax, amputate the feverish antennae, and seek an opening between the rings of his cuirass through which to pass their sword.

But regarding the loss of the queen, even the most level headed beekeeper observes the transformation in a way that reveals a sense that the bees are *feeling loss:*

> A queenless stock always shows a certain disquiet, excitement, and confusion, which expresses itself most strongly after the loss of the queen, or rather after this has been noticed by them, and is never entirely pacified. The bees, restless and seeking, run about in the hive, and principally about the entrance, the bees raise a continuous wail, a genuine cry of distress, that can be heard at some distance from the hive. The ordinary merry playings in front of the hives, which sound stocks so often indulge in, are quite absent in queenless ones.

The previous excerpt comes from "Dzierzon's Rational Beekeeping". Such a concise description of bees' feelings did not seem at all out of place to him. It was a rational Dr. Dzierzon who in 1835 made the remarkable discovery that the honey bee queen fertilizes eggs within her own body and that drones develop from unfertilized eggs. Dzierzon also did groundbreaking work on the nature of royal jelly and its role in queen development.

The fact that the queen lives up to 50 times as long as a typical worker bee led many to regard royal jelly as some sort of panacea for the aging. When, as we see, it is not the queen which lives long, but the workers that live short. However, only the summer bees are condemned to a very short lifespan of some six weeks. Bees raised in the fall live typically six months or more, as needed, until replaced by young bees raised in the following spring. But regardless, it is the queen which persists for up to five years, during which period she may produce hundreds of thousands of worker bees.

Mom, meet your replacement!

It is true that beekeepers can replace the queen, giving the appearance that bees are not entirely devoted to *their own* queen. But it must be explained that the replacement of a queen by a beekeeper is no trivial affair. In fact, the rules and habits of bees conspire against it and inexperienced beekeepers frequently fail at this delicate task. For example, were I to blithely toss a foreign queen into a hive of bees, she would be attacked and killed in minutes, correctly identified by her scent as an intruder. Further, this sort of response is heightened when the bees' defenses are accentuated, such as in the fall of the year, or at night.

Therefore, the best chance for success is when the hive is in the middle of the frenzy of the honey harvest. Their defenses are at a low point, the bulk of the older bees are in the field and the hive is populated by young, malleable workers. At this point a beekeeper may remove the queen and replace her with another, but even at this point it is necessary to keep the queen protected in a small cage until the bees realize that their queen is forever lost and this new one intends to take her place as the ruler of the hive. After a day or so, the new queen emerges from the little cage and if all goes well (which often, it does not) she is accepted as the commander in chief.

What makes this whole transfer possible is no doubt the power of the queen's substance. Social insects from ants and termites to bees and wasps, crave the taste of the queen. They pass the peculiar hydrocarbon from mouth to mouth and appear to be addicted to it. In any case, it is the source of the queen's magic, and if the queen of the hive can be replaced by another, it is primarily due the fact that the usurper can produce this ambrosia as well as the former chef. If not, she will soon be replaced by the bees with a queen of their own making. Often as not this is exactly what occurs because a queen purchased by the beekeeper and received through the mail is often impaired in subtle ways that are detectable only by the discriminating sensitivities of the hive bees.

Brave New World, Revisited

So, in a sense, the honey bee hive clearly resembles the "Brave New World" of Aldous Huxley. Thousand upon thousands of substandard queen bees are raised, utterly lacking in the ability to found colonies of their own, but compelled by force or habit to expend their brief lives in the construction and maintenance of a vast citadel in which they will not be able to spend the bulk of their own lives. Yet they are moved by profound stirrings. Were it not so, would they devote themselves so faithfully to the care of their mother's offspring? Do they somehow *feel as if* these are their own young? It is true that in the absence of the queen, many of these same workers will begin to lay eggs of their own, care for them and try to raise a new queen from them. This is sadly impossible for most honey bee strains, since as they have never been on the nuptial flight (bees are impregnated in midair), they can lay only unfertilized eggs which emerge as males, and fail ultimately to fulfill their role.

Curiously, this is not the case with all Hymenopterans. In many species the capacity exists for the workers to lay fertile eggs. In fact, in many colonies of ants, there are multiple queens and some workers have distinctly queen-like abilities, being able to command forces of workers, and being able to found new colonies of their own. There is even one strain of honey bee, living at the tip of South Africa, that can do this as well. The Cape honey bee (*Apis mellifera capensis*) workers can and do become queen like and invade normal colonies of honey bees, usurping the throne from the reigning queen.

However, all is not well with these bees: the colonies do not produce much surplus honey and so they are regarded as a scourge by South African beekeepers. Further, it appears to be an evolutionary dead end, because since they cannot maintain themselves, they require a supply of healthy colonies to be their hosts.

Stay tuned for the exciting conclusion of the Mystery of the Hive, where all the loose ends are tied up and everyone lives happily ever after (and the author carefully plants clues for another sequel).

Acknowledgements

I would like to thank the many people who have helped to make this story somewhat complete, but most of all Anne Frey, Sarah Kocher, Mea McNeil, Carole Stone, Randy Oliver, and of course, the ever present Tom Seeley.

The Primer Pheromones and Managing the Labor Pool

Part III

by Randy Oliver
ScientificBeekeeping.com

I left you last month in the middle of explaining the current model for colony workforce allocation, and the influence of various primer pheromones. Please allow me to pick up where I left off. (Having trouble hitting the keys with my cold fingers—I've just pulled off my wet coveralls, and am trying to revitalize myself with hot coffee; and I'm distracted by the annoying buzz of bees in the lampshade as they find their ways out of my clothing).

Brood Pheromone (BP)—the Power of Baby Talk

I've already explained that the queen, the larvae, and newly emerged and older workers all beg for jelly from the nurse bees. That raises a fundamental question: Why do the nurse bees give it to them? In order to answer this question, we can again go back to the ancestral model, in which early social wasp larvae secreted an irresistibly alluring saliva and/or an attractive oily substance from their skin, thereby enticing their sisters to feed them. Fast forward to the honey bee—the hungry brood of *that* society secrete pheromonal component(s) that induce the nurse bees to offer *them* precious jelly.

However, this simple description does injustice to the complexity of brood pheromone (BP). BP consists of at least ten components, identified by Dr. Yves LeConte in 1990. Since then, others (notably Dr. Tanya Pankiw) have more thoroughly investigated the nuances of BP. The proportions of the components change with the larva's age, degree of hunger, and needs. BP from young larvae screams for them to be fed (Huang & Otis 1991); from propupae it begs for workers to cap them over.

The above effects are from BP's role as a short-term *releaser* that elicits an immediate response from nurses; however, BP has much larger and important function as a *primer* pheromone throughout the hive (Fig. 1). The presence of BP tells the colony the location and status of the broodnest, and indirectly, acts as a measure of the fertility of the queen. BP stimulates the activation of the nurse bees' hypopharyngeal glands, and depresses the level of JH in their bodies (likely due to increasing Vg levels) (LeConte 2001)—thus keeping the nurses "young" and producing jelly. BP also affects the older foragers—its presence stimulates them to forage for the pollen necessary for the nurses to produce brood food.

Practical application: although queenless colonies will collect and store pollen, active pollen foraging by the foragers generally indicates that the colony is queenright, and is rearing brood. This is an important factor when renting colonies for pollination—the hives must contain enough open comb for expanded broodrearing and pollen storage. I will return to the potential uses of synthetic BP later in this series.

ANOTHER PIECE TO THE PUZZLE

This field of research is advancing so rapidly that I can now clarify the asterisk that was in my graphic in Part 1—the one that indicated that nurse bees could become diutinus (long-lived) bees only if they had never reared brood. That assumption, based upon Mattila's (2007) work, was that ***the physical stress of broodrearing*** wore out nurse bees such that they could no longer transform into long-lived diutinus bees.

A recent paper by the prolific Amdam team (Smedal 2009) clarifies the actual mechanism. I wish that the paper was more readily available, since it is a great example of good experimental design. Allow me to quote from the paper: "As brood rearing and nurse load decline in colonies toward the end of summer, so does the amount of brood pheromone. Previous work that explains *diutinus* bee development as a function of brood rearing does not fully account for this fact. To resolve how the amount of brood in honey bee colonies can affect worker lifespan, it is necessary to decouple the effects of nurse load and brood pheromone."

Smedal "decoupled" the effects of actual brood feeding, vs. the mere *presence of BP*, by creating small colonies that represented all four possible combinations of the presence or absence of actual brood or synthetic brood pheromone. She then measured the resulting fat body Vg storage levels of young, nurse, and mid-aged bees. Her results were surprising! **The presence of BP alone suppressed the storage of Vg in mid-aged bees, *whether or not they actually fed brood!***

She then placed the colonies into a refrigerated room to mimic winter conditions. No brood had been allowed to emerge in them, so all bees were *at least* 38 days old when "winter" started. In this case, the addition of actual broodrearing did exhibit an effect—the best survival was in those colonies that neither reared brood, nor were exposed to synthetic BP. The poorest survival was by those colonies that both reared brood, *plus* were exposed to additional BP (Fig. 2).

The powerful effect of BP on the ability of mid-aged bees to store Vg in their fat bodies helps to explain why bees that have reared brood are unable to live through the winter—***it is not only the "stress" of feeding brood that prevents nurse bees from turning into long-lived "winter bees"—it appears that the mere exposure to brood pheromone shortens their lives!*** Or, conversely, *lack* of exposure to BP *lengthens* their lives—this would clearly be an adaptive survival mechanism for colonies unable to rear brood due to lack of forage.

Please note, however, that exposure to BP or brood is not an absolute on/off switch. Harris (2008, 2009) found that workers that emerged in colonies that were rearing a small amount of brood throughout the winter still became long-lived bees, despite some exposure to brood and BP. So this BP/short-lived bee connection seems to be more of a trend, rather than a hard rule. The

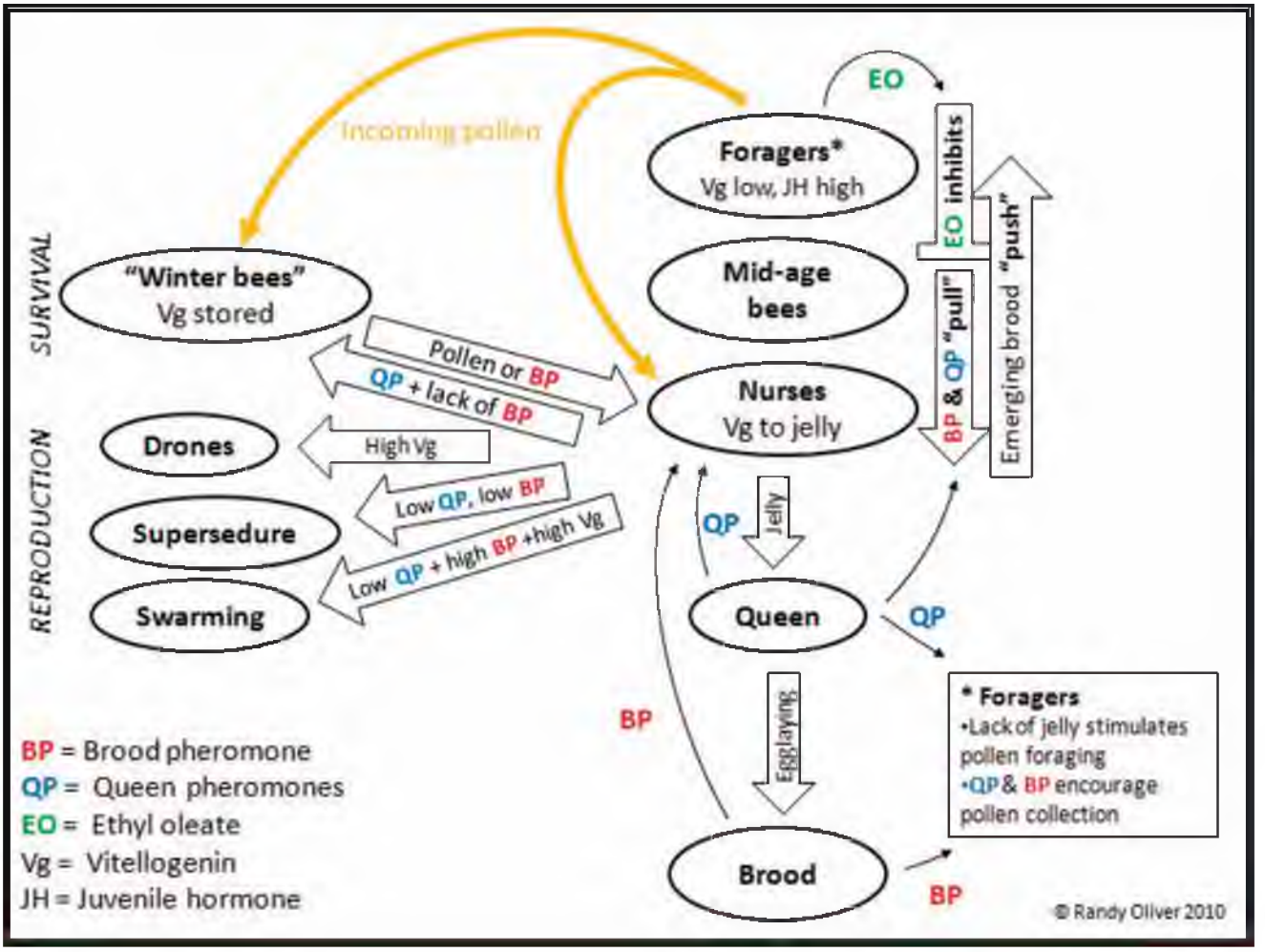


Figure 1. (This is the same figure as in Part 2 of this article). A simplified diagram of the transfer and effects of primer pheromones upon bee physiology, "aging," and task behavior; and colony reproduction and wintering. Note the overriding importance of incoming fresh pollen, and the multiple effects of brood pheromone and queen pheromone. Also note the "push/pull" on mid-aged bees to maintain a balance between foragers and food processors.

critical difference appears to be the physical contact of workers with the brood—in a winter cluster, the lesser degree of bee movement, coupled with the existence of only a small patch of brood, apparently prevents most of the winter bees from having their longevity affected by exposure to brood pheromone. More research needs to be done to clarify these effects.

Practical application: The take-home message for beekeepers is that essentially, it's the remaining sealed brood left once the queen shuts down in the fall, plus any bees that emerge during winter, that become the long-lived overwintering bees.

This fact is supported by Mattila's data—nearly all the long-lived "winter bees" developed from eggs laid in the last three weeks of broodrearing. **I cannot overstate the importance of this fact to those wishing to overwinter strong colonies! The last round of brood is critical.**

Harris (2008), in Manitoba, found that "overwintering populations were defined by the amount of brood reared after 31 August." He also noted that "When there was a strong honey flow, honey and nectar was stored in the brood areas as quickly as the new workers emerged from them. Once this honey was stored within the brood nest, its storage became permanent when it was in excess of the immediate needs for brood rearing within the brood nest, effectively reducing cell availability for egg laying."

Practical tip: Do not allow your colonies to become honeybound in late summer, as this condition may not allow the colony to rear enough "winter bees."

ETHYL OLEATE—FORAGER FEEDBACK

The pioneers in worker-worker interactions were Drs. Zachary Huang and Gene Robinson (both still contributing groundbreaking research). In 1992 they published a seminal paper showing that behavioral development of individual bees was strongly influenced by the number and ages of the bees with which they interacted.

In 1996, in a series of three elegant experiments on small colonies, they demonstrated the incredible physiological plasticity of workers. In their first experiment, they removed all the foragers from the colony. ***Such removal accelerated the behavioral development of the remaining mid-aged bees into foragers.***

In their second experiment, they confined the foragers to the colony by using artificial rain. By forcing the foragers to "hang out" in the hive, ***they depressed the normal development of mid-aged bees into foragers.***

In their final experiment, they removed all the nurse bees, in the absence of brood. Within hours, JH levels in both mid-aged and forager bees dropped substantially, and ***within two days the hypopharyngeal glands of the older bees that had "reverted" to nurse behavior (inspecting brood cells) had increased in size*** to 2.5x their original diameter (that's over 6 times the volume).

Practical application: caged packages may contain mostly nurse bees or a mixture of young and old bees, depending upon how they were shook. Once hived, older bees are able to revert to nursing duties. A similar situation occurs when you leave a weak hive to pick up "drift" when you move a yard of bees out during daylight, or when you pull brood and nurses to prevent swarming. The drift bees will be mostly older foragers, but they will revert to a balanced population in the catch hive.

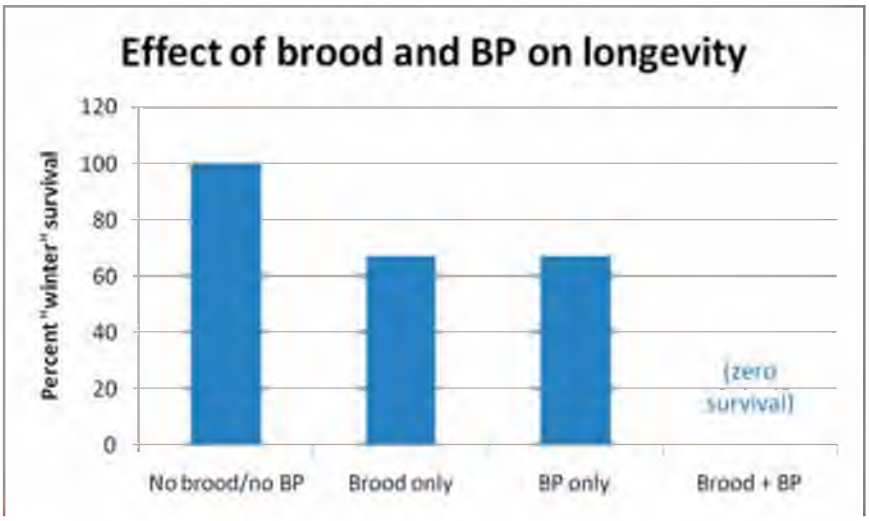


Fig. 2 Survival of small (~3000 bees) broodless colonies at 200 days in a 0°C (32°F) room, after exposure to either open brood, synthetic brood pheromone (BP), or lack thereof. Bees that were never exposed to brood or BP lived the longest; those exposed to both, the shortest (all bees were at least 38 days old when the colonies were put into the refrigerator). *Note that exposure to synthetic BP alone prevented workers from becoming long-lived diutinus bees.* After Smedal, et al. 2009.

#2: Yes, it is possible to raise queens with older workers as cell builders, but there is a lag time before they can activate their hypopharyngeal glands in order to produce jelly. This lag will affect the critical initial feeding of the queen larvae.

Clearly, there was some signal that foragers were passing down to younger bees that affected their transition to foraging status. Further experiments to track down the elusive signal concluded in a paper by Leoncini (2004) and an all star cast of researchers (including Huang and Robinson). They identified ***the forager pheromone that suppresses young bee maturation as ethyl oleate (EO)***, which, since it elicits physiological changes, would be classified as the third demonstrated bee primer pheromone (along with BP and QP).

Of note is that EO is also a component of both brood and queen pheromone. I suspect that EO might function as a "feed me" signal, since it is produced at a high level by the youngest larvae, even higher by the queen, and by the jelly-begging foragers (I can't find any study that has looked for it in drones). This may be the case, but I haven't found any direct supporting evidence. The feeding signal is a critical component of bee society, and I'm actually a bit surprised that it has not been investigated more thoroughly (I'm not sure whether foragers and drones beg food simply by antennal signals, or by production of a pheromone).

In any case, EO is again a multifunctional pheromone. Slessor, Winston, and LeConte (2005) coin a new term to describe the effects of the fatty acid esters: "colony pheromones." High titers of EO and BP in the colony, produced by the queen, larvae, and foragers, serve to keep vitellogenin levels in the nurse and mid-age bees high, and to keep the colony in the "growth" phase. Low levels, on the other hand, shift the colony into "survival" mode.

The adaptive response of mid-aged bees to EO feedback from foragers is beautiful in its simplicity. It works both ways. Forager behavior is modulated by how eagerly mid-aged bees receive their nectar loads—the quicker the unloading, the more stimulated they are perform waggle dances about the source. Conversely, mid-aged bee graduation into foraging behavior is inhibited by the EO that they receive along with that nectar (remember, foragers produce EO in their crops) (see the blocking effect in Fig. 1).

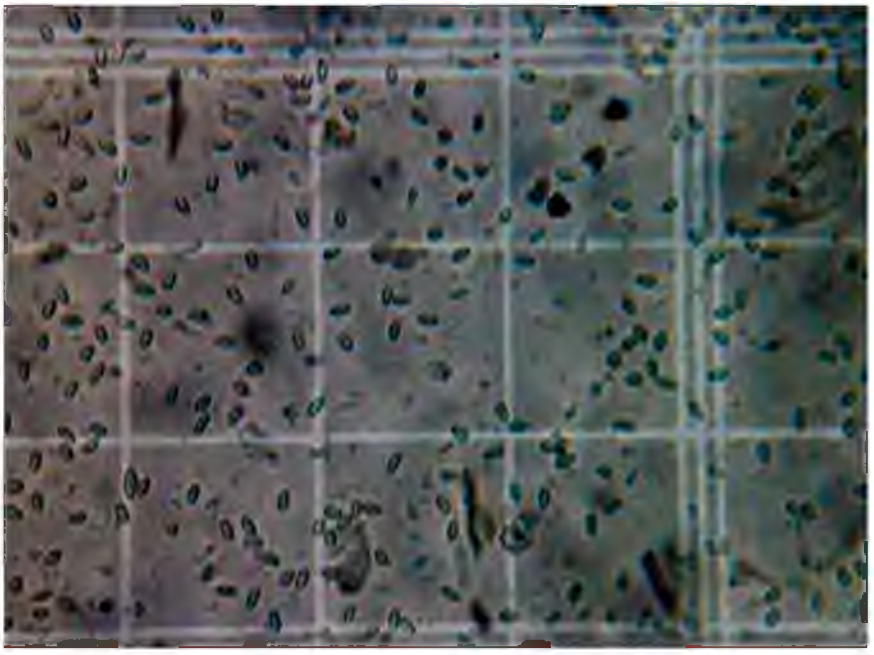
However, when foragers are lost due to the wearing out of their wings or flight muscles, or to the other rigors of foraging, such as drift, risky weather, pesticides, predation, or disease, the EO suppression of forager recruitment from the labor pool is lifted, and more bees can quickly take their places. So how about during a major honey flow? Under that circumstance the colony wants to strike a balance between the proportion of foragers to storage and processing workers. I'm guessing that EO dilution due to the intense nectar flow may help to recruit more foragers.

On the flip side, between blooms (or during rainy weather), when the foragers hang out waiting for scouts to mobilize them, their EO feedback prevents mid-age bees from shifting to forager physiology. As you may remember from my "Old Bees" series, this is important, since bees don't start "aging" until they shift to foraging behavior (this observation is strongly supported by Harris 2010). So by preventing the mid-aged bees from shifting, the colony maintains a ready reserve force of relatively long-lived workers just waiting for something to do.

As you might have guessed, I still have questions. I'm curious as to what the effect is of the sudden loss of foragers when a colony enters winter. Some heroic and meticulous field work by Lloyd Harris (2008) indicates that broodrearing ceased at exactly the same time that the last of the summer foragers died off—coincidence or not? Furthermore, his colonies initiated mid-winter broodrearing just as the "winter bees" started reaching about 84 days of age.

I wondered if the sudden absence of ethyl

Returning foragers produce the pheromone ethyl oleate (EO) in their crop. By passing EO to younger bees, they signal whether mid-aged bees should transition to forager status. This feedback mechanism regulates the efficient allocation of older workers to appropriate tasks.



Too many spores! This sample is running at about 50 million spores per bee (calculated by taking the average number of spores per square and multiplying by 4 million). This sample of bees is clearly in trouble. The *N. ceranae*/virus/poor nutrition combination may be fatal to colonies.

oleate due to forager die off affects the colony. Apparently, the lack of such in the absence of brood does not cause the promotion of "winter bees" to forager status, perhaps due to the absence of brood or the inability to fly in the cold. So that brings us back to the question of what is the proximate cause for the initiation of midwinter broodrearing?

Could it be that one of the factors involved is the transition of aging "winter bees" to forager status (to prepare to fly out of the hive to die of old age), and thus the resumption of production of ethyl oleate, which might stimulate the initiation of broodrearing? Could this be a mechanism by which colonies "know" when to start rearing replacement bees? I bounced this idea off the scientists at Contech, and they supplied me some custom pheromone strips to test my hypothesis this winter (thank you!) Results: See my research report in an upcoming issue.

I'm out of space now, so will continue with queen pheromone, colony reproduction, and the missing pieces in the puzzle.

Quick Status Report

There were major collapses of colonies in some operations this winter. Many collapses were predictable, as called early by Lyle Johnson and others, due to the poor weather and forage conditions in much of the country. Many colonies went into winter in poor nutritional shape, exacerbated by early frosts that killed off some fall pollen sources, such as Rabbitbrush. A number of beekeepers put off mite treatments in order to get that last super of honey, and paid the price later as mite populations increased past the point of no return. Finally, unusual winter freezes in Florida and Texas shut down colony buildup during the expected winter nectar flows.

The above are usual and unsurprising suspects for colony collapses—poor nutrition, too many mites, unexpected chills. However, CCD appears to have raised its ugly head again, with some good beekeepers having their operations decimated by sudden losses of the adult bee population. I'm hoping that samples taken by researchers who visited California may narrow down the actual cause of CCD. (Here's a teaser—a recent field trial that I performed sure points the finger at a virus or virus/*Nosema ceranae* synergy. I will report on this later).

Speaking of *N. ceranae*, a number of beekeepers are finding high levels this spring, despite the colonies being very strong. My own operation falls into this category—spore counts were up on my truck net samples coming back from almonds, but the bees are the best I've seen in years, and I'm too busy splitting them to keep them from hitting the trees to even test for nosema!

Beekeepers are asking whether they should treat. Well first, I don't give advice—I just report on the biology, and leave it to you to make business decisions. Here are some facts: we know that *N. ceranae* has been present in East Coast operations for at least 25 years, and didn't appear to be a particular problem. It was also strongly established in California operations when we first looked for it in 2006, sometimes at high levels in very strong and healthy-appearing colonies. However, some of us had unidentified collapses and poor buildup in 2004-2005, but I'm hesitant to blame them fully on nosema, since my untreated *N. ceranae* test colonies generally did just fine.

So here's the problem: we simply don't have historical data to see what kind of baseline *N. ceranae* count is "normal" in the spring. No one much looked for nosema in the spring—so *N. ceranae* could have been there for a long time, but no one noticed. Now that we're looking for it, we are finding it, but we really don't know what to make of it.

Data from all over North America indicate that *N. ceranae* spore counts tend to spike in May and perhaps in fall, similar to those of *N. apis*. ***Counts typically drop in June, whether you treat or not.*** Counts may climb during winter in warm areas.

Some beekeepers report that colonies are set back by spore counts of only a few million average in field bees, yet others tell me about booming hives exhibiting higher counts, and that treatment with fumagillin doesn't bring counts down. It appears that colonies can handle the parasite fairly well if there is good pollen nutrition. At what level treatment is necessary or cost effective, I'm not sure that anyone can really give you a good answer.

It may be the case that colonies can handle *N. ceranae* fairly well as long as they aren't dealing with other stresses, such as wet weather, poor nutrition, high mite levels, or especially the wrong viruses. This puts many beekeepers who have not normally used nosema treatments (this is the category into which I fall) in a quandary—should we be cautious and treat, or take our chances and see if the bees ride it out? I sure don't have the answer!

References

Harris, JL (2008) Effect of requeening on fall populations of honey bees on the northern Great Plains of North America. *Journal of Apicultural Research and Bee World* 47(4): 271–280.

Harris, JL (2009) Development of honey bee colonies on the Northern Great Plains of North America during confinement to winter quarters. *Journal of Apicultural Research* and *Bee World* 48(2): 85-90.

Harris, JL (2010) The effect of requeening in late July on honey bee colony development on the Northern Great Plains of North America after removal from an indoor winter storage facility. *Journal of Apicultural Research* and *Bee World* 49(2): 159-169

Higes, M, et al (2008) How natural infection by Nosema ceranae causes honeybee colony collapse. *Environmental Microbiology* 10(10): 2659–2669.

Huang, Z-Y and G. Otis (1991) Inspection and Feeding of Larvae by Worker Honey Bees (Hymenoptera: Apidae): Effect of Starvation and Food Quantity. *J. Insect Behavior* 4(3): 305-317.

Huang, Z and GE Robinson (1992) Honeybee colony integration: Worker-worker interactions mediate hormonally regulated plasticity in division of labor. *Proc. Natl. Acad. Sci.* 89: 11726-11729.

Huang, Z and GE Robinson (1996) Regulation of honey bee division of labor by colony age demography. *Behav Ecol Sociobiol* (1996) 39 : 147–158.

LeConte Y, Mohammedi A, Robinson GE (2001) Primer effects of a brood pheromone on honeybee behavioural development. *Proc R Soc Lond B* 268:1–6

Leoncini, I., Le Conte, Y., Costagliola, G., Plettner, E., Toth, A. L., Wang, M., Huang, Z., Bécard, J.-M., Crauser, D., Slessor, K. N. and Robinson, G. E. (2004) Regulation of behavioral maturation by a primer pheromone produced by adult worker honey bees. *Proc Natl Acad Sci USA* 101: 17559-17564.

Mattila HR, Otis GW (2007) Dwindling pollen resources trigger the transition to broodless populations of long lived honeybee each autumn. *Ecol Entomol* 32:496–505.

Pankiw, T (2004) Cued in: honey bee pheromones as information flow and collective decision-making. *Apidologie* 35: 217–226.

Slessor KN, ML Winston, Y LeConte (2005) Pheromone communication in the honeybee (*Apis mellifera* L.). *J Chem Ecol*. 2005;31:2731–2745.

Smedal, B, M Brynem, CD Kreibich and G. V. Amdam (2009) Brood pheromone suppresses physiology of extreme longevity in honeybees (*Apis mellifera*). *The Journal of Experimental Biology* 212: 3795-3801.

Honey Bee Biology

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Fourth Annual Report on the Coexistence of my North Carolina Bees with Varroa

In this article, I report on some of my varroa research for the summer of 2009. This research was supported by a grant from the California State Beekeepers' Association and with funding assistance from the Virginia State Beekeepers Association. As a lead up to that research, here is some background information.

By the 2008 field season, my North Carolina bees had survived untreated for varroa for six years. The data from that season suggested their varroa populations were indeed remarkably small. Using my digital camera technique to record their sealed brood and adult bee populations, along with the appropriate sampling, the average varroa population estimates were 628 in June and 398 in August. For all but one colony the brood infestation rates were well below ten percent[1].

These low numbers and other observations suggested the varroa populations remained small. The bees, as the host, may have struck a balance with their varroa, as the parasite, a situation referred to as a host-parasite equilibrium. It is important to know how this host-parasite equilibrium maintains itself, a compelling point since it did not occur from the introduction of a resistant queen stock. Rather it occurred once the more susceptible colonies perished after I stopped applying miticides (although I was taking a sizable chance of losing all my North Carolina colonies).

Figure 1. Creating a brood cohort. The worker comb is in the holder (painted black) and is inserted between the queen excluders under the light-colored wooden bars. The queen was held in a cage suspended from a wire running up through the top bar at the place indicated.

Ironically while encouraging, these low varroa populations posed a problem for my 2009 field studies. I wanted to know if Varroa Sensitive Hygiene (VSH), a genetic trait, had been selected for, to the extent that it could be playing a role in protecting my colonies. With VSH, bees detect varroa within the sealed brood cells. The bees uncap the cells and remove the infested pupae[2]. Removing the pupae disrupts the mite's reproduction cycle. (A worker brood cell is capped for about 12 days. Initially the mature larva spins a very thin cocoon. Then, the larva stretches out lengthwise in the cell becoming a propupa, "pro" meaning "before" the pupa. The entire time period, which includes spinning the cocoon, propupa, and pupa duration, is collectively known as the post-capping time, "post" referring to after the brood cap. When removing infested sealed brood, VSH bees tend not remove spinning larvae or propupae, but rather show a preference for removing young pupae 3-5 days post capping[2].)

If my North Carolina bees had the VSH trait at high enough frequencies, then they could be removing enough of the infested brood to reduce the overall reproduction rate of the mites. The reduced reproduction rate

Figure 2. A close-up of the pair of top-bar queen excluders (only one visible). Note the stick on the far sloping side to block the cut-open meshes where a queen could slip through.

could then allow the bees and varroa to coexist. The problem was that the brood infestation rates, as indicated from the 2008 data, were already quite low. Therefore, I needed a method to increase the brood infestation, at least initially, and then see if the bees could decrease it. For that I devised the following procedure.

I caged the queens in six colonies. These colonies would donate one brood comb each with elevated infestation levels to six colonies to be tested for VSH. The queens in the donor colonies remained caged until all their remaining brood had emerged. The varroa in their colonies would reside only on the adult bees (as phoretic mites) since no brood was available for their reproduction. Next, each queen was released on one comb of worker cells. With my top-bar hives, I enclosed this comb between two plastic queen excluders cut to the trapezoidal cross section of the hive. The overall set up is shown in Figure 1.

Unlike the ease of placing a queen excluder on a standard hive, installing one in a top-bar hive takes more patience. I use the heavy grade plastic excluder and put wood strips along the edges to block the cut open meshes where a queen could get through. It has just become easier to attach these wood strips to the sides and bottom of the excluder with discarded telephone wire, letting the strips snug up to the sides and floor of the hive. A wood stick, just a top-bar cut short and turned edge-wise, is grooved to accept the upper edge of the excluder. This arrangement helps support the excluder from above as shown in Figure 2. (As a side note to reduce my emails, I also use these top-bar queen excluders in honey production hives. For "all-natural" top-bar beekeeping, a philosophy without plastics in the hive, a position I respect, I would offer an idea from our apicultural past. In my historical hive collection are a few hand-made queen excluders with "bars" made from hardwood strips, probably oak. I do not know how well they worked, but with precision woodworking, the same idea could be applied to top-bar hives for keeping queens out of the rear of the hive where the bees store surplus honey.)

Ideally, a queen would finish laying eggs in this single worker comb in about 24 hours, producing brood of nearly the same age (called a brood *cohort*). In this situation, however, since the queens were caged, which of course interrupts their egg-laying, they were not initially at full egg production. Nor was the season conducive for maximum egg laying, a hot summer with a weak nectar flow. Five of the queens began laying slowly. (One had to be removed from the experiment.) After three days, the queens produced patches of eggs large enough for data collection, although I left them on the combs for two more days, making sure plenty of brood would be present. With the required amount of brood, I removed each comb from between the queen excluders and placed it near the entrance end of its hive, where the bees typically form the brood nest. At brood-capping time, this comb position would give the maturing larvae maximal exposure to varroa-infested bees. The queens were recaged and placed near their brood combs, insuring that each colony had only one comb of brood.

A colony's varroa population, though low in number and now phoretic, must concentrate themselves on this one brood comb for reproduction. The percent of infested brood should be much higher compared to a normally larger brood nest where reproductive mites are more spread out among the cells (which greatly lowers the percent infestation).

Just after the brood was capped, while the larvae were still spinning their cocoons, I collected the five top-bar combs. For each one, half of it was cut away to record the initial brood infestations. The remaining combs were each placed in five test colonies and removed just before the brood emerged. From these combs, exposed to the test colonies for VSH activity, a final brood infestation was determined. Comparing the initial and final infestation should give an indication of any VSH activity. If considerable VSH activity is present, then the final brood infestation should be substantially lower than the initial infestation, and this effect should be consistent among the test colonies. For example, one colony had an initial brood infestation of 50.3%. The final infestation had dropped to 37.7%, a reduction of 12.6%. Overall the brood infestation decreased in all five colonies with an average reduction of 13.9%. This result does not mean that this bee stock can decrease the brood infestation by 13.9% all the time (for every brood cycle). Rather I would take a more conservative position. It shows that the colonies can consistently decrease the infestation level (a qualitative answer that the study was designed to give).

Interestingly, the elevated brood infestation levels (up to 61%) generated by the study were more like what I saw in the early 1990's, far from the low levels I see today. Also in the study, many cells had more than one invading (mother) mite (found either in initial or final brood samples). Two and three mites in a cell were common; a few had up to eight mites. One cell held the dubious record, far surpassing the rest: 13 mother mites crammed in it (from an initial brood sample). What a long time it has been since I have seen that. A flashback to the tumultuous "old" varroa days, a terrible time when strong colonies died suddenly in the summer. I remember their brood nests seething with thousands of mites. Robber bees plundering unprotected honey, free food for the taking. Or so it seemed. They brought home hitchhiking mites, the seeds to destroy their colonies. More deaths in a long chain of casualties. Not only were colony losses immense, but many people quit beekeeping too. More victims of varroa. Lately things have definitely been looking up, even with setbacks along the way.

While the 2009 field results suggest that these bees are disrupting varroa reproduction by VSH, other factors could be involved to maintain the host-parasite equilibrium. For example, the varroa mites (themselves) may also have lowered their reproduction rates or increased their phoretic (nonreproductive) period, becoming in essence less virulent, helping colonies to survive. These other factors need to be understood to see if and how they contribute to maintaining the equilibrium between these bees and varroa.

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Literature Cited

[1]**Mangum, W. A. (2009).** The third annual report on the coexistence of my North Carolina bees with varroa. *American Bee Journal.* 149: 63-65.

[2]**Harris, J. W. (2007).** Bees with varroa sensitive hygiene preferentially remove mite infested pupae aged ≤ five days post capping. *Journal of Apicultural Research.* 46: 134-139.

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THE STATIONARY APIARY COORDINATED AGRICULTURAL PROJECT: A VIEW FROM THE FRONT LINES

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There are many days when I wish my laboratory was as organized as a honey bee hive. If only my routine were dictated by a delicate bouquet of chemical signals rather than a series of listserve emails and dense protocols. Imagine a staff whose patterns were linked by a superorganism mind set receiving instructions with one interpretation and a common goal. We could rise above the petty disputes over smelly boots left in the field truck or whose turn it is to count frames of bees and simply function. Collecting data would be perfectly uniform and natural.

However, this level of intuitive collaboration would put me and my fellow research technicians out of jobs. It is because we are clumsy, conflicted humans that the job of the research technician is so critical.

Whether it's wiring electrical circuits, plumbing the guts of ultra-low freezers, or fixing geriatric trucks, the daily jobs of a successful research technician describe a true "Renaissance" person. Though we are at the bottom of the research project "totem pole," we are frequently the front lines standing between the success or failure of a project. We take instructions from the top, supervise the bottom, and work feverishly to bridge the gap between the ideal in the mind of the primary investigators and the practical out in the real world.

Our true gift, though, is in managing the organized chaos otherwise known as field research. In this month's installment of the Managed Pollinator CAP Update, we pause from examining the science behind the CAP and instead focus on the art of managing a massive, multistate field project. This article seeks to provide the reader with an insight into the one of the biggest initiatives of the CAP – the Stationary Apiary Monitoring Scheme – from the viewpoint of, if you would, its "worker bees," the Research Technicians, Graduate Students, and Undergraduate Students who make it all happen.

The goal of the stationary apiary project is to monitor all of the possible variables affecting the survivorship of the colonies. This is a great idea in theory, but the practice of that level of data collection on 30 colonies in seven states is intense. So a group of some of the most brilliant minds in honeybee research came together to discuss how this would be accomplished. They wrote protocols for every variable to be analyzed. Their work was detailed and exacting, but still incomplete. The various persons charged with completing the tasks will interpret even the most exhaustive protocol slightly differently. There is also no guarantee that the protocols will work effectively in the field when applied to the project at hand. Now multiply this problem by seven states and seven teams of researchers; this is the Stationary Apiary CAP.

This kind of differing interpretation is a serious problem when trying to collect standardized data in a major, multi-state, multimillion-dollar research project. The confusion escalates as a fluctuating group of summer undergraduate workers are taught the protocol in a "whisper down the alley" style. Finally, it is nearly impossible to predict what will be the most effective protocol for a given project without doing test runs, which take additional time and money.

This is where the research technicians step in and earn their keep. As members of the Stationary Apiary project, we are familiar with the protocols and work with the primary researchers and other research technicians across the country to standardize our work and our staff. We also work to write "mini" protocols that fill in the unforeseen gaps between instructions. For example, it was hard to predict what the best method for collecting various castes of bees would be for each research team. Therefore, the individual research technicians were responsible for responding to this issue and leading their staff. Most importantly though, we figure out what works for our data collection and what does not. This allows us to mold the protocol over time into its most effective and efficient form. As we face our second summer of the Stationary Apiary CAP, we can reflect back on the myriad challenges overcome during our first season. What follows are a few examples of how the Penn State University research team worked to do just that.

The Stationary Apiary project can be broken down into two main technical components: the fieldwork and data collection done in seven apiaries around the country and the molecular and diagnostic data collection done in the lab. Many of my days

are spent in the lab running honeybee samples and analyzing their molecular components from which some of our most frustrating issues have arisen.

In order to give outsiders an idea of project scale, I explain to them the number of samples that pass through my hands during our peak beekeeping season from April through September. From seven apiaries around the country, a maximum number of 30 hives are sampled each month. Each hive has five different honeybee samples taken of which four are delivered to the Penn State laboratory. Over a six-month period I could inventory a maximum of 5,040 honeybee samples. These samples are not, by the way, space-efficient as they arrive in 50-milliliter tubes jammed inside a Ziploc bag. To make matters more insane, the samples can never thaw to a temperature higher than -80 degrees Celsius (-112 degrees Fahrenheit). This means that the samples must be shipped on dry ice and upon arrival be immediately stored in one of our laboratory's ultralow freezers. The process of shipping and receiving Stationary Apiary Project samples is relatively cut and dried until you factor in ultralow freezer space.

In molecular laboratories around the world, the value of ultralow freezer space is reckoned somewhere near an original Renoir or Van Gogh. I have seen distraught graduate students wandering the halls of our department begging for a drawer in someone's - anyone's - ultralow freezer. As the Stationary Apiary samples began arriving last summer, it became immediately apparent that we were out of space. Fifteen thousand dollars and much grinding of teeth later, we had a second ultralow freezer. One month later this freezer, too, was full to bursting. My undergraduate team became adept at stuffing something in the freezer and slamming the door shut before anything could fall out. Thankfully, no fingers were lost in the process.

We were back at square one and I was having nightmares in which, when I arrived at work the mailroom was filled with samples for me to stuff into non-existent freezer space. In order to maintain at least a façade of sanity, I devised a plan to "archive" the samples thus taking up much less space in the freezer. I could grind the frozen bees into pooled samples and store them in smaller tubes – tubes that fit neatly into an easily accessible box. To my absolute astonishment, it worked. I began to see my freezer compartments closing with ease, missing that threatening bulge. There are many, many more samples to archive, but the promise of freezer space drives me forward. Perhaps we will have so much extra space that the whole four years of the Stationary Apiary Project will fit into the two ultralow freezers we have and I will not have to deal with obnoxious freezer sales people ever again! Probably not – but a girl can dream.

Moving over to the field data collection, one of the factors we are analyzing includes the pollen bees bring back to the hive. This seems entirely reasonable, as the pollen is the bees' protein source. We should know if the pollen our bees are consuming is laden with pesticides or other foul substances. So how hard could pollen collection be? Lots of beekeepers do it. It turns out that pollen is one of the most challenging substances to move from one place to another. Those perfect little pollen balls crumble if you touch them incorrectly, and if the pollen gets even slightly wet you end up with slimy pollen mess over everything. So our beekeeper and technician Jeremy devised a contraption to get the pollen out of the pollen traps and into the sample collection tubes without destroying the pollen's structural integrity or his patience. Presenting the "water bottle pollen funnel!" By taking an average plastic water bottle, cutting out the bottom, and duct taping it to a wide mouth funnel, you have the perfect size opening to pour pollen into a sample tube. Simply take the pollen trap basket, pour the pollen into the funnel on top, and collect the pollen pieces in a sample tube held under the mouth of the water bottle! Of course! The reality of this process was not as simple as it may seem in writing. This mini-protocol took months, three to be exact. Three months of botched pollen sampling and disheartened looks. We got there, though, and no undergraduates were harmed in the process.

We were further instructed to collect adult worker bees in sample tubes with 95% ethanol for tracheal mite and *Nosema* load analysis. Our team has done this many times and so felt that no additional protocol brainstorming was necessary. I have discovered in my short time as a research technician that this feeling of security with a new protocol should not be trusted. I now always assume that a micro protocol is necessary. Because as it turns out, ethanol leaks out of our expensive sample tubes when they are shaken up in the mailing process, thus rendering any "permanent marker" tube labeling useless. So I purchased parafilm, a stretchy plastic-like material, to seal the tubes before I mailed the second batch. Again, I was foiled by the low viscosity of ethanol and my tubes arrived without labels. No more messing around; I purchased fifty-five dollars worth of ethanol-proof, laboratory grade markers. The third round of tubes were labeled, wrapped in parafilm, and put in separate Ziploc Baggies. Our samples arrived intact with clear labels. During our monthly conference call with the other Stationary CAPs participants, I proudly announced that I had found a solution to our labeling problem. There was silence as I explained the details until someone asked, "Why didn't you just write the information in pencil on a piece of paper and put it inside the tube. Ethanol doesn't remove pencil." Lesson: Someone else will always have a better solution than you do. Make sure you ask.

Then, as we entered spring and temperatures began to warm, we made our hardest discovery during our first year on this project. One colony, one colony out of thirty brand new colonies, survived the winter. All of that work feeding, watching, and counting was for naught. I was at a beekeeping conference last year when one of the other researchers offered that it is much easier to be a bee researcher than a beekeeper. When our bees die it's data. When a beekeeper's bees die its his livelihood. But any beekeeper knows that feeling of approaching a dead hive. You feel it deeply. As you open the lid and peer down into darkness you think, what could I have done differently? The smell of decaying bodies and the weight of a hive box still filled with winter stores serve only to fuel the feeling that you've let your girls down. And though my monetary investment may be different from a beekeeper's, my emotional investment is strong.

Primary Investigators tend to see data in dead bees. I see that too. But beyond that I see an area of agricultural research that is sad and tough. I feel very close to the beekeepers with whom I share stories and clasp calloused hands. We are all part of this sense of loss tinged with feelings of failure. When I started this job two years ago I was awestruck by the exciting research surrounding my field. Now I am fueled by an impatient determination.

There are many handprints on the Stationary Apiary CAP. I am proud to be a "worker bee" sorting through the chaos to find answers. And though bureaucracy, miscommunication, and vague protocols frequently frustrate me, I am bolstered by the importance of our goals.

I had the pleasure of meeting many of the principal investigators, technicians, and graduate students working on this CAP at the American Beekeeping Federation national meeting in Orlando, Florida this past January. I felt relief spreading through my veins toward my extremities and back toward my heart during our closed-door session on Wednesday. These researchers are brilliant and invested. I felt the old whispers of my awestruck self as they spoke about our project and its future. We are all in good hands.

Here is my Stationary Apiary CAP update. We in the beekeeping community, whether researchers or apiculturalists, have a long road ahead of us. Many of you have been traveling this road for some time. Take comfort in this. Every single member of the Stationary Apiary CAP team from the very top with Keith Delaplane and the other Primary Investigators to the very bottom with Jeremy, myself, and our motley crew are working together to find answers. Our progress will be slower than you or I might prefer, but we will never stop moving forward.

My laboratory will never function as well as a honeybee colony and I don't expect anyone to sacrifice themselves for the well-being of the project. But as worker bees we are loyal. We have your back, and we are not flying away from a fight.

Sticky Situations

by HOWARD SCOTT

Beekeeping is not all fun and games. Sometimes we get in trouble. I don't mean serious trouble, like breaking the law or anything like that. But there are embarrassing moments in the life of a beekeeper that must be dealt with. In my thirty-plus years (I don't believe it, I have become an old-timer), all of the awkward situations below have occurred to me. And I have not always dealt with them in the best possible way. This discussion might help you do better than I did.

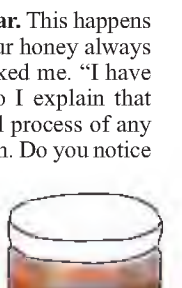
The object-in-honey complaint. Someone calls you with the discovery that there is an insect—dead of course—found in a jar of your honey. What do you say: "At least, it wasn't a dead mouse?" I don't think so. After all, you have been caught in the ultimate bad housekeeping faux pas. There is no excuse for the consumer finding a bee part or ant in his jar of honey.

The best defense is a heartfelt apology combined with a probable explanation, and an offer to replace the good with the bad product. The 1982 Tylenol poisoning case, where seven people died taking pills that contained cyanide, best illustrates this up-front approach. Immediately, Johnson & Johnson admitted their culpability. The company issued a nationwide recall and agreed to replace bottles, once they found out which products were affected. Executives offered financial compensation to the victim's families. They also instituted anti-tampering programs, including creating triple-sealed packages and increasing the amount of cross-inspection. Because of their forthrightness and fast action, the market forgave them. Consumers went back to buying the product, making Tylenol the most popular over-the-counter analgesic in the United States.

I try to do the same. A woman called me, most upset, saying she had bought a jar of my honey at a fair only to find a dead ant lying on the top. Horrified, she threw the bottle away. She couldn't stop complaining, suggesting that the jar was filled with ants. When I finally was able to get a word in, I apologized, and tried to explain, stating that we bottle our honey in my kitchen, taking great precautions. But, I suggested, perhaps I got a phone call, and in the interruption, an ant crawled into the container. I also noted that any foreign body rises to the top, so her fear that the bottle was filled with ants was unfounded. Clearly, she wasn't having any of my explanation. I offered to deliver a new jar of honey to her door, which she refused. Finally, I agreed to refund her purchase money. Even this didn't pacify her. She continued on and on how I had put her family in harm's way. Ultimately, I obtained the address from her, and promptly sent the check with a written apology. Obviously, I lost her as a customer, but I did what I could.

The sick bee sympathizer. Sometimes people consider you the savior of the natural world. One day, an elderly woman knocked on my door holding a small matchbox containing a bumblebee. She said, "I'm sorry to bother you, but I know you are a beekeeper. I found this sick bee on my front porch, and I'm wondering if there is anything that could be done for it?" I looked at her, hopefully with a sympathetic expression on my face, and took the box. Sure enough, there was a bumblebee sitting there. It was breathing. Thinking quickly, I grabbed a honey bear, pushed its nozzle in front of the bee, and squirted a bit of honey. We watched the bee eat a bit. Then, I took the box and flipped the bee in the air and the bumblebee seemingly flew away. "It probably just needed some sustenance," I mumbled. Fortunately, she didn't suggest that we follow it to see if it was really okay, and thanked me. Score one for the superbeehero.

The crystallized honey jar. This happens all the time. "Why does your honey always crystallize?" a customer asked me. "I have to throw the jar away." So I explain that crystallization is the natural process of any supersaturated sugar solution. Do you notice how figs gain a coating on their skin, which are the sugars crytallizing, yet the fruit is perfectly edible, I offer, by example. In fact, I suggest, some people prefer crystallized honey because they like the crunchiness and the fact that it is less messy and more controllable than liquid honey. And, of course, creamed honey is finely granulated honey that is great for spreading on bread and biscuits. Finally, I admonish, "Never, never throw away honey, because this is a natural food that does not spoil if it was ripe when harvested. There are also enzymes (glucose oxidase) in honey put in by the forager bees when the nectar is in their honey stomachs which inhibit bacteria growth. That fact, I inform them, is one reason why honey is such healthy food. In fact, honey is still used to stop infections in wounds and to heal burns. Modern day mountain rescue teams carry honey packets in their rucksacks for just that purpose. Finally, I provide two solutions. "Put the honey container in a hot pot of water, and heat the water at low heat, until the honey becomes liquid. Or, put the jars, caps loosened, in the oven, and heat at low heat for 40 minutes, or until honey liquefies.



The speech right after being stung in the face situation. Oh yes, this was a fun one. The day before I was to give a talk at a local garden club about the contribution of honey bees to their gardening, I was stung above the eye. My face blew up, making me look (or felt) like Cyclops man. So, I gave the speech to the ladies of the garden club, making jokes about the impaling. I said, "Just to show it's not all fun and games, I had a bee sting me yesterday." That got a big laugh. Then, I went on with my explanation. "Yes, it hurts. It hurts when the bee pricks me, it hurts when she's trying to pull out (I can imagine her squirming to untangle herself), and there's a discomfort sometimes for as long as three days. "Of course," I finish, "The bee dies, because in trying to untangle herself, her insides disgorge, and to me, that's the saddest aspect of all." So, I offer an educational component to my tale of woe and humor.

The sticky jar problem. I sell honey to

stores, and occasionally, a merchant calls, complaining that my honey jars are sticky. I try to clean up every jar, but sometimes there are spots of stickiness. So I apologize, and offer this excuse: "I try to fill every jar to the top ring, and sometimes I misgauge. That means a cleanup. But, in this manual process, sometimes my fingers are a bit sticky, even though I always have a bowl of hot water nearby. I will put a note on your account to be more careful next time. I can't promise it will never happen again, but I will make a real effort to see that your jars are completely sticky-free. I know it's a nuisance to your customers, but tell them that it's out of the urge to give them the most for their money. Tell them it's the stickiness of love."

The 'I'm stumped' situation. Sometimes, someone will ask me a question that I can't answer. For instance, someone recently asked me what honey is composed of? What kind of sugars?" I didn't really know the answer, so I said so, and promised I would get back to the person. And the next day, I called with the answer.

I take such inquiries as an opportunity to learn something. The question makes me do basic research. These days, there is so much on the Internet that you can Google the question and receive pages of responses. But, I might call a fellow practitioner to get a more nuanced, detailed answer. Or I might refer to one of my textbooks.

Never fear saying, "I don't know." Don't become the expert with a capital E. This expert is composed of an ex, which is a 'has-been' and a 'spurt,' which is a drip under pressure. Getting back with a reasoned answer is so much more preferable. You'll make yourself an invaluable resource, and you learn something in the process.

Learn from my experiences. Even in these sticky situations, you'll be a hero.

Howard Scott has kept bees for 30 years in Massachusetts and is an active member of his local beekeeping association.

Bee Beards by John

by DEWEY M. CARON

Emeritus, University of Delaware; Affiliate Professor, Oregon State University

What is your perception (or better yet, your family's perception) of bee swarms? Most people fear honey bees and a swarm represents a big fear to most people! The general perception is that bees sting and a swarm with all those bees is something to stay far away from. Beekeepers know and continually seek to explain to any and all listeners that both the fear of stings and their health threat is well out of proportion to the actual real risk or potential harmfulness.

Bee swarms, in proper context, are something to marvel over. Bee swarms are one of those unique events in a colony's natural history that continue to perplex beekeepers and yet also fascinate. Beekeepers have for years used swarm capture as a 'teachable moment' –as when a swarm 'suddenly' appears in the center of town on a traffic light or parking meter or settles in someone's yard. The swarm often draws an interested, if wary, crowd and swarm capture becomes a mini-beekeeping lesson. John Gibeau of Surrey British Columbia has taken swarming, his 'teachable moment' to a new level.

John Gibeau performs his bee beard demonstration as many as 80 times per year. I participated in an outdoor swarm demonstration at the 2008 WAS meeting in Victoria, BC on the grounds of Parliament Building in the heart of the downtown. More recently, I could observe and experience his excellent "show" at the Museum of Science and Technology (OMSI) in Portland, OR.

John crafts bee beards on volunteer faces as an educational tool and uses the event to help people overcome their fear of bee stings, introducing whole families to the world of honey bees. At OMSI, over 100 people volunteered to wear a bee beard during part of the Museum's exhibit SCREAM: THE SCIENCE OF FEAR over the Halloween weekend last fall. As a Bee Master, John has crafted an elaborate educational experience, intimately experienced by the 4 volunteers selected for the beard demonstrations and witnessed by hundreds of weekend museum attendees.

John has an efficient technique to establish artificial swarms. He opened the late-October bee colonies and selected only those that were strong. He initially finds the queen and cages her in a standard plastic queen cage. He next shakes 2-3 lbs (8000 to 15,000 adult) worker bees from brood frames (to get young-aged bees) into a plastic honey pail (his holding cage) using a pvc pipe and paper funnel. The holding cage has screening on 4 sides and an additional screened opening on top for a jar feeder of sugar water. The queen in her queen cage is suspended with candle wicking into the cluster of bees using the plastic pipe.

The bee colonies were those of Glen Andresen from his home apiary in NE Portland. Glen manages about 40 colonies in several backyards, in addition to his own, and at Leach Botanical Garden in NE Portland. Glen, a beekeeper since 1990, manages his bees without chemicals, the same way he manages his organic gardens. His honey, along with his garden produce, is sold from his porch and at the Botanical garden. He teaches organic beekeeping in a Portland Metro program and was contacted by OMSI to supply the bees for the FEAR event because he has authored programs at the Museum on organic gardening.

Once in their holding cages, the bees are given a jar of sugar water and held overnight in a cool, dark place so the artificial swarm becomes a functional unit. Bees and queens are returned the next day to their proper colonies so there is no need to further manage the original colonies. No colonies were "harmed" for the demonstration. In case a queen is not

Bee beard publicity poster

John Gibeau applying bee beard on W.A.S. volunteer in front of Parliament Bldg., Victoria, BC.

John Gibeau

John Gibeau preparing to shake young bees into funnel of holding cage.

John Gibeau initiating the bee beard on volunteer - note bee holding cage at bottom left.

John Gibeau standing with completed bee beard on OMSI volunteer. John has vacuum ready to return bees to holding cage (right bottom).

found, John has an extra vial or two of queen pheromone to substitute for the actual queen.

The holding cages were gathered the next day and kept in a cool place until needed. The sugar water jar was refilled. One of the holding cages is moved into the special 6X8 hexagonal plexiglass booth John uses for his indoor events. Outdoor events can also utilize the cage, but usually John does it "live" as he did in Victoria at WAS, using a caution tape fence to keep spectators back about 10 feet. John is safety conscious and in his demonstrations the last 4 years has only had a rare stinging incident.

John began the demonstration by patiently explaining what is going to happen. OMSI events coordinator, Andrea Middleton, introduced the volunteer (selected at random from the volunteers). John and the volunteer entered the plexiglass booth and John immediately began the process of getting the volunteer to relax. He started by removing the queen cage from the pvc tube and tied the cage around the neck of the volunteer using the wicking string. He then shakes a smallish number of bees (including the attendants adhering to the cage itself) onto a cardboard collar held just below the caged queen at the volunteers chin/chest. He goes slowly at first to allow the volunteer to get used to the heat and crawling sensation of the bees. More bees are shaken onto the cardboard collar directly from a hinged top of the holding cage if the bees are behaving and the volunteer appears to be comfortable.

John seeks to reassure the volunteer and watches for nerviousness or discomfort. He tells him/her to become one in soul and body with the bees. He listens for a "good" sound buzz from the bees. The demonstration will take 20 minutes to develop a beard on the volunteer with John explaining to the audience outside the plexiglass cage what is happening. If things are not 'normal' John will abort the demonstration, but only rarely – he seeks to obtain the final beard photo. He has to turn off his microphone to vacuum the bees back into the holding cage so his beekeeper volunteer, Glen, gets to explain his beekeeping within the city and how he manages his bees and processes and sells his honey. A 30 minute rest and John is ready to repeat the show using a different holding cage of bees and new volunteer.

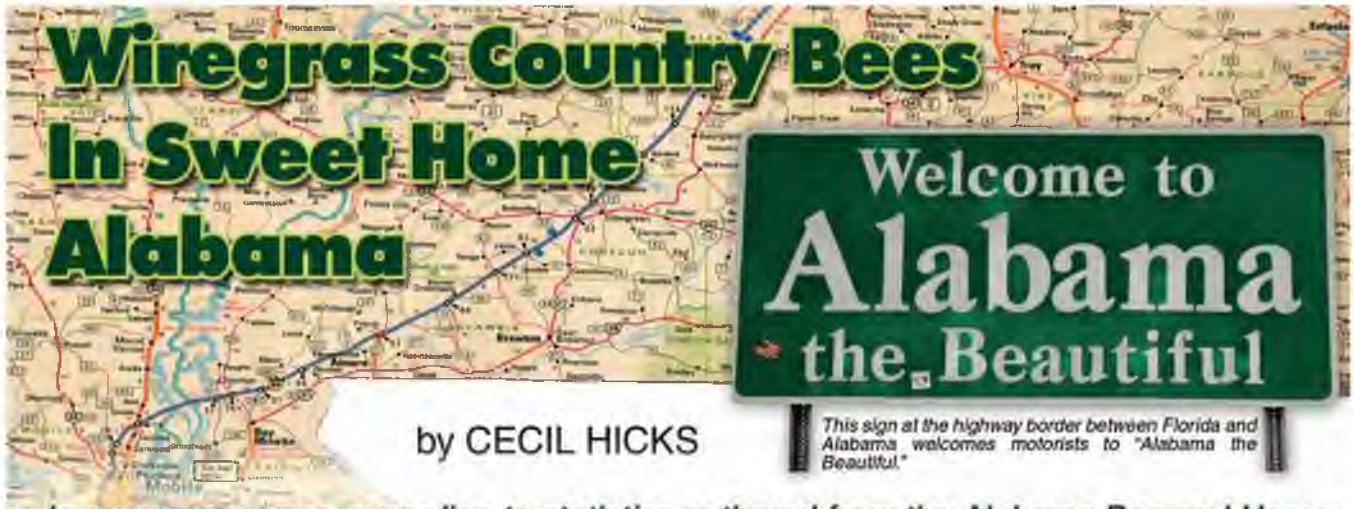
The swarm demonstration is extremely well done and is a great educational event. John Gibeau has perfected his "teachable moment" through lots of practice and experience. John, a former Royal Canadian police officer, began beekeeping at age 10. In 2000 he became a full time beekeeper following his father's footsteps and he is the 13th generation of farmers in his family in Canada. President and founder of Honeybee Enterprises Ltd., in Surrey, British Columbia, John uses his 950 bee colonies in pollination of high bush blueberry plants and 10 additional fruit crops in the Lower Mainland region of southern British Columbia. He markets his honey (average production of 66,000 lbs.) as uni-floral source honey after their placement in pollination. A Master Beekeeper of Simon Fraser University, he teaches basic to advanced beekeeping and hosts over 300 school and visitor bee farm tours annually.

John has served as vice president and president of the British Columbia Beekeepers Association (BCHPA), bringing the Western Apicultural Society (W.A.S.) to Victoria in his final year as president. He was Treasurer of British Columbia Bee Breeders Association for three years. In addition to Bee Beards for demonstration such as at OMSI and WAS, John is a consultant to and provides bees, beekeeping equipment, and expertise to the film industry. He has 25 film productions to his credit and has placed bees on famous actors like Nicolas Cage. He wrote the Film Industry Handbook for Honeybees.

W.A.S. 2010 will be in Salem, OR Aug 29-Sept 2. We will NOT have John do bee beards, but this convention, the 30th W.A.S. meeting, will still include lots of bees, bee people and an interesting mix for old/young, novice/experienced beekeeper, alike. See the Western apiculture website **groups.ucanr.org/WAS/** for program and registration details.

John Gibeau, the plexiglass cage and Glen Andresen at OMSI Bee Beard demonstration.

Wiregrass Country Bees In Sweet Home Alabama



This sign at the highway border between Florida and Alabama welcomes motorists to "Alabama the Beautiful."

by CECIL HICKS

In an average year, according to statistics gathered from the Alabama Bee and Honey Producers, a division of Alabama Farmers Federation, honey bees in the state visited approximately one trillion, five hundred sixty million flowers in order to produce an annual production average of 780,000 pounds of honey.

The primary nectar-producing plants honey bees visited in the state's 67 counties includes sourwood, gallberry, clovers, tulip poplar, soybeans and cotton. Of the state's 600 registered beekeepers about 300 are members of the Alabama Beekeepers Association.

The Wiregrass Beekeepers Association (WBA) of southeastern Alabama, which is affiliated with the statewide beekeepers association, is aptly named after the long-stemmed grass that once covered the ground in abundance beneath the longleaf pine forests of the region.

Membership in this local organization consists of about 45 beekeepers. While most of these beekeepers only have a few hives, according to Bill Miller, past-president of the WBA from Dothan (pop. 58,998), they'd like to be called small-scale, part-time commercial beekeepers instead of the term hobbyist, as most of their honey crop is sold either locally out of their home or at a farmers' market.

A hobbyist, in his way of thinking, is someone who keeps a hive or two in his, or her backyard for pollination of flower and vegetable gardens, plus a fruit tree or so and any honey extracted is for use by family and friends.

Bill had been president of the local club for the past two years and his job, according to him, consists of basically arranging programs, scheduling club events and writing club publicity. Meetings are held monthly at the local Houston County Extension Service center. He is also editor of "The Wired Bee," a three-page informational newsletter distributed to beekeeping members via postal mailings and an Internet website.

He's also an Eastern Apiculture Society Master Beekeeper and teaches the association's beginning beekeeping course that gets underway each year during the month of February.

He presently has eight active bee hives, but has equipment for about 15 production colonies. Six of his hives are set in yards near a fish pond which he stocked last year on his and his wife Mary's property. Their home, with 3 ½ acres of land, is located near farmlands on the outskirts of Dothan. He also has a couple of real "nuclear" beehives set at the Farley Nuclear Plant at Ashford, Alabama, where he works.

Both he and his wife are college graduates. They are originally from New Jersey, but spent most of their adult lives living in Gaithersburg, Maryland, which is a suburb of Washington. D.C. It was in Maryland where he first started beekeeping. Right after college, he started working in Navy ship design and construction. He transitioned to power plant engineering (mostly design of nuclear plants) early on in his career. His present "day job" is a design engineer at the Farley Nuclear Plant

Bill said his wife, who has mostly worked as a manager of various retail stores as well as at a doctor's office, has helped with the bees as needed when he wasn't available. In fact, he claims she's the first beekeeper in the house and tells the story about how she successfully hived his first bee package in 1981 when it arrived. "I was away on business and she transferred it to a hive after reading about the procedure from a book I had titled *First Lessons in Beekeeping*."

The couple are both 58 years of age and

(l) Welcome to the Miller's home where there's no doubt that there is a beekeeper in the household. (r) Beekeeper Bill Miller stands by several of his hives located at his home property near Dothan, Alabama.

David Edhegard, the 2010 president of the Wiregrass Beekeepers Association (WBA) in southeastern Alabama, opens the club's February meeting. (r) Members of the Wiregrass Beekeepers Association (pictured here) gathered for an evening of camaraderie, dinner, bee business updates and beekeeping instruction during their monthly meeting held on Feb. 4, 2010.

have been married for 36 years. They have two grown children, who were active in beekeeping when they were young. They would help with hive work, honey handling, and they were a big hit at the beekeeping booth at the county fair.

Next season his goal is to expand to at least 15 hives. He eventually hopes to have about 25 colonies. He'll probably split at least four colonies and usually he's able to collect at least three swarms in April and May.

In the Wiregrass region of Alabama, Bill says the nectar season starts around the first of April and is usually over by the mid June. Honey plants around his area include the gallberry, privet hedge, wild mustard and clover. Minor plants are black locust, dandelion and goldenrod. For tupelo honey beekeepers have to locate yards about 75 miles south of Dothan in the panhandle country of Florida.

At present, all honey extracting is done in his garage with a six-frame radial and the honey is later bottled in the house kitchen. He labels his honey "Miller's Honey" and sells it in squeezable one pound bottles from his home and at work ($5 per lb.) and at a farmers market ($6 per lb.). His bee truck is actually his Jeep Cherokee.

He's made arrangements at his work site, the Farley Nuclear Plant, that next year his "Nuclear Honey" will be sold by the Alabama Power Service Organization, which will use the profits for their charity work.

He considered 2009 a poor honey year as most of the local colonies in his area only produced about 30 pounds of honey each. A crop of 50-60 pounds of honey per colony is more normal. According to Miller, a lot of Alabama beekeepers had major headaches this year with small hive beetle problems. All of his colonies have full-time beetle traps in them. He uses a mix of AJ Beetle Eaters and Cutts Beetle Blasters. He found both traps effective and simple to use.

He said that fortunately this past year Varroa mites took a year off. As for Africanized bees, there are none reported in Alabama at present, but they are only about 300 miles away in Florida and Louisiana.

He did have a problem with a number of purchased queens this past year that died on him. He called them "three-week specials" because that's as long as they lived.

On his beekeeping wish list future is to some day build a honey house.

The 2010 president of the Wiregrass beekeepers is David Edhegard from the town of Ozark (pop. 15,000). He's a computer systems programmer, but a few years ago he retired from the military as a U.S. Army helicopter pilot.

He and his wife Marsha live on a small 41 acre farm where they raise chickens, goats, bees and fruit trees. The Edhegard's have four children, two are grown and two are still at home.

He is a hobbyist beekeeper with only five hives, which he keeps on a concrete pad about 60 yards from his house. His bees forage mainly on wildflowers, clover and privet, which is a wild hedge that grows in the area. He added that both his bees and goats love privet with its white-clustered flowers.

You might say David got into beekeep-

(l) David Edhegard holds a cone made of hardware cloth covered by screen wire he built four years ago to remove a nest of honey bees from one of the walls of his newly purchased house. (r) Here's David's "witches' hat" bee trap (sealed in foam to the outside wall) in action. The bees exited from their nest into the cone and then into a 9" by 18" wooden box and then were unable to return. After several days of use, the bees were successfully removed from the wall. (*Both photos Courtesy of David Edhegard*)

Master beekeeper, Bill Miller, demonstrates how to combine two weak beehives.

ing about the same time they moved into the house at their farm four years ago. He recalls that when they first moved in they discovered some bees had built a nest in one of the walls and there was an outside entrance.

David explained, "I had no idea how I was going to get rid of the bees and get the hive out of our wall." He ended up calling his local rural agriculture extension office. The agent suggested he trap the bees by building a cone made of hardware cloth covered by screen wire. He constructed the cone, which had a small bee exit hole at the apex. He soon named the cone "the witches' hat" and placed it over the entrance hole on the outside of the wall.

He then built two 9 inch square by 18 inch long wooden boxes. These boxes had an opening where the top of the witches' hat was inserted. The bees would exit their hive, pass through the cone and enter the box. The bees were unable to locate the hole to fly back to their hive, so they were trapped.

David made arrangements with a local beekeeper to pick up one of the boxes each day. Within a few days the hive was cleared of bees.

Following this bee trapping experience, he was even more curious about bees and made arrangements to buy a hive from the man who assisted him and he became David's mentor. David's future plans call for adding five more hives.

Sources for honey in southeast Alabama for David's bees are clover, privet, cotton, sage, tupelo, honeysuckle, wildflowers, dandelion, various grasses and weeds. While cotton is a viable nectar-producing crop in the region, it's not as heavily planted as it once was. At one time cotton dominated the state's agriculture economy and some four million acres of farm land was farmed for cotton production. However, several decades ago the arrival of the boll weevil devastated the crop. Today, only about one million acres of Alabama farm land remains in cotton. Agriculture in the state has since shifted away from cotton to crops such as peanuts, raising of livestock, tree farms and other farming methods.

David uses a six-frame radial extractor for his honey. He said the last time he extracted honey he made 20 gallons that he sold for $34 a gallon. Next year he's hoping for 40 gallons.

He claims he's lucky to date as he hasn't had any problems with his bees this year.

David, as the new 2010 president of the Wiregrass Beekeepers Association, would be the first person to acknowledge that there are more experienced beekeepers in his local group, but when he was nominated for the position, he agreed to run. Each monthly meeting, like the one he conducted on Thursday, Feb. 4, 2010 kicks off with a potluck of southern cuisine consisting of a variety of dishes such as fried chicken, grits, potato salad, beans, mustard greens, regular salad, and sweet tea and sodas, plus several desserts.

During some meetings guest speakers from the beekeeping and honey industry are invited for presentations and at the February 2010 meeting this author was introduced and club officers were thanked for their invitation to attend.

The first order of business included approving the previous month's minutes and reading of the treasurer's report. David reminded everyone to turn in a requested membership profile and a sign-up sheet was passed around for anyone wishing to be placed on the county's "beekeeper to call list" for collecting swarms. He explained that orders for Italian queens and bee packages should be placed by the first of March for April delivery.

He told members present that while they could order queens and bee packages, it was still illegal to import nucs into Alabama. He also passed on information about a new farmers market opening this season, which could be a new place to sell honey.

Master beekeeper Bill Miller gave a demonstration on combining two weak hives. He removes the top lid of a hive and lays a single sheet from a newspaper (which has a few finger-sized holes poked through it) on top the hive box. He then places the other weak hive on top the newspaper and replaces the lid. He explained that you now have a double hive and "you should just walk away from the hive for one week."

He said that when you return after a week to remove what's left of the newspaper, nature will have taken its course and the weak hive problem will have been resolved. You'll now have a stronger hive with double the number of bees and most likely only the strongest queen will remain.

While Alabama might be noted for having one of the best consistent university football teams in the nation and the Crimson Tide almost always makes it to a postseason college bowl game, the state's beekeepers like members of the Wiregrass Beekeepers Association would also hope that in a nationwide honey-tasting contest they, too, would make the playoffs.

Beekeeping in Rwanda

~~Gorillas~~ Apis in the Mist

BY STEPHEN PETERSEN
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Apis in the mist – these traditional hives (a mixture of basket and log) sit on piles of volcanic rock to keep them off the damp ground. The ends are closed with a woven disk and sealed with a mixture of cow dung, soil and wood ash.

"*Agacupa*! *Agacupa*!" screamed the roadside hordes of httle children as we bounced along the rutted road on our way to an apiary adjacent to the Virunga National Park in Rwanda. Figuring "*agacupa*" was some sort of greeting in the local language (Kinyarwanda), I greeted the group of FAV (Forum des Apicultures Virunga) beekeepers employing my newly acquired vocabulary – "*Agacupa*", I beamed with a big smile; but received only polite titters in response. "*Agacupa* means water bottle," explained my host Mark Mwine, "the children were asking that you give them any plastic water bottles you may have—they are a valuable commodity here. The proper way to say hello is *amaku*." Feeling more than chagrined, I switched to French for my discussion with the beekeepers; a language that many Rwandans know as a result of their Belgian colonial legacy.

Ex Africa semper aliquid novi *(Always something new out of Africa; Pliney 23-79AD)*

Although I was there to "consult" (i.e. teach a few classes and help with marketing), for me it was a great learning experience—my first with African bees. Notwithstanding Roger Morse's description of Asia's Giant Honey Bees (*Apis dorsata*) as "*the world's most ferocious stinging insect,*" I would much rather deal with *dorsata* bees than the hive bees of Central Africa. In theory there are two races that should be found in the area; *Apis mellifera monticola* and *A. m. scutellata.* According to Hepburn & Radloff (1998) and Ruttner (1988), they are differentiated by altitude, although hybrid zones exist. Typically the *monticola* are a gentler race living at higher elevations whilst the *scutellata* are more aggressive. *Monticola* are typically dark bees, but yellow forms exist and may be subdivided into "*monticola* yellow" and "*monticola* black". I found some dark bees, but by no stretch of the imagination would I call them "gentle".

To me the most valuable lesson I learned was how the type of hive used for the bees influences temperament, harvest methods, and honey yields; and therefore management procedures. Categorized in ascending order of "modernity" we can describe them as:

- Wild colonies living in natural cavities available for harvest by anyone upon discovery.
- Semi-managed, fixed-comb colonies in traditional horizontal cylindrical hives made from hollowed-out logs or mud-covered, woven baskets.
- Colonies managed in moveable comb top-bar hives.
- Colonies managed in moveable-frame, Langstroth-style equipment.

African bees are well known for rapid population build-ups and their propensity for swarming; it is not surprising then that almost any suitable cavity may house a swarm. There are several factors that must be taken into consideration – bees are not welcome around inhabited areas because of their aggressive nature, rustic dwellings are usually single-walled, wattle and daub (mud plastered over a basket like framework) with thatched-roofs providing few cavities for nesting, there are few large trees in villages, there is almost constant hunting pressure on wild colonies, and access to the surviving surrounding forest (a National Park in the area I was working) is severely restricted.

To take advantage of the high swarm rates beekeepers across Africa simply put out bait hives and wait for them to be occupied as in the "Field of Dreams" movie adage; "*Build it and they will come*". On the road from

Cylindrical bait hives in a eucalyptus tree along the Kigali-Ruhengeri road; the hives are 20-30 feet from the ground. When occupied they will be moved to an apiary.

Inside a basket weave traditional hive; combs of honey are harvested (about 5 in this case) until the beekeeper reaches the brood comb. In theory the bees have sufficient stores of honey at the other end of the brood nest.

Using a hand adze the author demonstrates how to turn ½ of a log half into a top bar hive by smoothing down the perimeter. Photo by Julie Ghrist.

A beekeeper in typical bee veil showing the entrance of a cylindrical hive. It is sealed with a mixture of cow dung, soil and wood ash.

Bystanders enjoy a bit of comb honey well away from the disturbed hives.

A top-bar hive with sloped sides. There was a problem with spacing; I measured anything from 48-52 mm width of the top bars—it should be 32mm. The end pieces of the hive stick up an inch or so, allowing an air space above the top bars, an excellent idea with a galvanized metal roof in the equatorial sun.

Rwanda's capital, Kigali, to the town of Ruhengeri, where the headquarters of the International Gorilla Conservation Program (IGCP) is located, I passed hundreds of cylindrical "bait" hives set high in the branches of eucalyptus trees planted along the roadside. My hosts informed me than when a hive was occupied the owner would climb the tree, retrieve the hive and bring it to one of his apiaries. This had to be done as soon as there was any sign of bee activity as theft of occupied hives was a major problem.

These fixed-comb, cylindrical hives are made from either a hollowed out log (becoming scarcer as timber is a premium commodity); from a mud-caked woven cylindrical basket or, from a series of stout reeds laid out and bound into a mat which is then rolled up and caked with mud. All of the cylindrical hives have a shade/weather protective covering made from bamboo leaves, grass, or galvanized roofing scraps (see photos). The primary advantage of these fixed-comb cylindrical hives is they are cheap; almost everyone has access to the raw materials (albeit large logs are a scarcity), everybody has the weaving skills for the basket style hives, and the outer covering – a mixture of mud, cow dung and wood ash, is everywhere. The cylindrical hives are "self regulating" from a harvest standpoint; the colony is accessed by removing the disk sealing the cylinder opposite the bee entrance end. Combs of honey are removed until a comb of brood is met, then the hive is sealed up again leaving the bees with about half of the honey located on the opposite end of the brood nest nearest the entrance. This reduces absconding. Too often with moveable combs or frames beekeepers tend to harvest too much honey resulting in the bees absconding due to lack of stores.

The next level of beekeeping is with moveable-comb, top-bar hives. This type of beehive was popularized in the 1960's by Canadian aid workers and is sometimes called the Kenya top-bar hive. They can be built from a variety of materials (an adaptation of the woven basket or reed mat materials), have either sloped or straight sides, and have the advantage of being able to be inspected and truly *managed*. The width of the top-bar (32mm or ≈ 1 ¼ inches, in the case of African bees) is the only critical dimension. Many of the top-bar hives I inspected disregarded this critical dimension (I measured a 48-52 mm range in one hive) and beekeepers complained that the bees built comb willy-nilly. None of the top-bar hives I inspected had any sort of comb guide – some had a dribble of wax along the center. Comb guides allow the bees a starting point for comb construction; they can be a 5mm-sided triangle made from bamboo and adhered to the top-bar with beeswax, a saw kerf with Popsicle sticks glued in with beeswax, or 1/2""- 3/4" strips of wax adhered to the center of the top-bar. This, plus the proper width of top-bar, will greatly enhance the prospect of the bees building straight, one-comb-to-a-bar combs that can be manipulated.

Typically, the top-bars in a hive are straight edged and fit snugly together; the colony is worked from one end or the other after removing one top bar providing a working space – the rest of the colony is "sealed" so that only one area (the working point) must be smoked and fewer bees can fly up to protect the hive. This is in contrast to the Langstroth style hive that has a bee space between each frame allowing the bees eleven slots to fly up and defend the hive - much more smoke is needed!

A disadvantage to the top-bar hive is the access to *all* of the combs in the colony; beekeepers must practice good management and self control by leaving the bees sufficient honey at harvest time so they don't immediately abscond; especially if there is another anticipated nectar flow in the near future. This is much easier said than done - in poor rural areas a few dollars now is better than half of a few dollars; especially

A top-bar hive suspended off the ground keeps predators at bay and provides a convenient working height.

Langstroth-style equipment with *Apis mellifera scutellata*; note the ten-frame metal spacer which provides the proper bee space but makes colony manipulation very difficult. There are 11 spaces for bees to fly up defending their hive as opposed to a top bar hive where there is only one space. Looking carefully, you may see there is no foundation in the frames… a few of the reasons I feel this is inappropriate technology.

A well protected Ugandan beekeeper displays a honey comb taken from a top bar hive. Passersby 100 yards away were being stung during this operation.

A typical rural dwelling of wattle and daub (a framework of woven sticks plastered with a mud/dung mix); those are potatoes growing in the yard.

A hand-built stone wall surrounds the Park in Rwanda, keeping wild animals from the farmer's field and providing a convenient place to locate hives. Farmers work right to the edge of the Park boundary—there is no buffer zone.

An armed guard and two guides escort small groups of tourists to see habituated groups of gorillas. If you're lucky, and the gorillas are close, it's a 45-60 minute walk—if not it is a long trek that may be several hours each way.

when your colonies will soon be repopulated by another swarm.

Both locally produced and imported (from Kenya) Langstroth equipment is available. I believe it is more of a detriment to beekeeping activities than of benefit. I visited the local carpenter shop that had been contracted to build some Langstroth style boxes using an imported Kenyan box as a model. We don't know how lucky we are in the West having such wonderful easy-to-work pine for our woodenware! Besides the poor quality lumber, and not to mention the hordes of 12-year old workers dressed in sandals, with their shirts hanging out, and stumbling over scrap wood piles around equipment with no safety guards (my high-school shop teacher would die a second death), here are some of the box construction problems I recognized:

- Hive bodies were not square – the diagonals were as much as 1 cm (≈1/2") different.
- Many of the frames were either too long for the box or fit *very* snugly requiring a strong pry to remove them.
- A high percentage of the frames were not rectangular—in some cases the bottom bar and one end-bar were touching the inside of the box while the top bar was snug in the rabbets.
- The frames were wired with 3-4 wires vertically—all were very loose.
- The rabbet was too deep, allowing the frames to hang below the bottom of the box.
- Warped lumber and poor joints made for many gaps where wax moths will lay eggs.
- A 10-frame metal spacer was used to establish bee space—this makes manipulation of the frames extremely inefficient—bees are rolled upon pulling out each frame, the frames cannot be slid as a unit, and the spaces allow many bees to fly up in defense.
- Sheets of comb foundation are not readily available – so equipment is used without foundation - bees build comb willy-nilly.

One of the benefits of Langstroth equipment besides moveable frames is the "banking" of drawn comb. Keeping the drawn combs on a strong colony or properly storing equipment (honey supers et al) allows Western beekeepers the opportunity to have drawn comb for their bees as it is needed (yes, I know we also can have major wax moth problems). A climate perfect for wax moths, all the cracks and poor joints acting as a wax moth egg repository, the fact that the bees frequently abscond, and a lack of adequate storage for drawn combs are some factors that negate the value of moveable-frame beekeeping.

Wax moths do play an important role in beekeeping under tropical migrating bee conditions. Moths invade rapidly if the combs are unprotected and soon turn the entire set of combs to frass in the bottom of the tree cavity, or the man-made container. This reduces the possibility for disease transmission—the beekeepers in Rwanda and Uganda told me they have no trouble with American or European Foulbrood. To ready a hive for occupation by a swarm, beekeepers just have to shake out the hive detritus left by the wax moths.

The Setting and the Beekeepers

The "Parc National des Volcans" (PNV) in Rwanda, the Bwindi Impenetrable Forest and Mgahinga National Parks in Uganda, and the Virunga National Park in DRC (Democratic Republic of Congo) are home to the world's approximately 700 - 750 remaining mountain gorillas (*Gorilla beringei beringei*). They were made famous by the Hollywood film "Gorillas in the Mist" (thus my bad pun as the title of this piece) recounting (in Hollywood style) the life of primatologist Dian Fossey (she was subsequently murdered in Dec 1984). The mountain gorillas were first studied in 1959 by noted field zoologist George Schaller culminating in his 1963 book, *The Mountain Gorilla*. Remembering a claim in "*Sweetness & Light*" (Ellis 2004) that mountain gorillas eat honey, I posed the question to the Park Rangers and trackers who spend many hours a day observing the gorillas. They had never seen the gorillas interacting with bees—except to get away from them if a nest was inadvertently disturbed. I looked in the Schaller book, asked local researchers studying the mountain gorillas, and searched for references on the Internet, but could find no one to confirm the "gorillas eat honey" rumor. Locals in Uganda's Bwindi Impenetrable forest told me that both chimpanzees (*Pan troglodytes*) and olive baboons (*Papio anubis*) had no trouble breaking into hives to steal honey.

In order to study the gorillas, they first have to be "habituated" i.e. a process where the gorillas eventually learn to ignore the non-threatening researchers. This is also important in developing sustainable tourism economy in areas adjacent to the Park. Now, small groups of tourists (max of 30 per day) can go on a guided trip (complete with armed guard as there are still *guerillas* active in the area) spending an hour observing the primates a close range (no closer than 15 feet) for $500. My job was to give technical assistance promised by IGCP encouraging the beekeepers to move out of the Park with their beekeeping activities. The pressure on the Park resources is intense—beekeepers are accused (perhaps rightly in some cases) of illegal wood cutting, setting snares, illegal hunting and starting fires.

Early on I gave a workshop on construction of top-bar hives from local materials or using the two halves of a log hive to make two top-bar hives. The FAV (Forum Apiculture des Volcans) has members in almost every village surrounding the Park. I visited a number of their apiaries, collecting bee samples, asking questions on their perceived problems and getting stung (a lot!). Ants are a big problem as in most tropical situations; this is addressed by greasing the hive stands (when and if they use them) or suspending the colonies off the ground. Several beekeepers told me "the bees don't like the top bar hives." As I observed the hives, complete with a galvanized tin roof, sitting in full equatorial sun I could see why; a thick layer of thatch atop the hive would keep the hive much cooler. I made the comparison between the galvanized roofs on some buildings compared to the traditional thatching used on others—everyone agreed the thatched roofs were cooler but "they didn't last as long".

The young gorillas are by far the most entertaining –visitors must keep 15 feet away from the apes at all times reducing the potential of disease transmission.

The Park border surrounding PNV is a hand-built stone wall some 4-5 feet tall and 2-3 feet thick. It serves to define the Park Boundary (one of the most startling vegetative transitions I've ever seen), keeps the larger animals such as Cape Buffalo out of farmer's fields, and provides a nice platform upon which to rest hundreds of beehives. If the hives are not on the wall, they risk being knocked over by livestock—something to be avoided given their aggressive nature. We approached several of the bee hives and, knocking the end cap sealed with cow dung loose from the hive, we made an inspection. I noted two things right off; nearly everybody was wearing dark, if not black, clothing and tremendous amounts of smoke were used. The bees retreated in the face of the smoky onslaught and we pried away combs of honey adhering to the top of the woven basket hive. After several combs (and a number of stings) were gleaned, we closed up the backside of the colony and retreated away from the disturbed bees to enjoy some honey in the comb. It tasted strongly of smoke – a taste I soon learned to associate with all the honey I tasted over there. This is definitely not a marketing plus by Western standards; perhaps a smoker fuel other than cow dung would temper the taste a bit.

FAV in Rwanda and their counterparts at Bwindi Beekeepers Development Association in Uganda do have some market pluses; their label has a well designed layout with a photo of a silver-backed mountain gorilla prominently featured and a side panel describing how a portion of the sales proceeds go to supporting sustainable development in areas surrounding the Parks. There are some negative aspects—the containers (not a huge selection from which to choose in Africa) are plastic and are very prone to leaking, the honey has a smoky taste, and the jars are often sticky. Not something you'd trust in your suitcase.

We had a discussion on pricing- they sell in bulk to local brewers to make either honey beer or assist in the fermentation of banana beer, a local specialty. You have to be local to appreciate it—it was not something that appealed to my taste buds. The bottled honey is sold to the tourist trade 99% of whom are there to see the gorillas. A 500 gram jar sells for the equivalent of 80 cents. After I explained concepts like "discretionary or disposable income" (a concept that does not exist there) and that people who had traveled thousands of miles, were spending hundreds of dollars a day on meals and lodging, not to mention the $500/hour fee to see the gorillas, would not balk at spending $8 on a jar of honey if it helped save the baby gorillas, they raised their prices. Six months after my return I received an e-mail, "*Mr Stephen—we sell as much honey for $8/jar as we did for .80/jar*" It's going for a good cause.

Beekeeping terminology

Besides bees I love languages (OK, my family is further up on the list) and I'm always trying to learn local expressions (notwithstanding my faux pas thinking "*agacupa* –water bottle" was a greeting) and beekeeping terminology wherever I go. *Kinyarwanda*, a Bantu-based language, is the *lingua franca* spoken by nearly everyone in Rwanda, far eastern Democratic Republic of Congo (DRC), southwestern Uganda, and northern Burundi; it is understood in other areas proximal to this region. French, a legacy of the Belgian colonial days (up until the mid 60's), is widely spoken in the area and English is being taught as a second language in the schools. Kinyarwanda, as can be seen by the chart shown, has lots of vowels – it wasn't a language that stuck easily in my brain.

Off to see the Gorillas

I was glad my sponsors had fronted the fee for a one-hour visit to see the gorillas—it was beyond my "discretionary income" budget but still….I'd come all this way, it would be a shame to miss the major attraction (for non-beekeepers anyway). Although it's a tourist destination and the gorillas have been habituated to humans, they are still wild animals and a safety orientation meeting *must* be attended by all who go on the trek to visit the primates. As gorilla and human DNA differs by only 2.3% (Johanson & Edgar 1996), there is a very real chance of transmitting human illnesses to gorillas. Woe be it unto anyone that sneezes, coughs, sniffles or otherwise shows *any* sign of coming down with something during the briefing—you'll be politely asked to remain at HQ and either offered a refund or rescheduled.

Apis in the Mist vocabulary

English	French	Kinyarwanda
(*Apis mellifera*) bees	les abeilles	Uruyuki (sing.) inzuki (plural)
Apiary	le rucher	Uruvumvu
Beekeeper	l'apiculteur	Umuvumvu, umuvumbu
Beekeeping	l'apiculture	Ubuvumvu, ubuvumbu
Drone	le bourdon, mâle	Ingabo
Flowers	les fleurs	Indabyo
Honey harvest	récolte du miel	Guhakura
Hive (Langstroth)	le ruche moderne	Umutiba wa kijyambere
Hive (traditional)	le ruche traditionnelle	Umutiba wa Kinyarwanda gakondo
Honey	le miel	Ubuki
Honey comb	le rayon de miel	igishashara
Migration	transhumer(?) verb	Ukwimuka
Pollen	le pollen	Ubwayi, insinda
Queen bee	la reine	Urwamikazi, urwiru
Smoker	l'enfumoir	Lfumba
Swarm	l'essaim	Irumbu
Wax	la cire	Inta
Worker	l'ouvrière	Abahashyi, impashyi

"Terre des mille collines- Land of a thousand hills" was the Belgian name for the countryside in Rwanda. A beautiful place blessed with rich soils, but suffering from overpopulation. Almost every square yard is under cultivation.

Members of the Bwindi Beekeepers Development Association in Uganda show off their attractively labeled honey. They also produce decorative candles for the tourist market.

A top-bar hive body; the protruding handles are multi-functional; they can be used for transporting the hive (2 people), they serve as comb rests while inspecting the hive, and allow the hive to be suspended above the ground. The bottom board is hinged, allowing a rapid inspection of colony status and a quick clean up as hive detritus falls to the ground upon opening.

An apiary of *A. m. scutellata* in Uganda; it's nice to have the hives near home where theft can be deterred, but when one hive is disturbed, soon the whole apiary is in a frenzy.

At the briefing you're instructed that you should keep 5 meters (15 feet) from the gorillas, back away if approached, tuck into a ball if charged, and please don't stare (it's confrontational). Our group was accompanied by an armed guard (not for protection from the gorillas but from potential "undesirables" that may be loose in the forest). The guides had been advised by trackers (who spend all day following the gorillas) as to the gorilla's location by radio so it was a direct march to the encounter. The babies were cute and frolicsome; the adults pretty much lounged about snacking on leaves and the dominant silver-backed male lay on the ferns the whole time and stared into space. The bee maniac that I am, I took the opportunity to quiz both the guides and the trackers (some of whom had been with the gorillas for decades) about gorilla-bee interactions; nothing, rien, nada, zip. On the way home, we passed through a village where I sampled the local banana beer; an acquired taste—my only comment was "not suitable for export".

The Way Forward

As the most densely populated country in Africa (983 people per square mile), space in Rwanda is at a premium; it seems as though every square inch of tillable land is being cultivated. Beekeeping offers some respite as it requires only enough property upon which to place a few colonies. Beekeeping in cylindrical log hives is a tradition going back thousands of years—the transition from traditional fixed-comb colonies to moveable-comb or moveable-frame via Western technology has not been very successful. Expanding the market is problematic; the local market using honey as a brewing agent is strong and will remain so, but prices paid are negligible; the international market faces strong competition. Unfortunately, besides the cachet of "Mountain Gorilla Honey", honey from the area is just another smoky-flavored, multifloral, *mellifera* honey that is very common on the African market.

Theft of hives was *the* biggest problem noted by beekeepers; this is a cultural/social factor that would be very difficult to be addressed by outside agencies. Theft inhibits entrepreneurship and the transition to moveable comb/frame hives; why put time and money into modern equipment that will be stolen, perhaps even before the bees take up residence?

Beekeeping development programs have been implemented along the Western Langstroth lines (by local, regional and international aid agencies); this, in my humble opinion, is the wrong road to follow. Emphasis should be placed on transitioning to moveable comb technology (top-bars), selecting and propagating bee stock that is "less" aggressive, implementing high standards of quality control, finding village-level solutions to high moisture tropical honey, and developing management techniques that are adapted to tropical bee patterns (swarming and absconding) instead of implementing temperate bee techniques. **Adapt your management to the bees instead of adapting the bees to your management.**

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References

Ellis, H., (2004); *Sweetness & Light, the Mysterious History of the Honeybee*, Harmony Books, New York.

Hepburn, H. R., Radloff, S. E., (1998); *Honeybees of Africa*, Springer-Verlag, Heidelberg.

Johanson, D. C., Edgar, B. (1996); From Lucy to Language,

Ruttner, F. (1988); *Biogeography and Taxonomy of Honeybees*, Springer-Verlag, Heidelberg.

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The Balsaminaceae
The Touch-me-not Family

Depending on the reference consulted, the Balsaminaceae is represented by 2-4 genera and between 450-850 species of mainly herbs and subshrubs primarily from Eurasia, North America and Africa. Part of the family's largest genus, Impatiens, is native to North America. The USDA website[20] lists 11 species of *impatiens* growing in North America, 5 of which are considered to be native.

The Family is characterized by crisp, translucent, watery stems that have a glassy appearance. Frequently the stems are tinged with red and purple and have swollen nodes. The leaves are usually arranged on their stems alternately, but may have opposite or whorled arrangements as well. Usually there are no stipules[1].

The flowers are complete, bilaterally symmetrical, sometimes referred to as highly irregular[2] and are either arranged singly or with several flowers coming from a common floral stem.

The calyx has 3, rarely 5, often colored sepals, the lower one frequently extended posteriorly into a funnel-like nectariferous spur[3]. The corolla usually consists of 5 petals, but sometimes 4 or 2. The upper petal is generally free (not joined to other petals), flat or helmet shaped, and the four lower and side petals are usually joined in pairs, one pair on each side of the flower.

The five stamens have short filaments and the anthers are joined to form a cap over the pistil. The style of the pistil is very short. As the ovary enlarges, the pistil breaks through the cap. The stamens, petals and sepals are attached to the floral stem below the ovary (ovary in superior position). The pistil is compound with five carpels[4], and there may be one or five stigmas.

The generally elongate fruits have five sides (valves), which, when ripe, split apart and explosively scatter their seeds when touched, therein the origin of the common name, "touch-me-not. Rarely the fruit is a berry[5].

About 20 species of the genus *Impatiens* are cultivated. [2, 4, 5, 7, 11 & 19].

Jewelweed, orange touch-me-not, spotted touch-me-not, lady's-earrings

Scientific name: *Impatiens capensis*

Synonyms: *Impatiens biflora, Impatiens fulva, Impatiens noli-tangere* ssp. *biflora, Impatiens nortonii*

Origin: Eastern North America

Plant description: *Impatiens capensis* is a glabrous (smooth, not hairy) annual that grows to heights of about 20 to 60 inches. The species generally branches in its upper levels, has ovate to elliptical[6] shaped leaves that are 1.2 to nearly 4 inches in length, are rather coarsely toothed, and glaucous[7] beneath.

The generally orange-yellow (rarely lemon yellow or white) flowers with reddish brown spots are found at the ends of slender drooping pedicels (flower stems). The flowers range from about 0.8 to 1.2 inches in length. The posterior sepal forms a nectariferous, forward curving spur that ranges from 0.3 to about 1 inch in length. The elongated narrow seed pods are about 0.8 inches long, and when mature, to the delight of "children of all ages", explosively distribute their seeds when touched, hence the common name, touch-me-not. [7, 8, 11 & 16]

Distribution: The species is generally found in moist places; moist woods, along brooks, wet roadside ditches and near springs [7, 11 & 16]. It, for example, grows luxuriantly around the edge of a marsh on my property.

Blooming period: Gleason and Cron-

1 **Stipules: a pair of leaf-like structures that are found at the base of the leaf stem of some leaves.**
2 **Complete: Flowers that have all the usual parts i.e. sepals, petals stamens and pistil. Bilaterally symmetrical: where only one plane can be passed through the flower to give mirror images. Irregular: where all the same parts of the flower (example petals) are not similar in size and arrangement.**
3 **Spur: a hollow slender sac-like structure coming from a flower, in this case made from a sepal.**
4 **Carpel: the basic female unit of the flower. When a pistil is composed of more than one carpel, it is said to be compound.**
5 **Berry: a fleshy fruit derived from a single pistil, with several to many seeds (example: a tomato).**
6 **Ovate: Egg shaped, with more or less rounded ends, and widest at its attached end (below the midpoint). Elliptical: Broadest toward the midpoint and narrowest at its relatively equal ends.**
7 **Glaucous: Covered with a whitish or bluish waxy material that is easily removed, much like a plum.**

***Impatiens capensis* flower. I had several pictures of this species from which to choose. I chose one with ants because it demonstrates that there is nectar in the flowers. Perhaps the ants were in the process of gathering it, or perhaps they were guarding it. Notice the anthers ready to dust a bee when she comes to harvest nectar. Beekeepers can stand at their hives and tell which bees are working jewelweed from the whitish-yellow spot on their thorax. Photo taken at the Missouri Botanical Garden located in St. Louis, MO on 8/05/01.**

quist[7] who treat the northeastern US and contiguous parts of Canada, provide a blooming date range of June to September. Pammel and King[16] in their 'Honey Plants of Iowa' report bees working the plants at Ames, IA on September 8, 1918 and September 1, 1924 as well as at Albert Lea, MN (extreme southern MN on route I-35) on August 28, 1927.

Importance as a honey plant: A. I. and E. R. Root in their 1920 edition of ABC and XYZ of Bee Culture[18], appear to make no mention of any species within the genus *Impatience*.

John Lovell[13] reports that surpluses of jewelweed honey have been reported from MN. He mentions that bumble bees frequently bite holes in the flower spurs, which then allow honey bees to rob nectar through the holes. He also describes the bees that work the flowers from the front as having their backs dusted with whitish pollen. Oertel[15] from his questionnaires, found the species (under the synonym, *I. biflora*) to be of at least some importance in MN and under just the genus, most likely either *I. capensis* or *I. pallida*, to be important in IL, IN, and VT. Frank Pellett[17], while not identifying the exact species about which he was writing[8], indicates that jewelweed is commonly regarded as a bumble bee plant, but was reported as a honey plant in MI and WI. He also provides the information that Charles Bessey included two species of jewelweed in his 1895 list of Nebraska honey plants. They are listed there under the synonyms *Impatiens biflora* (=*I. capensis*) and *I. aurea* (=*I. pallida*), and are placed there in the family Geraniaceae. The Bessey report states only, "Both species secrete nectar in their nectar-sacks, and probably bees are able to secure it."[3] Pammel and King[16] seem to regard the species mainly as a hummingbird flower, but also state that the plant is a source of nectar for bees in some locations. Milum[14], using only the genus name, places it in his tertiary or minor honey and pollen plants category, indicating that either he considered the plant produced little nectar or that it was rather scarce. From the USDA distribution maps of the *Impatiens* known to be growing in the wild in the US, Milum most likely was referring to the two *Impatiens* considered here. It also could have included *Impatiens balsamina*, a nonnative and commercial flower bed plant. These are generally double-flowering and thought to produce no nectar[9]. Harvey Lovell in his 1966 Honey Plants Manual[12] doesn't mention *Impatiens*, but the 1977[6] version by Lawrence Goltz describes the species as "of limited value to bees". To the above I add my personal experience with the species. Before the advent of the mites, I found the *I. capensis* that grew around the edge of the marsh on my property to be quite popular with honey bees, and I much enjoyed watching the bees returning to my hives with the telltale dusting of whitish pollen on their thoraces as described above by J. Lovell. With almost no effort on my part, I could tell my bees, "I know where you've been" and at the same time make an estimate of the percentage of the foraging force of a particular hive that was working the species. *I. capensis* appeared to be a very popular plant with my bees.

[8] **The picture provided appears to be *I. capensis*. The species *I. pallida*, which is generally less common than *I. capensis*[7], he describes as being very common in parts of MI and WI. According to the USDA Plants Website[20] none of the other native species are found in MI and WI.**

[9] **Till: an unstratified deposit composed of sand, gravel, clay, and boulders left behind by glaciers.**

Pale touch-me-not, jewel-weed, pale snapweed

Scientific name: *Impatiens pallida*

Origin: Eastern North America

Plant description: *Impatiens pallida* is very similar to *I. capensis,* but is generally a slightly larger plant, the stems are more glaucous, the flowers are generally a canary yellow either without spots or only sparingly spotted. The lower sepal forming the 0.16 to 0.24 inch long spur is nearly as broad as or broader than it is long, is shorter than that of *I. capensis* and abruptly bends downward at right angles. The species is generally less abundant than *I. capensis*. [7, 8 & 11]

***Impatiens pallida*. Photo taken in the W. J. Beal Botanical Garden on the Michigan State University Campus on 7/26/03.**

Distribution: According to Gleason and Cronquist[7] , which covers northeastern US and contiguous parts of Canada, the species is found in wet woods and meadows, often in shadier locations than *I. capensis*. Larsson and Shuel[LandS] state that it is found in Ontario in "lowlands on wet saturated tills[9] and seasonally flooded swamps." Pammel and King[16] report that it is "widely distributed in Iowa on rich

soil banks of small streams, in ravines, rich woods and borders of lakes, in soils better drained than where the spotted touch-me-not grows; or sometimes in woods in alluvial bottoms[10]." In Iowa at least, they indicate that it seems less restricted in its distribution than *I. capensis.*

Blooming period: Gleason and Cronquist[7] state that the species blooms June to September. Larsson and Shuel[10], writing about Ontario, provide a blooming date range of August to early September. Pammel and King[16],writing about Iowa bee forage, state that the blooming date range is July and August. They also report having observed it blooming at Ames, IA on September 1, 1924.

Importance as a honey plant: Oertel[15] from his questionnaires, while not mentioning the species specifically, found the genus to be of at least some importance in IL, IN, and VT. From those locations these reports most likely represented either *I. capensis* or *I. pallida.* Ayers and Harman[1], from their questionnaires, found the species to be of at least some importance in Ontario and Maine. Larsson and Shuel[10] writing about Ontario bee forage, state that the species is a "good nectar and pollen producer in August to early September". On bee attractiveness, they rate it a 4, their highest rating.

Honey potential: In nectar secretion, Larsson and Shuel[10] rate the species as a 2 on their 3 point scale indicating that it is a "good nectar producer, sometimes giving a surplus". On abundance they rate the species as a 4 on their 4 point scale indicating that there are "large communities (of the species) on uncultivated sites".

Honey: Larsson and Shuel[10] indicate that the honey is "light and sweet", this apparently coming from an unreferenced Russian report found in an unpublished 118 page manuscript that was later condensed to reference [10].

Pollen: Larsson and Shuel also indicate that the species is a good pollen producer.

References

1. **Ayers, G. S. and J. R. Harman. 1992.** Bee Forage of North America and the Potential for Planting for Bees. In The Hive and the Honey Bee (J. M. Graham, Ed.), Dadant and Sons. Hamilton, IL.
2. **Baumgardt, J. P. 1982**. How to Identify Flowering Plant Families--A Practical Guide for Horticulturists and Plant Lovers. Timber Press. Portland, Oregon.
3. **Bessey, C. E. 1895.** A preliminary list of the honey-producing plants of Nebraska. *Nebraska Agricultural Experiment Station Bulletin* 40: 141-152.
4. **Cronquist, A. 1970.** How to Know the Seed Plants. W. C. Brown Co. Dubuique, IA.
5. **Cullen, J. 1997.** The Identification of Flowering Plant Families. Cambridge University Press. Cambridge, UK.
6. **Goltz, L. R. 1977.** Honey Plants--A revised edition of the original Honey Plants Manual of Harvey B. Lovell, Ph.D. A. I Root Co. Medina OH.
7. **Gleason H. A. and A. Cronquist 1991.** Manual of Vascular Plants of Northeastern United States and Adjacent Canada (Second Edition). The New York Botanical Garden Press. Bronx, NY.
8. **House, H. D. 1935.** Wild Flowers. Macmillan Co. New York.
9. **Howes, F. N. 1979**. Plants and Beekeeping. Faber and Faber. London.
10. **Larsson, H. C. and R. Shuel. 1992.** NectarTrees, Shrubs and Herbs of Ontario. (C. D. Scott-Dupree, Ed.) Publication 82. Ontario Ministery of Agriculture and Food Publication 82. Queens Printer for Ontario.
11. **Liberty Hyde Bailey Hortorium Staff. 1976.** Hortus Third. A Consise Dictionary of Plants Cultivated in the United States and Canada. Macmillan Publishing Co. Inc. New York.
12. **Lovell, H. B. 1966,** Honey Plants Manual. A Practical Field Handbook for Identifying Honey Flora. A. I. Root Co. Medina, OH.
13. **Lovell, J. H. 1926.** Honey Plants of North America. A. I. Root Co. Medina, OH.
14. **Milum, V. G. 1957.** Illinois Honey and Pollen Plants. Contributions from the Department of Horticulture, University of Illinois. Urbana, IL.
15. **Oertel, E. 1939.** Honey and Pollen Plants of the United States (U. S. D. A. Circular 554) U. S. Government Printing Office. Washington D. C.
16. **Pammel, L. H. and C. M. King. 1930.** Honey Plants of Iowa. Iowa Geographical Survey Bulletin No. 7. Iowa Geological Survey, State of Iowa. Des Moines, IA.
17. **Pellett, F. C. 1978.** American Honey Plants. Dadant and Sons, Hamilton, IL.
18. **Root, A. I. and E. R. Root. 1920.** The ABC and XYZ of Bee Culture. A. I. Root Co. Medina, OH.
19. **Smith, J. P. 1977.** Vascular Plant Families. Mad River Press. Eureka, CA.
20. **USDA, NRCS.** The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

[19] **Alluvial bottoms: soils deposited by running water at only slight elevations above the streams that deposited them.**

MarketPlace

FOR SALE

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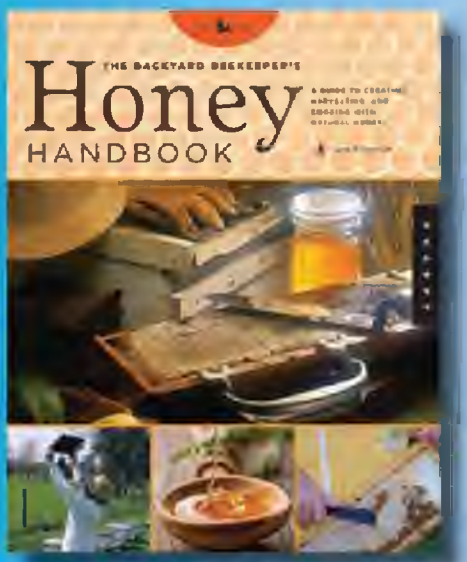

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DADANT AND SONS

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NEW AND IMPROVED EXTRACTOR MOTORS

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Made in the USA!

Why are they the best in the business?

TWICE as THICK as our competitors

➪ We use Type 304 stainless steel. This may not mean anything to you, but it is the most widely used and accepted stainless steel in the food-processing industry, because of its resistance to rust and corrosion to protect your honey.

➪ We use stainless that in some cases is almost TWICE as THICK as our competitors' stainless steel. You want durability? Here it is.

➪ Sheets of stainless steel are difficult to permanently join together. Instead of using the old technology of soldering, caulking or crimping stainless steel together, we use state-of-the-art, Automatic MIG welders to actually melt and weld our stainless steel together. Smooth welds inside and out that won't ever leak. No sealants are used to hide poor quality welds and prevent leaks. Dadant manufacturing standards are rigid. We meet them on each and every all-welded stainless steel tank sold. Each tank is tested before it leaves the factory.

➪ A team of 15 is involved in the over 25 steps it takes to make the durable, efficient and sanitary stainless steel extractors from Dadant.

Ideal Products for the Smaller Producers

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The perfect answer for melting up those burr combs and small amounts of wax. Melter is 19" x 24". Works best when painted black. Comes unassembled.

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- Three piece clear uncapping tub, drainer and lid!
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- Virtually Unbreakable!*
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An excellent hand tool for opening the cells to let the honey out. 20 sharp needles molded into high strength plastic. A must in every honeyhouse.

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- Cover
- 200 Micron Fine Filter
- 400 Micron Medium Filter
- 600 Micron Coarse Filter
- 5 Gallon Pail Honey Bucket

Filters are also Sold Separately

Serrated Uncapping Knife

M00338

$22.95

Serrated Uncapping Knife—Probably the best "cold" uncapping knives we have found, the double sided serrated knife cuts through the capping very effectively. A high quality tool from Portugal.

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Ten Toll-Free Order Numbers

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Illinois	1-888-922-1293	Texas	1-877-632-3268		

*Note: The Wisconsin toll-free number will be answered at the Dadant Corporate Office in Hamiton, IL.