May 2011

SWARM SEASON SECRETS

Catch The Buzz™

www.BeeCulture.com

Bee Culture

The Magazine Of American Beekeeping

Grow Buckwheat

Improved Queens

Plus –

ROOT PUBLICATIONS
$4.99

A beekeeping rite of passage – catching a swarm. And who can argue with FREE BEES!
Painting by Marie App

Publisher – John Root
Editor – Kim Flottum, Ext. 3214, Kim@BeeCulture.com
Production Coordinator – Kathy Summers, Ext. 3215, Kathy@BeeCulture.com
Circulation & Advertising – Dawn Feagan, Ext. 3220, Dawn@BeeCulture.com
800.289.7668 • www.BeeCulture.com

Contributors
Clarence Collison • James E. Tew • Ann Harman • Kim Lehman
Steve Sheppard • Larry Connor • Connie Krochmal
Jennifer Berry • Ross Conrad • Audrey Sheridan

Subscription Information
U.S., one year, $25; two years, $48. Newsstand price: $4.99. All other countries, (U.S. Currency only), $15.00 per year additional for postage. Digital Edition $15. Send remittance by money order, bank draft, express money order, or check or credit card. Bee Culture (ISSN 1071-3190), May 2011, Volume 139, Issue 5, is published monthly by The A.I. Root Co., 623 W. Liberty Street, Medina, OH 44256. Periodicals Postage Paid at Medina, OH and additional mailing offices.

Subscriptions, Book Orders
V800.289.7668 • V330.725.6677, Ext. 3220 • F330.725.5624
www.BeeCulture.com; email: info@BeeCulture.com

Advertising
Contact Dawn Feagan
800.289.7668, Ext. 3220; Dawn@BeeCulture.com

POSTMASTER: Send address changes to
BEE CULTURE, The A.I. Root Co.,
623 W. Liberty St., Medina, OH 44256

Bee Culture

FEATURES . . .

DEPARTMENTS & COLUMNS

GLEANINGS-73, CALENDAR-60, CLASSIFIED ADS-61

Designing Bee Course?

Help! I am planning to teach a course on bees in the Fall of 2011 at our local college. It will be a three semester hour course offered in the evenings for college credit, but open to anyone who wants to take it. It is not expected to be just a beekeeping course, although I hope to introduce basic beekeeping as part of it. The intent is to explore pollination, bee biology, and bee culture of both native bees and honey bees.

I would welcome any suggestions, activities, topics, curriculum, or methods.

I am a professor of biology, but my training was all done in the field of parasitology. Later I did research in insect pathology, but not specifically bees. I understand biology pretty well, but have never studied bees professionally am just a hobby beekeeper myself. But I believe that hobby beekeepers and part-timers may hold the key to better bee health of both native and honey bees by providing a stable environment for bees to evolve. In other words I would like to contribute to regional pollination through this course. If anyone can help me out in designing such a course I would be very grateful.

Please send suggestions to me at any of the following:

Dr. Gary McCallister
Biology Department
Mesa State College
Grand Junction, CO 81501
970.248.1939
mccallis@mesastate.edu

Regulatory Compromise?

After keeping bees for 40 years and queen breeding with OTS (On The Spot) for over 20 years, I have seen many a Winter come and go. Over the past three years, I began to see honey bee colonies struggling in my area but I myself was still able to maintain normal overwintering rates, until this past Fall. Because of the major bee losses that we are experiencing now, I want to clarify the nature and origins of these losses so that beekeepers do not mistakenly doubt the integrity and high quality of OTS queen rearing and July Starts.

Over this past Winter, I attended many meetings where I was able to interview a lot of beekeepers as well as listen to many various speakers and researchers. I found that most researchers focused on viruses and/or nosema as being the underlying causes of hive losses. The possibility of an outside agent causing illness or bee kill was not mentioned, considered, or explored. Hardly talked about or entirely omitted were the recent, revealing leaks that the USDA and EPA's own scientists have known all along about the neonicotinoids' outright, deadly harm to honey bees and other pollinators through their very own research. It is a taboo subject but we now know that our own regulators abandoned honey bee safety and stressed our entire beekeeping industry for some corporation's market share. In other words, the chemical lobby was stronger than the beekeeping lobby.

Another conflict of interest that has come to my attention is that many researchers could lose valuable funding if the CCD mystery is solved.

The beekeepers I interviewed bring further light to this problem. I found that the beekeepers experiencing the most success are located in areas that are isolated from worked landscapes. By isolated I mean that they are well out of flight range and wind drift of industrial agriculture, golf courses, and chemically treated residential areas. And I am seeing the same success within my own isolated apiaries.

Last Fall I lost two yards of July starts that were doing very well into October. The new queens started laying the first of August on the 43rd parallel and had excellent brood patterns as was demonstrated to the local bee club in late September. The starts were brood rearing well into mid-October which is normal with July starts with OTS queens. Sometime between mid-October and mid-November, I had three CCD hives and four other hives losing their queens and field force and trying to supersede. The other hives in the yard were queenright but had lost a lot of bees and were dead shortly thereafter.

Another yard had healthy July starts behaving normally. In late August I decided to move 1/3 of the hives to an isolated area on private land flanking the Allegan State Forest. These re-located hives are doing well with normal losses as expected whereas the same-family hives back at the original location perished completely. This has become a very important experiment as the bees were from the same stock in the same yard and the locations have very similar overwintering conditions. Had nosema and/or viruses been a problem in that stock, both apiaries would have perished.

Hive loss in all the yards near worked landscapes seems to have occurred sometime as of October on the 43rd parallel. This is consistent with other CCD and hive loss reports in the Fall. It seems as if they are being affected with an outside agent that weakens them if it doesn't outright kill them. If this outside agent is undetectable at one part per 10 billion then we are left to believe that they died from viruses or nosema. Just because we have not yet designed an instrument to detect to one part per trillion does not necessarily mean that an outside agent cannot kill at that level. What I am saying here is that the honey bee is the canary in the coal mine detecting an agent that is compromising human health. Don't forget that every one of us starts out in life smaller than a bee.

I may not be able to see the wind but I know what it is doing and the same is true with an outside agent. A medical examiner states the cause and *manner* of death. If the deceased had HIV and died of pneumonia, the cause is HIV and the manner is pneuomonia. As for the current drastic bee losses, it is my opinion that nosema and/or other viruses are the man-

ner of death and an outside agent is the cause. The best beekeeping methods in the world cannot maintain thriving honey bee colonies around pesticides or other harmful agents.

I have been keeping bees for a very long time and my instincts tell me something is very wrong, wrong enough that I have begun to establish isolated apiaries far away from worked landscapes to protect my stock. It would be my recommendation that you do the same. Please examine the surroundings of your apiaries within and beyond flight range and wind drift. Learn more about the seasonal timing of your local agricultural methods. Finally, please contact your elected representatives.

I have contacted both of my U.S. Senators to inform them of my findings. There may be a very serious problem within our environment right now and it may be affecting the air, water and soil that the EPA was commissioned to protect in 1970. And now the U.S. taxpayers are told they must fund a national health care plan. Are we going to pay for medical problems that are really a result of environmental contamination?

What started out as a honey bee problem is now clearly a human health and safety issue.

Mel Disselkoen
Wyoming, MI

Master Beekeepers Need Continued Education

On Saturday, February 12, I proudly presented 18 books and one CD about beekeeping to Connie Whitt, Head Librarian, Eden Branch of the Rockingham County Public Library. Also present were Dr. David Tarpy, Associate Professor of Entomology at North Carolina State University, and Extension Apiculturist; and Jerry M. Isley, Piedmont Regional Director, North Carolina State Beekeepers Association. Dr. Tarpy and Mr. Isley offered their congratulations, and Dr. Tarpy added, "This activity of yours typifies the Master Beekeeper Program. It is exactly the type of good works and active citizenry that we want to foster in the NCSBA, and the Master Beekeeper Program, and Cooperative Extension."

After inquiring at the Eden Library for the books necessary to study for the Master Beekeeper Program (sponsored by the North Carolina State Beekeepers Association, along with the NC Department of Agriculture, and the Apiculture and Cooperative Extension programs at NC State University), and finding only one, I decided to contribute books about beekeeping to the library as a part of the community service necessary to attain the Journeyman level. I contacted Dr. David Tarpy, NC Master Beekeeper Program Chairman, for approval to do this; and Project "Bee Educated" was born.

My project poster brandishes the theme of "Bee Educated: My Honey – My Sweat – Your Money." I explained to anyone willing to listen that I wanted to purchase and donate "bee books" to the Eden Library, fulfilling a need of the community for knowledge about honey bees. So many people had asked me questions about bees, and I wanted much of this knowledge to be readily available to them – as well as to other local beekeepers and those interested in the Master Beekeeper Program. Once you read something, it sticks with you better than just word of mouth.

Educating children about bees is especially important. Children's books being donated include *The Magic School Bus*, *A Taste of Honey*, and *The Life and Times of the Honey Bee*.

To raise funds, I sold honey from my hives; people donated money for me to purchase books; and several bee supply companies donated books. Special thanks go to Brushy Mountain Bee Farm, Dadant & Sons, Miller Bee Supply, and the Rockingham County Cooperative Extension Service for donating books. I express deep appreciation to the concerned citizens of my community for donations and support, enabling the Eden Library to have the following books:

- *Honeybee Biology & Beekeeping* – Dewey M. Caron
- *Contemporary Queen Rearing* – Harry H. Laidlaw, Jr.
- *First Lessons in Beekeeping* – Keith S. Delaplane
- *A Taste of Honey* – Nancy Elizabeth Wallace
- *Hive Management* – Richard E. Bonney
- *Honey Handbook* and *The Backyard Beekeeper* – Kim Flottum
- *The Hive and the Honeybee* – Dadant & Sons, Inc.
- *Honeybees and Beekeeping: A Year in the Life of an Apiary* – Keith S. Delaplane
- *The Magic School Bus* – Joanna Cole and Bruce Degen
- *The Life and Times of the Honey Bee* – Charles Micucci
- *Natural Beekeeping* – Ross Conrad
- *Beekeeping for Dummies* – Howard Blackiston
- *ABC & XYZ of Bee Culture* (41st edition) – Root Publications
- *Basic Beekeeping – Starting Your First Hive* – Rancher Ron CD
- *The New Complete Guide to Beekeeping* – Roger A. Morse
- *Honeybee Ecology: A Study of Adaptation in Social Life* – Thomas D. Seeley
- *Honey Bee Pests, Predators, and Diseases* (2nd edition) - Roger A. Morse

I received strong support from the citizens of my community, and I believe that Project "Bee Educated" would serve other communities and beekeepers, as well. I am an active member of the Rockingham County Beekeepers' Association, the North Carolina State Beekeepers Association, and the Henry County (VA) Beekeepers' Association.

Acknowledgement: The author thanks Jean Light Kinyon for her comments and help on this letter.

R.V. Gillispie
rvgillispiegmail.com
jlkinyon@vnet.net

Dr. David Tarpy (L) and Mr. Vernell Gillispie (R).

CA Apiary Commission

Go West young man go West. When things got tough in our history as a nation, many looked to the west for a fresh start. Many found that fresh start. Today the almond industry brings many beekeepers from all over our great nation to the state of California to pick up that extra income that almond pollination provides. With that tremendous opportunity comes some problems. The main problem is the rapid distribution of diseases and pests. Any disease or pest that has entered the United States in the past year is probably going to be brought to California and shared with all the neighboring beekeepers in adjoining almond fields. Then they are taken back and distributed across the United States. In some ways you could say we are responsible for this. But we are also looking for some solutions to these problems. The government has been good on promises of money to research CCD, *Varroa*, Viruses, Nosema, Trachael mites, and others. However most of the money promised just never seems to arrive.

The California State Beekeepers Association (CSBA) has consistently raised over $50,000 dollars annually and donated this money to research around the country. Our requests for donations, which involves encouraging people to attend benefit auctions, has been stretched to the limit. We are simply unable to raise enough money from the generous people who donate and go home with over priced items they really do not need. Research does not come for free; people have to be hired to do it. The first step in solving a problem is to understand it, and that takes information, which is acquired through research.

The CSBA has taken the first steps necessary to create a "California Apiary Research Commission." The purpose of this commission is to raise funds to use in the beekeeping industry for education and research. If established, the Commission would assess all bee colonies in California on March 1st of the year being assessed. Beekeepers with 50 colonies or less would be exempt. While none of us like to pay additional fees, this assessment would allow us to be less dependant on the government for our research dollars. It would be an investment in our future. This assessment will provide a stable, dependable source of research dollars for our whole industry. The commission will be in control of the rate of assessment, and where those funds are spent. ***The proposed commission would be run by beekeepers (including at least one from outside of California) who are elected by the bee industry.***

Finally, our Board of Directors would like you to know some important facts about our industry-sponsored legislation AB 1912 which sets up the Commission:

1) The law AB 1912 now exists, but the Commission will not exist until approved in a referendum conducted among the eligible producers (those of us with 50+ colonies in CA on March 1st).

2) The Commission's members will be beekeepers, chosen by the industry. Its purpose will be to fund research and educational programs to benefit beekeepers.

3) The Commission will be allowed to annually assess beekeepers with 50+ colonies at a per colony rate as low as one cent but never to exceed one dollar.

4) This Commission, if established, would be in control of collection and expenditures of the assessments as spelled out in the law.

5) The State of California is prohibited by law from ever taking any of the funds collected by these assessments.

6) The commission will have six beekeepers and one public member. Three of the beekeepers will be residents of California, one will reside out-of-state, and the other two will be elected regardless of residence.

7) The CDFA (CA Dept. of Food & Ag.) will compile the list of producers who will vote on the referendum and be assessed if the referendum passes. While CDFA is looking for names electronically, they will gladly accept signups. There is a signup form on the CDFA website. The referendum is open to out-of-state and California-based beekeepers, subject to the restriction on colony numbers. To vote, out-of-state beekeepers must have brought 50+ colonies to California and been in California on March 1, 2011.

If this commission does not fulfill our needs, we only have to go to our fellow beekeepers who serve on the commission. If they do not listen, we can elect other beekeepers or vote to end the commission. This commission is the best solution that has been proposed to help solve our own problems and spread that cost out over the entire industry in the fairest manner possible.

Frank Pendell
President, CA State Beekeepers

Smoker Box

I traded in my truck for a fuel efficient car but I did not want to stink it up with the smoker. I bought this box at a benefit auction and made a holder to fit into the hitch receiver.

Gary Reuter
University of MN

Our Time Is Brief

The January *Bee Culture* came, the one with the snow covered hives on the front. I sat down with a glass of honey cider and read Ed Colby's Bottom Board page. As I came to the end, with tears running down my face I looked at my husband and said "Yep . . . that's it." Our time on this earth is brief . . . we took the road less traveled and I am at Peace with that.

Mary Rankin
New Sharon, ME

BOOK REVIEW

The Beekeeper's Lament: How One Man and Half a Billion Honey Bees Help Feed America, by Hannah Nordhaus. Published by Harper Perennial. ISBN 978-0061873256. 288 pages. Paper back. 8" x 5.5". Black and white.

Out of the blue in July 2000, I got an e-mail from John Miller, who was spending the summer with his bees in Gackle, ND. I didn't know that he is one of the biggest migratory beekeepers in the country, and I'd never heard of Gackle (pop. 275). But John, probably the only Gackle resident who subscribes to *Forbes* magazine, had read some of my columns and articles that referenced my beekeeping.

We struck up an immediate friendship, and it became clear that John is extremely bright, energetic, curious and articulate. Who else would describe Bee-Go, formulated to drive bees out of supers to be harvested, as "noxious, revolting, nauseating, eye-transplant, no anesthesia, chunk-blowing" to humans and apparently bees as well. Shakespeare, too, lacked a college degree but that didn't impede his writing skills either.

Several years later, my wife and I were staying with friends at their Napa Valley vineyard and I volunteered to show them the workings of two bee hives that were among their grapes. The only available protective gear was a veil and a bee suit about a foot too short in the legs, and no smoker, but how could I, a rough, tough beekeeper, worry about a few stings? The bees soon found my ankles, covered only by dress socks. I tried to retain my composure but with about 100 stings, I nearly passed out later.

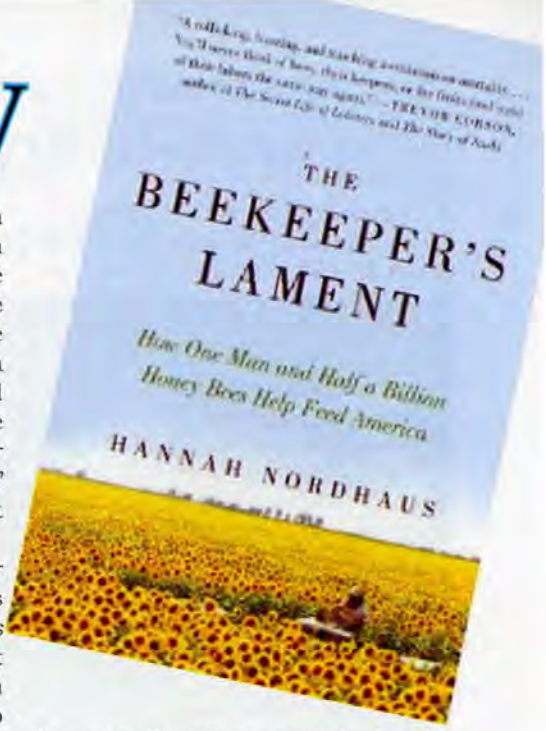
I wrote up this incident as the "Commentary" I do every month on the last page of our investment newsletter. I titled it, "Macho Bee Man," and on reading it, John Miller e-mailed: "Sorry to read about your misfortune . . . it does make me smile. I too have taken hellish beatings when pride preceded wisdom. Lessons are repeated until they are learnt. Your ONLY friend in the beeyard is your smoker."

In late February-early March 2002, I accepted John's invitation to tour almond pollination in the central valley of California. I saw the beautiful almond blossoms and the bees at work pollinating them, had a delicious Taco Wagon lunch, toured an almond packing plant, saw the gold mining historic sites in Placer County, saw C.F. Koehnen & Sons' queen-breeding operations and met other beekeepers.

Hannah Nordhaus had a similar tour with John, which she describes in her new book, *The Beekeeper's Lament*. She and I also learned that in order to get every almond blossom pollinated, the bee hives are packed so densely that John has to move them elsewhere for R & R before trucking them to eastern Washington State for apple pollination. Then they're moved to North Dakota where Miller Honey Farms harvests about one million pounds of clover and alfalfa honey. Unlike Nordhaus, I haven't been to Gackle but I want to accept John's open invitation before long.

This highly readable book is really two books in one, providing a wealth of information on beekeeping as well as the life and times of John Miller. Those who are new to beekeeping or looking for its vicarious thrills will find a wealth of details about its history as well as the rewards and tribulations of beekeeping. Active beekeepers like me, and I've been involved for over two decades and read the bee journals, can also learn a lot from this book. For example, we're told that the *Varroa* mite was first identified in Indonesia in 1904, coexisting with *Apis cerana* bees. In 1869, *Bee Culture* first described what sounds like today's Colony Collapse Disorder. The first renting of bees for pollination was in a New Jersey apple orchard in 1909. In the 1880s, A.I. Root experimented with shipping packages of bees and convinced the Post Office to handle them. And Nordhaus informs us that only in the 17th century was the Aristotilian belief that the hive was ruled by a king – since kings usually ran the known world – dropped for the reality that it is a queen.

I agree with Nordhaus that John Miller is outgoing and gregarious. He



loves to discuss an amazingly wide range of subjects. When I visited, I wanted to learn more about beekeeping, especially how to do it efficiently since I do have a day job. He and his microbiology teacher wife, Jan, however, wanted to hear from me about economics and investing.

But Nordhaus and I also agree that beekeepers are, by nature, loners who would rather be in a bee yard on a nice day, figuring out with deductive logic, what's right or wrong with a hive than drinking with the boys – or girls. She describes several beekeepers John introduced her to who fall in this category. So do I. Professionally, I have a lot of fun making presentations to financial institutional clients, speaking to investors and in media interviews. And I tell many jokes and one-liners to make my subject more interesting. But I also love to be in a beeyard alone except for the bees and my boombox playing Baroque music while there. I tolerate business phone calls from clients and my ever-cheerful but deadly efficient assistant, Beth Grant, as well as security market updates. I wonder if deep down, John Miller might be somewhat similar.

Beekeeping is such a small business and so low on federal and donor priority lists that its problems aren't flooded with money as is human cancer. But serious, dedicated beekeepers like John tend to be very creative and fill the gap. Nordhaus describes his "Frankenstein yard" where he tests various approved and off-use miticides and other tick killers on

non-honey-producing colonies, trying to keep ahead of *Varroa's* insidious ability to mutate into pesticide-resistant strains.

He, I and several others some years ago also explored bringing modern technology into the beehive. In a 2002 speech to the American Beekeeping Federation, I noted that the four key developments in modern beekeeping occurred in just 24 years, and over a century ago. In 1851, the Rev. Lorenzo L. Langstroth discovered the bee space and invented movable frame hives. In 1865, Major Francesco Hruschko of the Italian army developed a centrifuge to extract honey. The foundation machine was pioneered by A.I. Root in the 1870s to imprint the hex cell designs on sheets of bees wax. And in 1875, Moses Quimby invented the smoker.

But no major technological advances have occurred in beekeeping since. Satellites tell farmers how much fertilizer to put on their North Forty. Why, we reasoned, couldn't temperature and odor detectors, etc. be placed in bee hives to read out their conditions remotely rather than laboriously opening each one to find out? Sadly, our idea has yet to reach fruition.

Nevertheless, technology is invading other aspects of beekeeping. Nordhaus describes Miller's "nuking machine," which puts together nucs in a factory-like setting, complete with assembly-line conveyor belts. I'm way behind him, but did develop a screened bottom board a decade ago before they were widely available commercially, as discussed in my July 2003 *Bee Culture* article, "Screen Bottom Boards Semi Mass Produced."

This book curiously stops short on some important aspects of bees and beekeeping. Nordhaus mentions that the drone has no father but doesn't explore this rare example of parthenogenesis. She writes about honey from different nectars but doesn't explain that opportunistic bees in a hive gather from different flowers and mix up the nectars such that much honey sold should be labeled as "wildflower," not solely "clover, "buckwheat," etc. The author dwells at length on the depopulation in Gackle and North Dakota in general, but doesn't mention that that state has the lowest unemployment rate in the nation, 3.8% in January 2011, vs. a national average of 9.0%, and in recessionary 2009, North Dakota had the fourth fastest economic growth among the states, and it was positive. The book mentions Africanized bees but not the threat that they will move further north.

She also waxes anthropomorphic in discussing how bees made a "Faustian Bargain" with beekeepers, and elsewhere in the book writes that bees are assigned the tasks of "industry, selflessness, community and domesticity." Nordhaus incessantly quotes Langstroth, especially his imbuing bees with human traits when he discusses bees fueled "with the bitterest hate" and that drones at the end of the season "are so persecuted and starved that they soon perish." Honey bees, however, are insects, not people.

Nordhaus covers CCD, *Varroa* and other bee pests and diseases, and how the plight of the honey bee has attracted public sympathy and attention. I wonder, though, whether people don't have a love-hate relationship with them. When folks learn I'm a beekeeper, their first question invariably is, "Do you ever get stung?" "Yes," I reply, "400 or 500 times a year." But that's not all bad. In a 1997 *Forbes* article, I wrote, "The real payoff [of beekeeping] is the perspective it provides. On days when our economic forecasts go wrong or our portfolios go south, I remember that day when 100 bees stung me. Mounted in a glass case behind my office desk is that pair of long, thick canvas gloves covered with hundreds of small black bee stingers. There are worse things in the world than underperforming portfolios."

Nordhaus described John Miller as a very well-organized, clean beekeeper, although he told us both he likes drunken farmers who don't cut their alfalfa before it can bloom and feed his bees. And good beekeepers are blessed with few problems, right? Miller found out otherwise in the winter of 2005 when mutating mites developed resistance to Apistan strips and coumaphos, and he had to scratch to find chemicals to "kill bugs on bugs." I, too, thought I was a careful beekeeper and I largely avoided CCD in recent years. But this past winter, I lost 79 of 80 hives and I; John Miller; the N.J. state bee inspector; Kim Flottum, editor of *Bee Culture*; and Dr. Jeff Pettis, Research Leader of the USDA-ARS Bee Research Laboratory in Beltsville, Md., are trying to figure out why.

In beekeeping, even the best conditions can reverse in a hurry. On June 23, 2009, John e-mailed me: "In ND, we enjoyed an epic snow cover; robust Spring rainfall, and now suddenly, Summer! When the planets have aligned correctly, the mosquitos and the honey flow coincide. Last evening, the mosquitoes were drawing blood for the first time this year. Yesterday, bees were on strong flight, ignoring the bee guy and his ham-handed handling. Suddenly Summer. I'm thinking Three Cadillac Crop; El Dorado, Flop-Top, Kelley Green, Ostrich Leather Interior...all three exactly the same, just because I can."

In July 2009, however, the clover didn't bloom in what Miller calls his "Lost Summer." And between January and March 2010, he lost half his hives to *Varroa*, CCD and Winter starvation. But that didn't dampen his spirits or his hope for the future. "Next year, for sure, right?" Nordhaus quotes him. The more I keep bees, the more I realize that almost everything I do is with a great crop of honey and strong colonies *next* year in mind. Successful beekeepers like John Miller are realists, but they also have to be optimists. BC

Dr. A. Gary Shilling is President of A. Gary Shilling & Co., economic consultants and investment advisors, and an avid part-time beekeeper.

INNER COVER

If there's a constant in this activity of ours, it has to be dealing with swarms. It's what bees want to do, and what we don't want bees to do. We spend all of our energy and time and resources and smarts figuring out how to get the population of a colony strong enough at the right time so they can take advantage of the honey flows we have, and then we spend as much energy, time and resources rescuing the bees from themselves so they don't swarm. God, it seems, has a good sense of humor, but I'm not sure who the joke is on – beekeepers or bees.

It is an annual puzzle we all must solve, not unlike those puzzles you see in some restaurants. A triangle with 10 holes and nine pegs. Jump over one peg with another . . . similar to a checkers move . . . and remove the jumped-over peg. Continue until only one peg remains. You've done it a hundred times – as a kid, as an adult, and now as a beekeeper. Most of us end up with three pegs . . . isolated, unable to move or jump or help. Sometimes there's only two left – and then you wonder what you did this time that you didn't do last time when there were three left. You always start the same and did what you thought were the same moves (and there's that thing about doing things the same way every time, but expecting different results – which is why swarming behavior drives beekeepers crazy). I'll bet you didn't take notes, right? But there's that rare moment, when looking ahead three or four moves you can see it – there will only be one peg left. One! Success! Brilliant!! Genius is what it usually says on the margin of the board of the puzzle. One peg . . . no swarms. Genius!! If you actually do keep good records let me know what you did. We'll share it with the world. We'll be rich beyond imagination. Give me a call. Let's talk.

•

Do you answer swarm calls?

The phone rings. A somewhat panicky voice tells you they just looked out the window and saw a mass of bees as large as a Volkswagen hanging on a branch of a shrub only a couple of feet off the ground, and they've only been there a few minutes, and absolutely they are honey bees, and no, they haven't sprayed them with anything, let alone a pesticide or even water, and can you please hurry, and how much do you usually pay for them by the way, and how soon can you get here?

Not uncommon in the spring of the year. If you've signed up to gather swarms with your local association or police or fire department and the weather has been right and winter not too hard . . . yup, swarm calls by the dozen might be headed your way. Free bees. FREE BEES! Can't say no to free bees, right?

Well, yes, sometimes just saying no isn't such a bad idea (see below). But mostly getting free bees is a good idea, but being prepared can make the task easier. I have a stack of forms at my desk that I use when a call comes in that remind me of all the questions I should ask *before* I strike out into the wilderness to gather in my next batch of free bees.

Here's the questions I ask: Who is calling? Phone number and address. Do you have a cell number other than this? Have you called anybody else before me? Is another person there to answer the phone if I need to call back? Are the bees at this address? If not at what address are the bees? Where are the bees physically, how high off the ground, on what object, hanging from what overhang? How long have they been there? How big, really, is the mass of bees – size wise – like a softball, soccer ball, or beach ball? Have you done anything to them like spray with chemicals or water? Are you sure they are honey bees? Do you know if they belong to a nearby beekeeper? Can I see the house or your car from the street or road? The color of your house and car if home. Is anybody in danger? May I enter your property without danger from dogs, homeowners, small children? It will take me this long to get there. I am driving this kind of vehicle that's this color. Please remove any bystanders at least 50 feet from the swarm. This is my cell phone number, please call if they leave or the situation changes.

If I get all the answers, I almost never make a dry run. The bees are there when I get there, they are docile, easily retrieved, or retrieved with the equipment I can muster (step ladder, buckets on a pole, like that), no one has been damaged, and, once done, they're taken away. Sometimes messy swarms need a second trip to get them all – I try and avoid that. Most often I leave a jar of honey, but sometimes I don't have one and an honest Thank You is all I have to offer. That's usually enough for a scared homeowner.

Another thing I avoid is getting my old body more than three or four feet off the ground on a step ladder. Three steps up and that's it. If I can't reach them they'll belong to someone else. No amount of free bees, no amount at all, is worth one minute of hospital time. I absolutely don't bounce like I used to. Anymore, I just break when I fall off something. And I don't need any more broken anythings to get me sympathy from friends and relatives. No, free bees aren't worth dying for. If I can't get them with a bucket on a pole if they're higher than my ladder – there they stay. My philosophy is – the world needs more bees, and some beekeeper somewhere is doing his or her duty by supplying the world with that swarm – way up there.

•

Free bees can't be beat, but ask all the right questions before you

Swarms, And Swarming

head out . . . and even before that, make sure you have all the equipment you need to get that swarm safely, efficiently and quickly . . . and then transport it to its new home.

This is easy if you own a truck. I don't. And I know lots of beekeepers who don't own a truck. It's the family car, and mixing honey bees and anything dealing with a well-heeled family – groceries, kids, church clothes, a teenage driver showing off to a girlfriend – means keeping the inside of the car absolutely spotless.

There's lots of good ways to do this. In the trunk during swarm season, keep some type of box . . . and I've seen all manner of homemade boxes that serve this process. It can be collapsible or solid, wood or cardboard, big or not so big . . . but it has to be durable because it will bear some abuse over time. The box needs a couple of sides with screens. A box about the size of a deep is common, and a deep is more common. You have them around, old broken ones with gouged corners you just know you'd need someday . . . Or maybe make one, or even buy one for just this purpose. The screen in the bottom should be stout – maybe a double screen – one a four or five mesh that's ridged and well attached. It must bear the weight of the swarm's cluster when you dump it in, and under that a window screen size. It should be fastened permanently. The top needs to be window screen type too, but it needs to fit snug on the top – it needs to be bee proof. One I've seen is made like a telescoping cover, the edge that fits around the box is quite snug, with screen on top. Some will put some kind of door on one side, then when they have a bunch of bees in it already, they can stand it on end with the door on the top of the box, and the screens on the sides. Not unlike a big package. You'll need a spray bottle of water – or better sugar syrup (grab that just as you run out the door – don't keep one in the trunk 'cause it'll ferment in a hurry in the Spring), a bee brush, a dust pan or funnel and a big plastic tarp.

When it's time to gather the swarm, if possible put the tarp down, the box on the tarp and dump the bees in and slap on the top. Turn the box on its end so the door is up, gather up the tarp and form a funnel with that and dump in the rest of the bees. If a lot missed, use the brush and dustpan to get as many as you can after you spray them to quiet and calm them. In short, get as many as you can in the box as fast as you can and keep as many out of the air as possible. When you're done put four or five bungie cords around the box both ways to secure the top, spread the tarp on the back seat, clean side down, set the box on the tarp, SCREEN SIDES EXPOSED and off you go with lots and lots of free bees. Avoid quick stops on the way home by the way . . . if you have one of the newer cars where the back seat folds down so you have free access to the trunk you can use the trunk – spread out the tarp and put the bees there. If not, don't use the trunk...it'll overheat in a heartbeat and you'll get home with a box of dead bees. Not pretty, not fun, and not good.

Now that you've read this, I'm quite certain you already see ten ways to improve on this technique and equipment – that's good. Make it yourself, and go and get free bees this season.

•

One more thing about swarms. Once you get those bees home and established in a hive, give them a good going over – mites, disease certainly – and if you must, control them by the means you normally use. And requeen. You've got an old lady there, two, maybe more years old. She's not going to be prime, and she's running out of gas. She did produce a colony strong enough, healthy enough and big enough to produce a swarm, so there's some good genes hidden in there, so use her offspring if you can, but if not, use her bees to support your new queen.

And one more thing...if this is the first one you caught, congratulations! If it's the 100th, congratulations – catching swarms is the tie that binds you, your grandfather, his grandfather – all the way back to A. I. Root and before – it's what makes beekeepers beekeepers . . .

I caught a Swarm!

But in all the excitement, don't forget to keep your smoker lit, your hive tool handy, and your veil tight – it's gonna be another year to remember. Honest.

Kim Flottum

P.S.

Some reminders here.

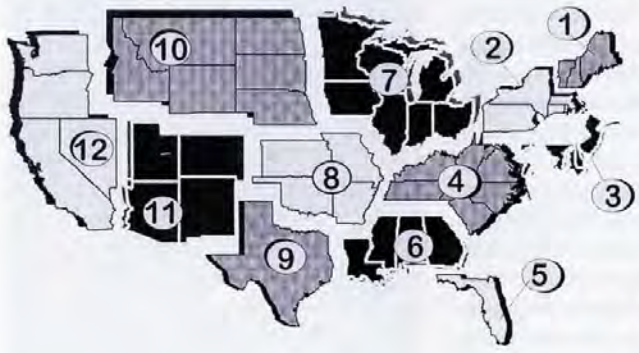
First. Don't forget the annual Calendar Contest. Photos this year should be "Workin' Bees". Beekeepers doing what beekeepers do outside with hives and trucks and boxes and frames and swarms and splits and queen rearing and moving and stacking and harvesting and setting up and taking down. Show us beekeepers being beekeepers. That's what we're looking for. And remember too that the calendar this year is changing format. No more will we have that big ad on the side of the photo...all photos all the time on the whole page at the top of every month. Get your camera out today. Don't miss that perfect shot.

Second. If you did bees in the Peace Corps, or were helped by a Peace Corps volunteer with a beekeeping project we'd like to hear from you. We'll put something together a bit later this year if we get some...a couple have already filtered in...I know there's more out there. Send us a couple hundred words on what that experience meant to you...and how it helped.

Third. Our CATCH THE BUZZ™ News service is really picking up steam. If you're not on our mailing list for this free news service sign up today. It's FREE and all you have to do is sign up at **www.BeeCulture.com/Buzz** and you're in. And you won't get spam or any other emails at all from us or anybody when you do. Can't say that about a lot of services out there.

Fourth. It's May. This is the best month there is to be a beekeeper. Get out to the beeyard as often as you can. Let your hives teach you something about being a bee. Look, listen, watch and *smell* what's happening. A bee hive is a galaxy of information if you just take the time. Put you smoker down for a few minutes, watch the front door, listen to the hummmmmmm inside and out, watch the bees coming and going and coming and going...where are they going, where are they coming from, and quietly and carefully lift off the cover, get close and smell the life of the hive...the honey, the pollen the bees themselves. It'll be the best time of the day. Stop. Look. Listen. Watch and *Smell*. It's good for you.

MAY – REGIONAL HONEY PRICE REPORT



We surveyed our reporters this month about winter losses. It's a bit early for those in the far north since the snow cover in many places was still such that they couldn't get to the bees, but most did and here are the results. We separated our reporters in to 3 categories…100 or fewer colonies, 100 - 1000 colonies, and those with more than 1000 colonies. We've conducted this survey 3 years running now, and include the data from all 3 for comparison. Over all 37% felt winter losses this year were low, 26% felt they were moderate, and 37% thought they were high. The chart tells the numbers of colonies lost by the size of the operation. There are some big jumps, and hardly moved.

What those colonies died from however is interesting. Since we have very few really big beekeepers as reporters those numbers tend to be skewed, but the mid and smaller sized operations are telling. The long and late spring this year took a toll on smaller operations certainly, but Varroa's still the killer king. Queen longevity certainly was a problem with over 30% of all the beekeepers losing hives because the colony went queenless. 53% of our reporters lost colonies to starvation, about half and half due to too cold for too long, and just plain ran out of food.

Colony Losses

Size of Operation	% Reporters			# Colonies Lost: >10			10-100			100-500			500+		
Year	09	10	11	09	10	11	09	10	11	09	10	11	09	10	11
1000+	9%	3%	2%	–	–	–	–	–	50%	66%	–	50%	35%	100%	–
100-1000	36%	33%	34%	21%	–	21%	63%	80%	39%	16%	15%	14%	–	–	–
100 or less	55%	64%	63%	75%	55%	65%	25%	29%	27%	–	–	–	–	–	–

% Of Beekeepers Losing Colonies To:

	Pesticides			Nosema			Disappeared			Starved			*Varroa*			Disease			Pests			Don't Know			Queens		
Year	09	10	11	09	10	11	09	10	11	09	10	11	09	10	11	09	10	11	09	10	11	09	10	11	09	10	11
Commercial	–	–	–	67	–	33	33	60	33	100	45	100	67	50	100	–	–	–	–	–	–	67	–	–	–	–	33
Sideline	–	–	4	26	25	21	43	26	21	73	79	75	39	33	25	4	22	9	17	2	4	26	26	14	9	4	43
Backyard	9	8	–	11	14	6	26	45	17	74	75	31	29	44	67	6	18	–	–	3	8	20	21	21	11	9	19

REPORTING REGIONS

	1	2	3	4	5	6	7	8	9	10	11	12	SUMMARY Range	SUMMARY Avg.	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.72	1.85	1.72	1.53	1.58	1.73	1.73	1.60	1.80	1.58	1.62	1.63	1.53-1.85	1.67	1.64	1.56
55 Gal. Drum, Ambr	1.61	1.75	1.61	1.49	1.50	1.59	1.68	1.50	1.40	1.45	1.54	1.55	1.40-1.75	1.55	1.56	1.48
60# Light (retail)	145.00	161.00	140.00	128.50	140.00	147.50	143.67	143.33	100.00	139.80	133.00	165.00	100.00-165.00	140.57	144.62	132.28
60# Amber (retail)	145.00	151.00	140.00	125.75	140.00	578.33	140.60	145.00	117.50	178.12	125.00	156.48	117.50-178.33	145.23	140.47	125.46
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	63.36	71.48	49.08	52.62	68.24	57.50	48.64	68.24	68.24	48.00	55.87	85.20	48.00-85.20	61.37	61.81	65.35
1# 24/case	86.20	99.23	84.78	70.93	76.00	85.78	70.37	89.60	72.00	99.40	75.47	104.57	70.37-104.57	84.53	87.50	82.90
2# 12/case	84.60	81.85	77.01	62.63	69.00	76.41	72.77	82.20	67.50	81.00	69.50	85.08	62.63-85.08	75.80	80.05	71.77
12.oz. Plas. 24/cs	91.28	88.78	63.96	73.70	60.00	76.60	63.28	79.20	66.00	60.60	73.20	75.25	60.00-91.28	72.65	71.43	66.35
5# 6/case	103.05	93.98	92.55	70.83	84.00	88.25	79.53	92.25	70.00	75.60	69.05	97.67	69.05-103.05	84.73	84.21	75.22
Quarts 12/case	124.92	141.73	142.80	107.52	96.00	94.59	103.60	103.00	126.00	94.38	98.70	124.00	94.38-142.80	113.10	109.07	106.82
Pints 12/case	75.20	94.98	81.60	73.50	68.00	66.75	84.27	67.80	73.00	80.00	59.33	75.00	59.33-94.98	74.95	75.36	63.27
RETAIL SHELF PRICES																
1/2#	3.00	4.65	2.91	3.43	3.39	3.25	3.11	3.99	3.19	3.15	2.97	5.25	2.91-5.25	3.52	3.55	3.03
12 oz. Plastic	3.75	4.63	3.76	4.00	5.04	3.84	3.75	4.16	3.91	3.59	4.02	4.66	3.59-5.04	4.09	4.14	3.75
1# Glass/Plastic	4.63	5.79	5.20	5.14	5.70	5.27	4.80	5.69	4.23	4.85	5.03	6.63	4.23-6.63	5.25	5.26	4.70
2# Glass/Plastic	8.00	8.49	7.46	8.30	9.20	8.17	7.39	9.00	7.75	7.47	8.66	11.16	7.39-11.16	8.42	8.65	8.21
Pint	7.18	7.49	7.50	6.76	6.37	6.54	6.70	7.41	7.00	7.16	6.49	9.33	6.37-9.33	7.16	7.84	7.49
Quart	12.00	13.07	13.00	11.50	11.89	10.95	12.11	11.91	12.00	12.99	10.07	15.87	10.07-15.87	12.28	13.20	12.76
5# Glass/Plastic	19.50	18.36	21.45	19.27	23.00	21.00	17.47	18.25	21.00	18.54	18.24	23.00	17.47-23.00	19.92	19.52	17.10
1# Cream	6.81	7.24	7.32	5.63	6.81	5.17	5.78	5.44	6.81	5.94	5.76	6.75	5.17-7.32	6.29	6.41	5.76
1# Cut Comb	7.50	7.32	9.08	6.45	10.26	7.83	6.82	6.00	10.26	8.00	7.13	11.00	6.00-11.00	8.14	7.25	6.61
Ross Round	7.25	6.48	7.15	5.33	7.25	6.50	6.00	7.00	7.25	7.25	7.31	8.62	5.33-8.62	6.95	6.75	6.41
Wholesale Wax (Lt)	3.25	4.75	3.75	3.50	2.50	5.92	5.56	4.90	4.50	6.00	3.29	4.28	2.50-6.00	4.35	4.34	3.22
Wholesale Wax (Dk)	2.25	3.98	2.75	3.30	2.00	5.00	4.81	4.00	5.05	5.05	2.45	3.90	2.00-5.05	3.71	3.54	3.02
Pollination Fee/Col.	90.00	106.33	75.00	50.50	90.00	61.25	53.00	75.00	90.05	90.05	66.00	117.00	50.50-117.00	80.35	78.18	80.30

A Closer LOOK

DIVISION OF LABOR

Clarence **Collison**
Audrey **Sheridan**

These very necessary chemicals are involved in a vast number of colony, and individual behaviors.

Within the honey bee colony, recognition of nestmates from intruders is based on olfactory cues and many studies have demonstrated that such cues are contained within the wax layer covering the cuticle. Waxes are secreted on the outer surface of the cuticle and protect the bee from water loss or desiccation (Lockey 1988). Aliphatic (chemical compounds in which the carbon atoms are linked in open chains) hydrocarbons in the cuticular waxes of bees are assumed to function as the recognition cues that bees use to recognize nestmates and kin (Fröhlich et al. 2001). Conditioning experiments have shown that bees are able to distinguish full sisters from half sisters by the odor of their cuticle (Tautz 2008). These cuticular hydrocarbons also aid arthropod parasites in finding a host. Cuticular hydrocarbons consist of mainly long-chained linear alkanes and smaller amounts of alkenes and methyl branched alkanes. They are biologically stable, and found in all life stages of insects.

In honey bees, cuticular hydrocarbon profiles are partly genetically based (Page et al. 1991, Arnold et al. 1996), but can be affected by reproductive status (Katzav-Gozansky et al. 1997). Because cuticular hydrocarbons are highly variable between the sexes and castes in honey bees (Page et al. 1991, Arnold et al. 1996), this makes them ideal candidates for use in chemical communication (Smith and Breed 1995).

Quantitative chemical analyses of cuticular waxes of the honey bee with gas chromatography and mass spectrometry showed significant differences in the chemical composition of cuticular waxes from drones and workers performing different tasks (Fröhlich et al. 2001). They used the proboscis extension reflex to test the ability of bees to discriminate between these cuticular waxes. Differentially conditioned bees significantly discriminated between cuticular waxes of drones, food storers, foragers and queen attenders. They found that the esters and polar components in the cuticular waxes provide the discriminative cues.

The ability of honey bees to discriminate between worker-laid and queen-laid eggs, known as worker policing (Ratnieks and Visscher 1989), was used to investigate the role of cuticular hydrocarbons in the egg-recognition system (Martin et al. 2004). The ability to differentiate between the two types of eggs is certainly chemically based because no physical differences can be found between the two egg types (Martin et al. 2002b, Katzav-Gozansky et al. 2003). Odd chain-length linear alkanes (C23-C31) were the dominant hydrocarbons on the surfaces of both queen and worker-derived eggs. Sig-

"Quantitative chemical analyses of cuticular waxes of the honey bee with gas chromatography and mass spectrometry showed significant differences in the chemical composition of cuticular waxes from drones and workers performing different tasks."

nificant differences were found in the profile of the linear alkanes between full-sized worker and queen eggs just before being laid (dissected from the ovaries). In egg-discrimination bioassays, only queen-laid eggs were not removed, whereas all worker-laid eggs and all full-sized eggs taken from the ovaries were removed within two hours. Despite worker-laid and queen-laid honey bee eggs having significantly different hydrocarbon profiles, bioassays and chemical supplementation studies show that changing the hydrocarbon profile does not affect egg identity. Furthermore, full-sized eggs in the queen's ovary that was tested just before being laid or just after being laid have similar hydrocarbon patterns but are treated differently in egg-discrimination bioassays with only the laid eggs surviving.

The initial caste differences in hydrocarbon profiles of eggs disappear as their profiles merge during the first 24 hours in the colony, although this fails to protect the worker-laid eggs because they are always removed. In addition, even when the hydrocarbon profile of worker-laid eggs was artificially changed to be queen-like by the addition of a hexane extract of a queen Dufour's gland, these treated eggs were still removed (Martin et al. 2002b). The correlational studies suggest that fluctuations in the proportion of C25 and C27 may be critical in allowing honey bees to discriminate between egg types. However, this is not supported by the egg-discrimination bioassays or the chemical supplementation studies (Martin et al. 2002b). This strongly suggests that the cuticular hydrocarbons, and specifically the linear alkanes, do not play a role in egg discrimination. Other studies have provided similar findings.

Pickett et al. (1982) found that fractions containing mainly the linear alkanes (C23, C25 and C27) or synthetic linear alkanes C23 and C25 gave no significant electroantennogram response which measures receptor potentials of olfactory neurons in the antenna, whereas eicosenol, an alcohol-based worker alarm pheromone (Pickett et al. 1982), gave a significant response. This would explain why honey bees discriminate between different waxes using esters and alcohols but not using cuticular hydrocarbons (Fröhlich et al. 2001), based on experiments using the classic conditioning of the proboscis extension reflex response. Furthermore, no glomerular (neural) responses in the antennal lobe of honey bees were obtained for linear alkanes of less than C10 whereas a wide range of short-chained (C5-C10) alcohols, aldehydes and ketones elicited both strong neural responses (Sachse et al. 1999) and can be discriminated by free-flying honey bees (Laska et al. 1999). The reason why nonvolatile linear alkanes are not used as recognition cues may because they have no electronegative atoms (such as oxygen or nitrogen), that their hydrophobic properties reduce interactions with the receptors, or that the alkanes could be coded in glomeruli not included in the study of Sachse et al. (1999).

"In honey bees, the cuticular hydrocarbon profiles are partly genetically based and differ between subfamilies, which suggests that they might be used by the workers as labels for subfamily recognition."

Dani et al. (2005) tested whether artificial changes in the cuticular profile through supplementation of naturally occurring alkanes and alkenes in honey bees affect the behavior of nestmate guards. Compounds were applied to live foragers in microgram quantities and the bees returned to their hive entrance where the behavior of the guard bees was observed. In this fashion they compared the effect of single alkenes with that of single alkanes; the effect of mixtures of alkenes versus that of mixtures of alkanes and the whole alkane fraction. With only one exception (the comparison between n-C_{19} and (Z)9-C_{19}), in all the experiments bees treated with alkenes were attacked more intensively than bees treated with alkanes. They concluded that modification of the natural chemical profile with the two different classes of compounds has a different effect on acceptance and suggests that this may correspond to a differential importance in the recognition signature.

In honey bees, the cuticular hydrocarbon profiles are partly genetically based and differ between subfamilies, which suggests that they might be used by the workers as labels for subfamily recognition. This ability could potentially form the basis for nepotistic conflicts between subfamilies that would be detrimental to the inclusive fitness of the colony. Arnold et al. (2000) compared the subfamily hydrocarbon profiles of five-day-old workers maintained in isolation with those kept in their parental colony. They demonstrated that the cuticular hydrocarbon profiles tend to be less distant between most subfamilies within the hive compared with those held in isolation. The main consequence of this partial homogenization of the majority of subfamily signatures may result in a reduction of the number of recognizable subfamilies in the colony. Nevertheless, a few subfamilies retain very distinct cuticular hydrocarobon profiles.

Bee cuticular hydrocarbons are also believed to be used by *Varroa* and tracheal mites (Phelan et al. 1991) in locating a new host. Foundress *Varroa* mites enter brood cells containing fifth-instar worker larvae between 15 and 20 hours before capping (Ifantidis 1988, Boot et al. 1994). After the honey bee larva spins its cocoon, the female *Varroa* feeds on the pupa and lays eggs. Rickli et al. (1994) have studied the walking behavior of *Varroa* mites on a treated semipermeable membrane surface and have shown that hexane extract of eight-day-old larvae mediate an arrestment of the mite. The active fraction of the cuticle extract contained saturated straight-chain odd-numbered C19-C29 hydrocarbons and branched n-alkanes. They suggested that *Varroa* can recognize bee larvae using hydrocarbons if the relative proportions are sufficiently specific to the life-stage of the host. During cell invasion, several

Will the egg on the left be left alone. (Jaycox photo)

Varroa females can enter the same cell whereas, a neighboring cell containing a larva of similar developmental stage can be free of mites (Martin 1995). This observed multi-infestation could be the result of a greater attractivity of some eight-day-old larvae due to differences in cuticular hydrocarbon production. Another possibility is that the stress caused by the close contact between the mite and larva could result in a quantitative and/or qualitative modification of the cuticular hydrocarbon profile of the host.

Cuticular hydrocarbons of unparasitized bees and of bees parasitized by *Varroa jacobsoni* were extracted and analysed by gas chromatography coupled with mass spectrometry (Salvy et al. 2001). Three developmental stages of worker honey bees were studied: larvae, pupae and emergent adults. The cuticular hydrocarbon profiles of honey bees were qualitatively similar, for the three developmental stages and regardless of the presence of *Varroa* in the cells. Nevertheless, comparison of the relative proportions of hydrocarbons showed that the cuticular profiles of pupae and emergent adults parasitzed by one mite and of larvae parasitized by two mites were significantly different from the corresponding unparasitized individuals. Such modifications could be regarded 1) as a cause of the multi-infestation in larvae during invasion of brood and 2) as a consequence of stress and/or removal of proteins contained in the hemolymph of host during its development.

Hygienic honey bees may also use cuticular hydrocarbons to detect *Varroa* inside capped brood cells. Martin et al. (2002a) screened numerous substances that might allow detection of *Varroa* infested brood cells by bees. Gas chromatography-mass spectrometry analysis was performed on substances extracted from brood cells. Solid phase microextraction and solid injection were performed on substances obtained from living and dead *Varroa*. Electroantennography was performed to assess the sensitivity of olfactory receptors in bee antennae to some of these substances. Principal component analysis based on proportions of cuticular substances allowed discrimination between bees and other cell contents. Foundress *Varroa* exhibited the greatest dissimilarity to healthy pupae that were used as controls. Immature *Varroa* and fecal material were intermediate. High molecular weight compounds, mainly dimethylalkanes, were proportionally the most characteristic components of foundress *Varroa*. This finding suggests that these compounds would be the most apt to induce uncapping of cells infested by *Varroa*. Solid-phase microextraction and solid injection demonstrated the presence of aliphatic acids, esters, and one alcohol, eicosenol, in *Varroa*. Electroantennographic recordings, showed that mite-resistant bees were more responsive to some acids and one ester. They suggested that these compounds may be involved in recognition of living *Varroa* by honey bees. BC

References

Arnold, G., B. Quenet, J.M. Cornuet and C. Masson 1996. *Kin recognition in honeybees.* Nature 379- 498.

Arnold, G., B. Quenet and C. Masson 2000. *Influence of social environment on genetically based subfamily signature in the honeybee.* J. Chem. Ecol. 26: 2321-2334.

Boot, W.J., D.J.A. Sisselaar, J.N.M. Calis and J. Beetsma 1994. *Factors affecting invasion of* Varroa jacobsoni *(Acari: Varroidae) into honeybee,* Apis mellifera *(Hymenoptera: Apidae), brood cells.* Bull. Entomol. Res. 84: 3-10.

Dani, F.R., G.R. Jones, S. Corsi, R. Beard, D. Pradella and S. Turillazzi 2005. *Nestmate recognition cues in the honey bee: Differential importance of cuticular alkanes and alkenes.* Chemical Senses 30: 477-489.

Frõhlich, B., M. Riederer and J. Tautz 2001. *Honeybees discriminate cuticular waxes based on esters and polar components.* Apidologie 32: 265-274.

Ifantidis, M.D. 1988. *Some aspects of the process of* Varroa jacobsoni *mite entrance into honey bee (*Apis mellifera*) brood cells.* Apidologie 19: 387-396.

Katzav-Gozansky, T., V. Soroker, A. Hefetz, M. Cojocaru, D.H. Erdmann and W. Francke 1997. *Plasticity of caste-specific Dufour's gland secretion in the honeybee (*Apis mellifera). Naturwissenschaften 84: 238-241.

Katzav-Gozansky, T., V. Soroker, J. Kamer et al. 2003. *Ultrastructural and chemical characterization of egg surface of honeybee worker and queen-laid eggs.* Chemoecology 13: 129-134.

Laska, M., G.C. Galizia, M. Giurfa and R. Menzel 1999. *Olfactory discrimination ability and odor structure-activity relationships in honeybees.* Chemical Senses. 24: 429-438.

Lockey, K.H. 1988. *Lipids of the insect cuticle: origin, composition and function.* Comp. Biochem. Physiol. B. 89: 595-645.

Martin, C., E. Provost, A.-G. Bagnéres, M. Roux, J.L. Clément and Y. Le Conte 2002a. Potential mechanism for detection by *Apis mellifera* of the parasitic mite *Varroa destructor* inside sealed brood cells. Physiol. Entomol. 27: 175-188.

Martin, S.J. 1995. *Reproduction of* Varroa jacobsoni *in cells of* Apis mellifera *containing one or more mother mites and the distribution of these cells.* J. Apic. Res. 34: 187-196.

Martin, S.J., G.R. Jones, N. Châline, H. Middleton and F.L.W. Ratnieks 2002b. *Reassessing the role of the honeybee (*Apis mellifera*) Dufour's glands in egg marking.* Naturwissenschaften 89: 528-532.

Martin, S.J., G.R. Jones, N. Châline and F.L.W. Ratnieks 2004. *Role of hydrocarbons in egg recognition in the honeybee.* Physiol. Entomol. 29: 395-399.

Page, R.E., R.A. Metcalf, R.L. Metcalf, E.H. Erickson and R.L. Lampman 1991. *Extractable hydrocarbons and kin recognition in honeybee (*Apis mellifera *L.).* J. Chem. Ecol. 17: 745-756.

Phelan, P.L., A.W. Smith and G.R. Needham 1991. *Mediation of host selection by cuticular hydrocarbons in the honeybee tracheal mite* Acarapis woodi *(Rennie).* J. Chem. Ecol. 17: 463-473.

Pickett, J.A., I.H. Williams and A.P. Martin 1982. *(IX)-11-Eicosen-1-ol, an important new pheromonal component from the sting of the honey bee* Apis mellifera *(Hymenoptera: Apidae).* J. Chem. Ecol. 8: 163-175.

Ratnieks, F.L.W. and P.K. Visscher 1989. *Worker policing in honeybees.* Nature 342: 796-797.

Rickli, M., P.A. Diehl and P.M. Guerin 1994. *Cuticle n-alkanes of honeybee larvae mediate arrestment of bee parasite* Varroa jacobsoni. *J.* Chem. Ecol. 20: 2437-2452.

Sachse, S., A. Rappert and C.G. Galizia 1999. *The spatial representation of chemical structures in the antennal lobe of honeybees: steps towards the olfactory code.* Eur. J. Neurosci. 11:3970-3982.

Salvy, M., C. Martin, A.G. Bagnères, E. Provost, M. Roux, Y. Le Conte and J.L. Clément 2001. *Modifications of the cuticular hydrocarbon profile of* Apis mellifera *worker bees in the presence of the ectoparasitic mite* Varroa jacobsoni *in brood cells.* Parasitology 122: 145-159.

Smith, B.H. and M.D. Breed 1995. *The chemical basis for nestmate recognition and mate discrimination in insects.* Chemical Ecology of Insects 2 (ed. by R.T. Cardé and W.J. Bell), pp. 287-317. Chapman & Hall, New York.

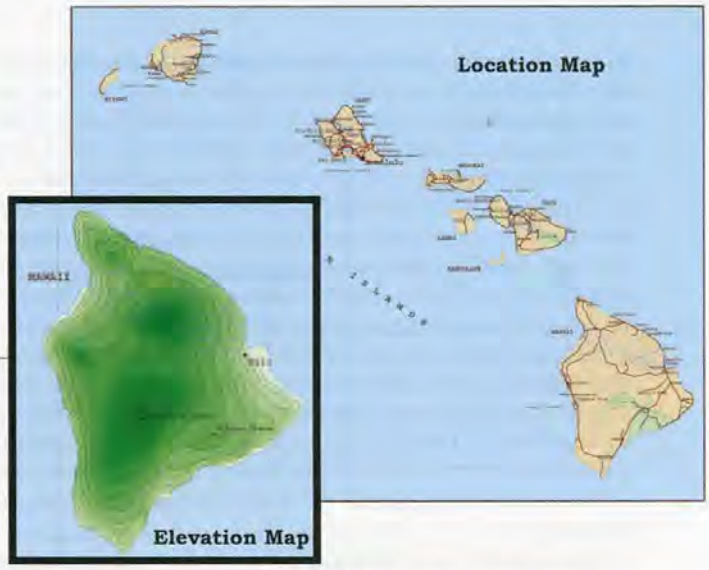
Tautz, J. 2008. *The Buzz About Bees, Biology Of A Superorganism.* Springer-Verlag, Berlin, 284 pp.

Clarence Collison is an Emeritus Professor of Entomology and Department Head Emeritus of Entomology and Plant Pathology and Audrey Sheridan is a Research Technician at Mississippi State University, Mississippi State, MS.

The Big Island In Crisis

Larry **Connor**

Part Two Of The Small Hive Beetle Story In Hawaii



In the April issue we looked at the widespread loss of colonies on Hawai'i, the big Island in the state of Hawaii in what some beekeepers call a "Perfect Storm" of Nosema, *Varroa* and small hive beetles. We reviewed some of the stories the beekeepers on the Island tell about their heavy losses and the challenges they have, especially with the *Varroa* mites and the small hive beetles. In this article we will review more of the biology of the small hive beetle and the impact of the mites and beetles on some of the commercial beekeepers on the Island.

Role of rainfall, warm temperatures on the explosion of small hive beetles

From my very limited visit, there seem to be two distinct groups of beekeepers as based on their prior knowledge and current experiences with the varroa mite and small hive beetle infestation on the Island of Hawai'i. The eastern side of the Island where Hilo is located has been hit the hardest. This is the wet side, receiving enormous amounts of rainfall (200-300 inches in/year some places) and consistently warm temperatures. The west side of the Island is dry, much dryer, and the area has had a period of drought that has stressed many nectar producing plants, reduced the bees' food supply, and thus weakened some colonies. Everywhere on the Island the temperature falls as you move up the mountains, and in those locations there have been fewer problems with bee losses, but that is not a guarantee.

Dr. Lilia de Guzman, Baton Rouge.

Dr. Lilia de Guzman of the USDA Honey Bee Laboratory in Baton Rouge, LA was on the Island at the same time I was in February, and reported at a meeting for beekeepers on some of her work in Louisiana as well as some preliminary work with the beetles on Hawai'i. The Baton Rouge lab redirected $50,000 of its funding to work on this project. She is working with Dr. Ethel M. Villalobos of the University of Hawaii Honey Bee Project. Villalobos and her associates focus on varroa treatments, mite-bee interactions (mite reproductive potential), as well as colony health assessment and hygienic behavior. They also work with the Hawaii's growers and pollination needs. While on the Island de Guzman and Villalobos were conducting some studies, such as feeding preferences for the beetle – seeing which tropical fruit the beetles were attracted to, and if so, which ones they might be able to feed on. Many fear the beetles can reproduce without bees.

At the meeting Lilia de Guzman reviewed the biology of the small hive beetles and how they are ideal for the hot and humid environment of the Hilo side of Hawai'i. She reported how colonies can be taken over when the heat index is over 105, especially in queen rearing colonies. The levels of the beetles are "really overwhelming" she said in the presentation to beekeepers. The beetles are extremely destructive and reproduce very rapidly. They are opportunistic – taking over a small or queenless hive very quickly. The adult beetles are sexually mature when they emerge from the pupal form (in the ground) and mate quickly.

They can be distinguished from the wax moths by their smaller head capsules and the double row of spines that run along the length of the larval body. They pop

Dr. Ethel M. Villalobos, University of Hawaii.

when squeezed, a trait many beekeepers use for rapid identification. The adults are identified by their clubbed antennae, the short elytra and the shape of their thorax, often compared to Batman's cape. The females have a long ovipositor and the male genitalia are at a 90° angle.

Their life cycle is directly influenced by temperature, with development in 39 days in Louisiana room temperature but full development in 22 days in an incubator set at 90°F. Hawai'i temperatures favor a rapid development of the beetles. In the hive the beetles eat just about everything in the bee box except the wood: brood, pollen, honey and protein patties. Feeding bees protein is also dangerous because it gives the beetles a place to lay eggs, so de Guzman recommends using just enough that the colonies can consume all the material in just two days – thus preventing rapid 'runaway' development of the beetles.

As part of the feeding process the beetles generate slime from a yeast they carry that helps ferment the honey in the hive. It gets thin and runny, and is unattractive and repellant to bees. In severely infested colonies the slime will pour out of the entrance of the hive. The process of generating the slime makes the colonies unacceptable to other bees.

Strong fliers, the beetles can find a suitable colony from a distance of eight to 10 miles. They are more active at hive entrances at dusk. They mate inside the hive and female beetles lay eggs right away. Beetles in the lab live two weeks to six months, but some have lived, with food, for over one year.

As far as bee stocks, Russian and Italian line bees have been compared for the way they handle small hive beetles. The Russian colonies had fewer beetles in their hives. They carry the beetles out of the hive when monitored in observation hives. They are more aggressive and keep the beetles out of the hive.

Ten Best Management Practices to Reduce Beetle Numbers

Lilia ended her talk with 10 ways to reduce beetle numbers:

1. Promptly remove colonies that have died because of beetle infestation. Put them in the freezer or burn.
2. Remove areas where the beetles can hide, propolis and burr comb areas, areas between frames.
3. Keep colonies strong.
4. Keep queen-right colonies. Queenless colonies attract beetles. Drone layers are weakened hives and are very attractive to beetles.
5. Don't stack supers, but if you do make sure there is no brood in them.
6. Place colonies in the sun (also works against tracheal and varroa mites)
7. Only give colonies the size pollen (protein) patty they can consume in two days.
8. Keep feeders and bottom boards clean
9. Keep your honey house clean; store pollen in the freezer
10. Extract all honey within two to three days after removing it from the hives.

Visiting other Hawai'i beekeepers

My host, Ron Hansen, drove me to several commercial honey producers and two large queen producers during my visit. Two of the honey producers were losing hives while one had not had much of a loss. Neither of the large queen producers had experienced much of a loss, in part because they were actively doing battle against the hive beetles as well as the varroa mites, using a combination of good beekeeping practices and selected control methods.

Local Buzz Hawaiian Honey

Scott Buske is a beekeeper and coffee grower in Ka'u, operating as Paradise Meadows Orchards & Bee Farm, with bees in the Pahala area of the Island. The family's Ka'u coffee earned a bronze award in 2010 at a Hawaii Coffee Association tasting, beating out the Kona growers. The coffee is grown at 1800 feet on the side of the volcano overlooking the Pacific. There are bees in the area for coffee, fruit and nut tree pollination. Buske and family market seasonal honey, and have a strong roadside and Internet sales of both coffee and honey. Both the coffee and the bees are kept in a reduced chemical environment. That seems to be changing for the bees.


Scott Buske

Colonies have been living more or less chemical free and many colonies died in the past year. Now a series of beetle traps are in place, and their management concentration is to keep colonies strong to prevent the beetles from establishing a presence in the hives. Various traps are employed for beetle capture. Colony numbers are down about two-thirds over the pre-mite+beetle invasion. The honey room is filled with empty and partially slimed equipment as a result of the invasion. Surviving colonies are under continuous attack. This sinister activity is in stark contracts with the post-card beauty of the area, and the friendliness of the five family members (Megan Collins, Scott Buske, Chris Buske, Lili Rodriguez and Erin Buchanan) who manage bees, coffee, greenhouse and a variety of other farming activities.


Coffee Cherries at Scott Buske's farm.

Queens being shipped from Kona Queen in February.

Kona Queen Hawaii

Since 1975, Kona Queen Hawaii has produced queens for sale to the World's beekeepers. They are able to ship most of the year, and service beekeepers who need queens for late season and early season splits and requeening. This has become extremely important with the large demand for queens for colonies placed in Almond pollination. In Canada, the Kona queens have been a huge part of the production of early season splits for honey production and pollination. Since 1979 Gus Rouse has been the manager of the operation. Many beekeepers have worked at Kona and developed both beekeeping and queen rearing skills. Rouse is a businessman as well as a beekeeper. Rouse is no stranger to most large beekeepers in North America, having shipped queens off the Island for decades. To learn more go to **www.konaqueen.com**.

When Ron and I visited, Gus had gone to a coffee grower's meeting where we would end up at the end of the morning. The office manager Nancy took us around and showed us the high points of the operation. Some might argue that the queen production is too machine like, but the Kona operation is impressive and the bees are treated well. They produce an enormous number of queens every year (no packages) and meet the needs of a tremendous number of beekeepers.

In spite of the problems found on other parts of the Island Kona is still shipping queens. They were a bit behind in February because of the drought the previous season, and this held the bees back a bit in build up. The shipping room was filled with queens and bees in special cages ready to be delivered to some of the major beekeepers in the United States (it was too early for Canadian shipments). Later that morning Ron and I met up with Gus at the coffee grower and beekeeper meeting with the Hawaiian Agriculture Board. When the meeting was over we had a chance to talk. Asked how he is surviving the mite and beetle attack, he simply said that many of his customers and friends have been through this on the mainland in the past, and he knows how to deal with Nosema, varroa and small hive beetles.

That does not indicate that is easy to stay ahead of these pests. But of all the beekeepers Ron and I visited, the commercial queen producers were the beekeepers best prepared to manage healthy hives and use chemicals to insure production. Of course I regret that I did not have more time to spend at Kona Queen; that is the cost of such a condensed visit.

Gus Rouse

Big Island Bees

Just up the road from Kona Queen is the Big Island Bees. Garnett Puett owns the business run by his stepfather Jim Powers, one of the largest beekeepers in the world during the 1970s and 80s. In fact, Garnett showed me a large banyan tree that Dr. Eva Crane of IBRA planted in 1980; Powers and Crane were very good friends.

Puett is a fourth-generation beekeeper; his grandfather was a Dadant Branch Manager in southern Georgia for many years before he moved to establish a honey production operation. The emphasis over the past has been in the production of certified organic honey, and this is where he has run into trouble with the small hive beetles. Ron Hansen and I were able to briefly visit with Puett after the Hawaii Agricultural Committee finished a meeting and tour of coffee and beekeeping operations.

With about 3800 colonies, Puett has lost over 50% of the hives to the beetles, as evident by a huge pile of damaged combs and boxes sitting outside his warehouse. Inside the warehouse are many thousands of boxes of combs that are being kept at 45 percent relative humidity to prevent the beetle eggs from hatching and the beetles from feeding on the combs. The warehouse is not air conditioned, but the investment in two huge dehumidifiers at the cost of $500 per month for electricity has preserved the combs. Prior to that the crew cleaned up the beetle

Garnett Puett

larvae and slime on the floor of the building, filling five gallon buckets.

In the Powers tradition, Big Island Bees is a migratory operation, moving colonies by flatbed around the Island for nectar gathering. This provided a diversity of nectar sources sold on his website (**http://www.bigislandbees.com**)

Garnett, trained at the Pratt Institute, is well known in the art world for his apiscultures, a 'collaboration' between the artist and the bees to create unique beeswax sculptures exhibited around the world, including New York's Guggenhiem Museum. His work is in a number of sculpture collections and is being copied by other artists. Perhaps the current collapse of so many colonies will encourage him to take up his artwork again.

What is more likely, of course, is his abandonment of the "expensive organic status" and to follow his neighbor's leadership and use chemicals and IPM methods for control of the beetles and mites. Perhaps too he will be able to work with the queen producers and utilize some of the *Varroa* sensitive hygienic stock (VSH) that has been brought into the commercial queen producers breeder stock. It will take time to change over the drone populations on the islands to resistant drones, but the small hive beetle has certainly reduced the feral bee population to help facilitate that goal.

Big Island Queens (Olivarez Honey Bee, Inc)

In the same general area of Captain Cook, HI, is the Hawaii division of the Olivarez Honey Bee, Inc operation. The owners purchased the Big Island Queens a few years ago, and the Hawaii facility is managed by Russell Olivarez and helped by his father Ray. The combined California and Hawaiian operation is managed by Ray Olivarez, Jr., located in northern California (Chico/Orland).

Ron and I set aside a little more time to visit with Ray and Russell. We learned that they were working hard to keep ahead of the mites and beetles. As Russ said "If we loose a hive we make it up again, that same day." That approach fully utilizes the developing beekeeping operation to grow bees; that colonies during the Spring of the season are able to generate excess bees (that would otherwise swarm). It also keeps all colonies large and healthy. I was surprised that the firm uses mini-nucs, but the insulated, Styrofoam type. "We could not use them if they were not insulated", Ray said. "The temperatures on the ground (the whole Island is lava rock) can get pretty hot." All the

Russ Olivarez, Larry Connor, Ray Olivarez.

Working Cell finishers at Olivarez's operation.

colonies are on benches or hive stands to keep the hives off the ground, in part to eliminate any overheating, but also to get away from feeding by the cane toad that will sit at the entrance of the hive and pick the bees off one at a time.

The Olivarez operation spends a tremendous amount of time paying attention to bee feeding. A special mixing tank heats sugar syrup that is inverted to decrease spoilage. Dry protein feed in a 55-gallon drum tells Ray when the bees are short on protein, and serves as a protein-feeding device. Tens of thousands of pollen foragers were working the dry feed the day we were visiting.

For the long term, the Olivarez family and other queen breeders (including Kona) are flying Tom Glenn from California with semen from the *Varroa* Sensitive Hygienic stock (developed by Harbo, Harris and many others at the Baton Rouge Bee Lab) for instrumental insemination to local queens. These queens become the breeder queens that generate the production queens that are open mated. This honors the State's ban on whole bee importation but allows the addition of varroa mite resistance to the gene pool of Island bees and provides beekeepers who buy these queens with some level of varroa resistance. That had not been possible in the past, and was one of the criticisms of queens from Hawaii (as well as Australia and New Zealand) – that there was no mite resistance in the queens that were shipped. With that change, and 88% VSH in the queen side, it will allow the beekeepers on the Island to convert over to *Varroa* resistant stocks, flood the bee trees with swarms headed by these queens and saturate the Island with drones that will provide some degree of mite protection in the future. (http://www.ohbees.com)

Volcano Island Honey Company

The Volcano Island Honey Company is the passion and result of the hard work and inspiration of Richard Spiegel. A lawyer by training, Spiegel has lived and worked in the country with only wood fires. A chain saw accident sent him to Hawaii to heal and he has been on the Big Island since 1977. Since his wife died in 1993 he has concentrated on honey production in the Kiawe forest of the northern part of the Island and focused on production of what others call some of the best honey in the world

Richard Spiegel

(National Geographic Traveler Magazine).

Chemical control is essential at least in some form. Spiegel says there "are times when you need to cut off the leg to save a life," referring to the need to move to chemical treatments that will kill mites and permit him to produce honey that is labeled organic. His honey is some of the most expensive in the world, and he and his associates take enormous efforts to produce the best product they can. Located on the northern side of the Island of Hawai'i, Spiegel is a bit removed from the main tropical beetle reproductive area around Hilo and the commercial honey and queen producing areas around Kona. His main honey crop is from the thorny legume Kiawe (*Prosopis palida*) , a mesquite species introduced by the cattlemen as a protein source for cattle. It produces a white honey that in granulated form can be like "silk". He uses that in is marketing plan.

Talking to Richard is part motivational pitch and part legal deposition. He is passionate about his work and has attracted some gifted people to partner with him in developing a unique philosophy about the work they are doing. He has been interviewed extensively about his work, and pointed to a display of magazine and newspapers that have featured his work. He has traveled considerably as a lecturer about his work, and lectured in University forums.

Richard's admission that he would use some chemicals seemed to be a reflection of the complexity of the issue at hand, and the difficulty to achieve control over the varroa mites and small hive beetles. The area where he keeps bees, with much lower rainfall and more open landscapes, may help him in this mission. Adding the selective use of chemicals will be one way to continue in business. It is clear that he will not let any pest destroy the operation he has worked to develop over the past decades.

Hawaii's overall picture certainly looks pretty grim at first glance, as outlined in last month's article. Yet there is plenty of reason to expect the Island to recover fully from the impact of the combined 'perfect storm' of Nosema, varroa and small hive beetles, but only after a rapid and intense educational program on the best way to keep bees on the Island without doing harm by chemical contamination. Such optimism is tempered by the

realization that some of the people keeping bees prior to 2010, when the crisis hit, will probably not continue to keep bees. This is especially evident with the small farmers who used honey as an additional income source while providing bees for pollination of a wide range of crops they produce. There may be a shift that will mirror the move many experienced over the past 25 years on the Mainland, where there has been fewer grower-beekeepers and more reliance on beekeepers and growers who work together and allow them to keep bees on their property. Beekeepers benefit from the location for honey production, and the grower benefits by having bees for pollination that are managed by another motivated party.

For Hawaiian beekeepers undergoing the attack of beetles, mites and Nosema, there are literally piles of ash from which to rebuild, like the mythical firebird of so many cultures. Some will abandon their beekeeping, discouraged and depressed. Many will rise again, catch the swarms that will reappear on the Island if they ever really disappear, and will quickly become beekeepers one more time. It is an old story of hard-working people who have kept bees and lost them to diseases, fire (literally), pesticides, human error, mites, and predators. While the colony loss story on the Big Island is impressive for it's rapid unfolding, it is not new to Mainland beekeepers, who are at times rudely unsympathetic to the blight of others who have lost colonies.

Indeed, as I look around my neighbor beekeepers in the Great Lakes area, most face losses as large or larger than many of the Hawaiian beekeepers. The cause was Winter 2010-2011, and perhaps some really bad genetic material. But there will be a rebuilding. In September I plan to return to Hawai'i for the Western Apicultural Society meeting. There I will also present a separate class on rebuilding bee colonies. It is not new. It is in my book *Increase Essentials* as well as most beekeeping texts. We loose colonies. We rebuild colonies. In Nature bees die but the survivors swarm. Humans only serve to help. BC

Learn to raise your own queens in June with Dr. Connor at his course being taught in Galesburg, Michigan. Information available at ***www.wicwas.com***.

Public Lands Task Force

Tammy **Horn**

The Use Of Natural Resources For the Greateast Good Of The Greatest Number For The Longest Time.

In 2010, Chief of Natural Resources Conservation Service David White addressed the North American Pollinator Protection Campaign (NAAPC) conference in Washington, DC. Approximately seventy percent of land in the United States is privately owned, he stated simply. Chief White did not mention Canada or Mexico, nor did he place that statistic in context. For how long has that much of the land been privately owned, for instance? Since the 1940s or 1950s? Since the 1990s? Chief White also did not politicize the statistic. He did not seem unduly alarmed or outraged (I myself was stunned stupid). No, Chief White merely continued with his presentation in a monotone, melding his statistic into a whole host of other challenges facing pollinators.

As NAPPC prepares for its next decade of leadership to protect pollinators, however, it does so with a realization that less than 40 percent of public land is controlled by taxpayer-financed entities such as university campuses, national parks, forestlands, and highway rights of ways. Until very recently, taxpayers have had little say about the habitat planted on public lands. A task force created by NAPPC called Public Land Managers has been working to provide criteria for land managers but given the diversity of land uses, it has been challenging.

From the outset, the task force had to figure out how to define public lands and implicitly, why taxpayers should be concerned with habitat. The United States is a country of freeholders who, from early stages in colonialism, have taken for granted the immense natural resources to be found in North America. English colonists were enamored with British ideals of agrarianism, specifically those of enclosure and private property ownership. The overgrazing of Boston Common, first opened to colonists for grazing cattle in 1634, is still used as an example of unfettered regulation. Less wealthy Puritan families who had cattle to graze were soon outnumbered by wealthier families, who brought more cattle into the Common. This competition led to a dearth of resources for all cattle. As a result, many families sought land outside of the city limits in an effort to expand their resources. Still, for two hundred years, the Boston Common functioned as public grazing space. Finally, in 1830, Boston ended common grazing. In 1836, an iron fence was erected, in effect, enclosing the nation's first public park and delineating a clear line between agrarian and urban expansion.

In the 19th century, United States promoted its expansionist dreams with land-financed opportunities, while providing no regulation of watersheds, forests, or soils. Land was taken from Native Americans and/or purchased from other countries. Congress was content to let farmers be the prime stewards of the earth. Large land purchases such as the Louisiana Purchase were--strictly speaking – considered a "waste" if acreage was not used for taxation or settlement.

Only after the Civil War did presidents and politicians, alarmed at the rapidity of environmental destruction, finally begin to preserve land in national parks such as Yellowstone in 1872, followed by Sequoia and Yosemite in 1890. Under President Theodore Roosevelt's leadership (1901-1909), a clear national ethic of the conservation movement was defined by geologist W.J. McGee and forester Gifford Pinchot: "the use of natural resources for the greatest good of the greatest number for the longest time."

The 21st century has been a time of redefinition of Roosevelt's national ethic for the "greatest good" to include bats, butterflies, moths, bees, and birds. With the steady loss of pollinators, the NAPPC Public Lands Task Force promotes floral habitat and diversity as one way to increase numbers of pollinators. Military bases, college campuses, highway right-of-ways, and other public lands can increase the problems associated with private landownership by creating large "pollen" deserts and bloom gaps with deforestation, pesticide use, and monocultural plantings. Since nutrition is a key component to pollinator health, our public lands can be investments in floral diversity.

In 2009, the Public Lands Task Force began development of a brochure for public land managers. In 2010, with a draft in place, the task force began to envision a website that would work along with a brochure. With public lands clearly defined, taxpayer benefits are obvious: public land managers could save money by planting wildflowers that would re-seed themselves, provide for pollinators, and enhance aesthetic value to taxpaying citizens. The brochure, based on an existing template, will guide land managers to an online

website devoted to public lands, defining what those lands look like and how the task force could highlight current projects already being done. For instance, in 2010, Kentucky passed two laws for pollinator habitat. The website will contain hyperlinks to those laws so that other state bee associations can pass similar legislation.

Other task forces convene at the North American Pollinator Partnership Campaign (**www.Pollinator.org**) such as Agriculture, Bombus, Exhibits, Gardens, Honey Bee Health, Monarch Butterflies, NAFTA, Youth Education, Research, Databases, IABIN, and Pesticides. These task forces are comprised of participants who choose to volunteer time, scholarship, and expertise. In other years, task forces have been devoted to the National Academy of Sciences, National Research Council report, U.S. Postal Service stamps honoring pollinators, a U.S. Botanic Garden Exhibit, and other projects. Because I work with surface mine companies, which affects large acreages that may or may not revert to private ownership when mining is concluded, the Public Lands task force appealed to me.

The esteemed U.S. poet Mary Oliver once wrote, "One day you finally knew/what you had to do, and began/though the voices around you/kept shouting/their bad advice" ("The Journey"). With the U.S. losing one in three hives, beekeepers know what we need to do. Taxpayers need to insist upon accountability and maintenance for its public lands. These are investments in the future. The anticipated date for completing the NAPPC Public Lands brochure thie year. But these efforts cannot just end with planting more pollinator habitat. Our efforts need to include cultural perceptions about these public lands. With very little expense and time involved, people can change the culture of their neighborhoods. The Public Lands Task Force is establishing Campus Criteria, which considers perennial flowers instead of annuals, and events such as bee authors and movies to influence public perception about pollinators. These events could just as easily be adapted by churches, civic organizations, and government entities and often, budgets do not need to be modified by much money. Acre by acre, U.S. taxpayers can design a more hospitable environment for pollinators. BC

Our efforts need to include not only more food for pollinators, but a cultural change is also needed.

Tammy Horn is actively involved in restoring strip mine land in her home state of Kentucky.

Kentucky Pollinator Habitat Bills (both signed into law 2010)

a. **Pollinator Habitat Bill:** This bill encourages surface mine companies to reclaim with wildflowers and undercanopy in order to provide pollinator habitat. Also names the honey bees, "the official agricultural insect of KY." **http://www.lrc.ky.gov/record/10rs/hb175.htm**

b. **Highway Rights of Way Bill.** Encourages the KY Dept. of Transportation to work with beekeeping associations to plant wildflowers **http://www.lrc.ky.gov/record/10RS/SJ177.htm**

Eastern Kentucky University Pollinator Week, April 11-16, 2011 (events may be cancelled due to inclement weather)

April 11: Bee Hive Build and Paint event, 11-1. Powell Building

April 12: "Death by a Honey Bee," author Abigail Keam, Crabbe Library, 5:30 p.m.

April 13: Honey Tasting Day, 11-1. Powell Building

April 14: "The Vanishing of the Bees" movie, 5:30 Crabbe Library 108

April 15: Roll a Beeswax Candle, 11-1:00 p.m. Powell Building

April 16: Bee Day in the new EKU Outdoor Classroom, 10-12:00. Participants can plant wildflowers, plant bee trees, don a bee suit, meet the bee crew, etc. Reservations need to be made through Amanda Sears by April 7th, Madison County Extension Agent.

Listening In

A Method For ObservingThe Vibroacoustic And Seismic Activity In A Hive

Stephen **Engel**

A method for observing of the vibro-acoustic and seismic activity within honeycomb.

I am interested in the waves traveling through the "shared-floor" plane of the beeswax comb in a beehive. I read a paper regarding the use of honeycomb structure in aircraft fuselages which gave me the idea. The paper was mostly a fabric/materials engineering study on methods to reduce flight-noise from wave propagation and amplification through honey comb structure due to air friction forces on the exterior skin of aircraft. I thought the behavior of the honeycomb structure to be rather interesting and thought that I might be able to record a (reverse effect) in an actual honey bee honeycomb.

In a beehive the honeycomb is made with beeswax, an excellent conductor material for audio signals all by itself, but in a honeycomb structure I would expect that similar wave propagation properties would occur as in aircraft, even if filled with honey, pollen, larvae or empty.

Audio recording of bees has been a never ending challenge since bees do not like foreign objects within the colony, and I have been some what motivated to try and look at this as monitoring over an extended time approach rather than just a fast stick it in and listen and then pull it out kind of approach. So I have been thinking on ways that I could do this with less cost and a little bit of naive compunction to want to think I can trick the bees so I can eavesdrop, rather than they are conducting a performance because they know someone is listening, or a foreign object is in the hive eliciting a specific behavior.

I decided on transducers. The plan was to turn a normal acoustic bee hive into an electric-beehive. Transducers provide the means to capture the waves traveling through the comb in a similar fashion to a seismic geophone and this may be considered a vibroacoustic effect.

Transducers in instruments are only as good as their mount point and in the case of a bee hive many are available to consider. In short I concluded that two were of most interest to me, and that is the plane perpendicular to the shared floor of a honeycomb just below the top bar, and the other is within the exact plane of the shared-floor of the honey comb. I selected the 2nd option in this attached example.

I use the term seismic-array because the transducers I use are imbedded in the combs similar to the method of deployment for geophones and may also be referred to as vibro-acoustics. It is my hope that I am collecting the vibrations propagating comb and not or very little of the vibrations of the modulating airspace near the combs. The signal source is all bees; but, I can actually use this technique to introduce signals to the combs from my mixer/amp.

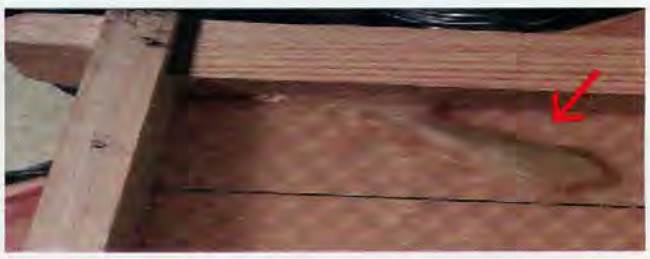
What I found most interesting was the difference in signals/sounds. The signaling sounds are completely different in the combs than in the modulating air space in near proximity to the combs. I also think, but am not certain yet, that those signals are routed between adjacent combs, and I also believe I have response signaling. For example, I think I have a queen making a signal and I believe I have a response signal from the colony. I also think I can detect this signaling from one comb to an adjacent comb and from lower to upper combs which suggests to me the existence of a type of data-network.

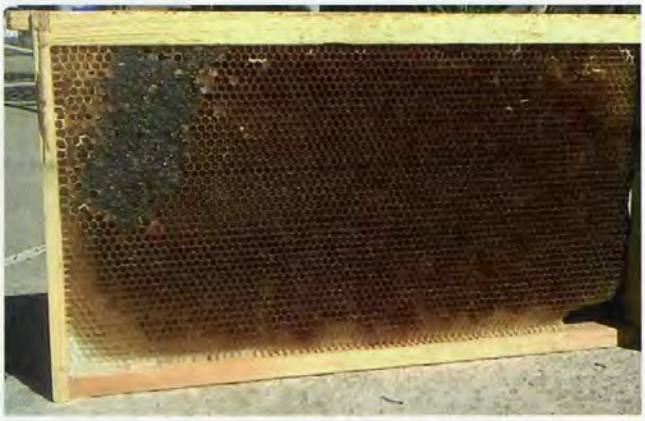
They seemed very unique to me, but I am still learning about the sounds/signals bees make.

The audio file associated with the waveform and sonogram can be downloaded here: **https://docs.google.com/leaf?id=0B1-J3roeA7FeYzk4MTY2NzctMGEzZi00OTY4LWEwYTgtNGI2ODY1ZDU4MTkx&hl=en&authkey=CMfrvbQK**

Just to set the stage a little, the wav file was generated on June 25th of 2010 from a strong hive in a double brood box hive (10 frames). Frames one and 10 are follower board frames two through nine are brood frames, and frame #6 in each box contains a part of the array.

This is two channels that are in a mono recording. The sources travel through amp and mixer prior to





mono channel export. The time is about 11:00 p.m. and I come to the hive and bring a good smack to the side of the hive.

All recordings were initially generated with Cornell University's software program called "Raven." I have other images such as frequency graphs but I think that might be too much for this article. I think these simple waveforms/sonic grams make the point pretty well.

The behavior of the bees is dramatic due to the induced event, as is the synchronization of the wing beat muscles. But in my attached pdf, I am trying to direct the viewer to portions of the wav that I think I detected the signaling scheme both in pre-smack and in post-smack phases. In this case no waggle dancers should be doing their thing, and I can confirm similar signals exist during the daytime.

These signals can contribute to our understanding of honey bee behavior and communications.

Some key behaviors that this type of signal detection system may help to identify are situations such as a queenless colony, a colony with queen cells and a colony staging to swarm.

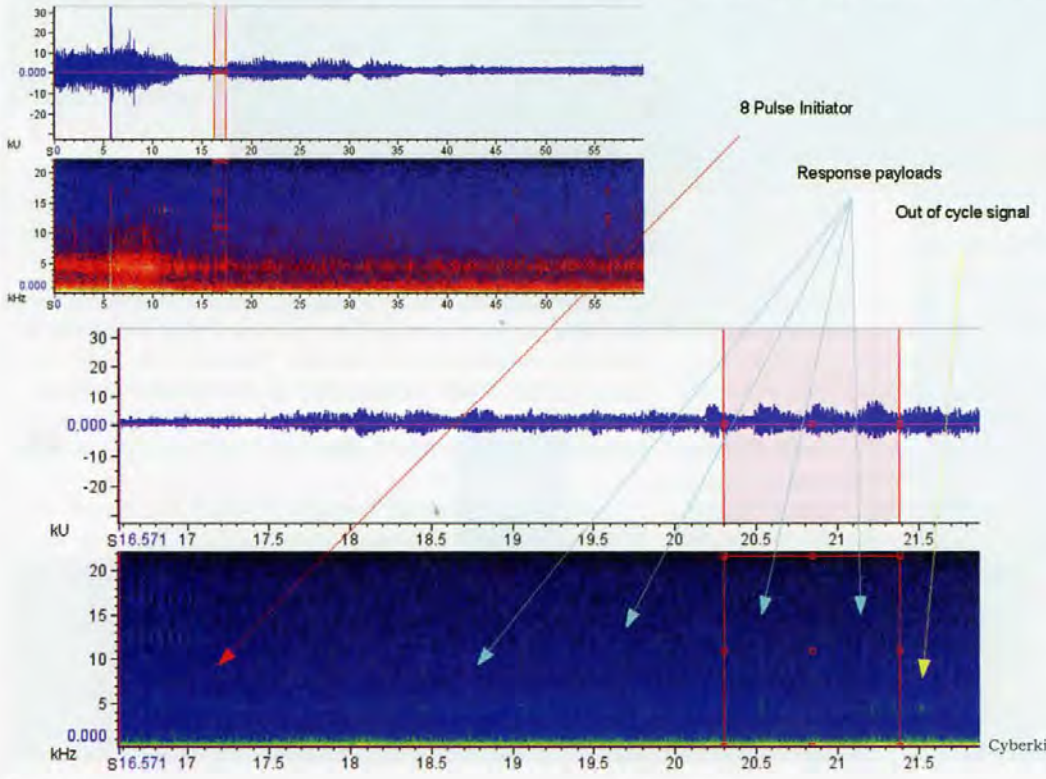
Early knowledge of these conditions to a beekeeper would allow a beekeeper to make a modification to the hive in time to prevent or reduce the swarm potential or introduce a new queen.

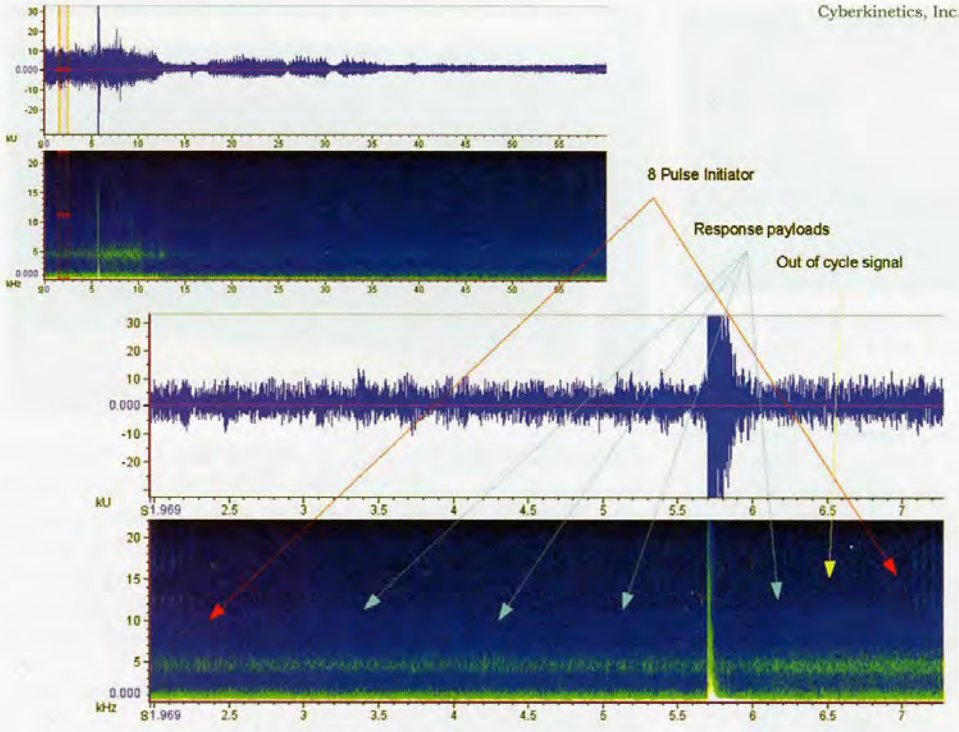
But this really comes from the concept of the Apidictor, by the famous bee keeper Eddie Woods. Basically this system can clearly and effortlessly detect and record queen piping and other vibro-acoustic waves traveling through the comb matrix. I am not an expert in bee or larvae behavior yet, but it may be the case that the colony communicates with larvae through some vibro-acoustic effects, but that and other communications will need to be further investigated.

In a conversation/collaboration with the USDA-ARS I received input that suspicion exists that the waggle dance is really a tapping communication on the cell walls by the forager with its legs more so than the actual movement observed on the surface plane of the combs.

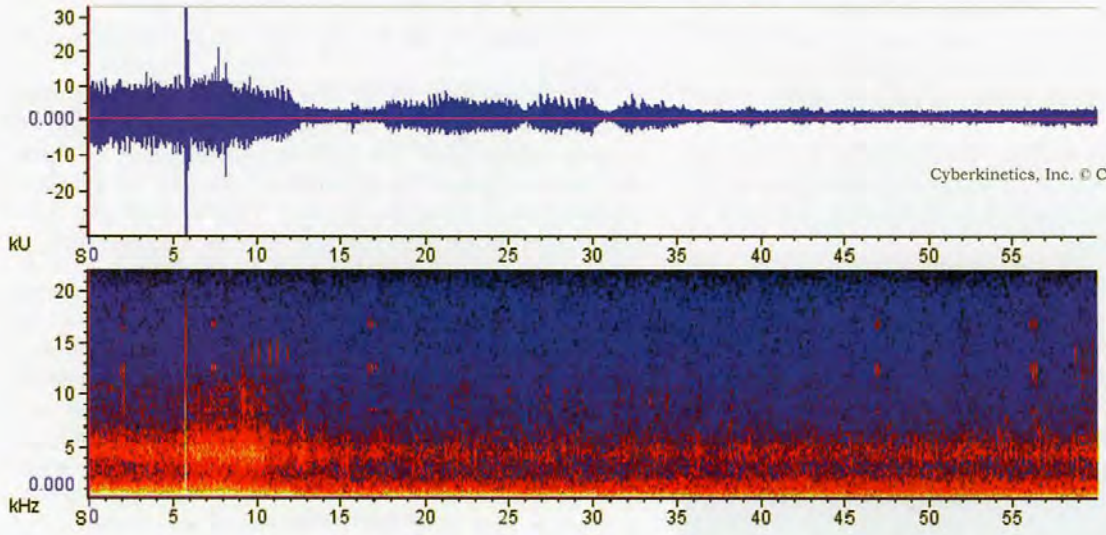
This seems to be in line with what I am currently observing.

Dr. Bromenshenk at Bee Alert collects frequency signaling and patterns through special microphones to identify frequencies that lead to identification of chemistry and pathogen components in the hive as a form of contamination detection system. This system may have potential to collect data that can later be analyzed through Bee Alert for pathogen/chemical contamination.





Waveform & Spectrogram for Stephens Apiary, June 25



There may also be a relationship between the comb construction method in the hive and the vibro-acoustic effects of the combs. It may be the case that bees construct the comb to support the communications network needed within the space of the hive.

For me, I can easily pipe the output from my system into my home stereo and I can hear what is going on inside of the hive all day long as I do other stuff, when a unique signal is achieved I can hear it, and it might stimulate me to go out to the hive, or it may execute a predetermined set of commands such as logging some data, taking some pictures, or even sending me an email that a certain frequency was achieved or pattern. There are actually more components than I presented in the simple diagram, I have a data center with software monitoring the audio output from the transducers 24/7 and trending it. BC

Stephen Engel keeps bees and listens to the sounds of the hives in Northern California.

Johnny-

It must be admitted, regrettably, that not everyone is fond of bees. Some people are terrified of being stung, or some are simply panic stricken at the thought of the bees in general. No-one, however, hated bees and beekeepers the way John-no-more hated them. His was a pathological hatred that burned fiercely within him, fuelled by the continual use of his ridiculous nickname. He hated it and it had been given to him, and nurtured by, the local beekeepers. Perhaps some explanation of how he had come to be so called is necessary here.

Johnny McAlinden was an honest hard-working young man. He was employed by the local creamery as a maintenance fitter and good he was at his job. He was so good that the manager saw fit to promote him over the heads of his peers to the lofty position of maintenance foreman. With the new position went a new desk, it wasn't quite as good as an office but only one step away. That first Monday morning in his new position he donned his crisp white coat and went for a first inspection of the maintenance domain. The first man to meet him was his old partner Andy Wallace, who had worked beside him since he had first come into the creamery.

"Hey Johnny, there's trouble with this new separator. Can you get some spare parts for it?"

Johnny decided there and then that a proper respect must be paid to him or he would never escape from the work-bench. "Call me Johnny no more." He exclaimed, pointing to his new coat. So they did. From that day forward they called him Johnny-no-more. Even his wife had got into the habit of calling him it. He loathed it and no matter what he did or said, the whole village and surrounding district used it. He vowed that somehow he would get his revenge on his ex-partner, who, as was well known, was a leading member of the local beekeeping fraternity. And kept several hives in the centre of the village. He bided his time, quietly and patiently. For years. Vengeance is a thing to be savoured and is all the better for being taken cold.

One fine Sunday morning, just as the locals were preparing for Sunday worship at their various places of prayer, a great swarm of bees began to alight on the old pump in the village square. As the prospective worshippers passed it they either took a detour or, if beekeepers, tried to work out who they belonged to. The group of beekeepers grew almost in proportion to the swarm of bees and finally Andy Wallace passed with his wife on the way to the congregational church. "I think those are mine lads. I had a big hive ready for swarming and thought it would last until this afternoon when I could get a chance to do something with it. It'll be safe enough there until after the service."

So they all departed to their respective places of worship. All except Johnny-no-more. He had heard the conversation and quietly sent his

Be Careful W
It May Har

Yo-More

Orlich

wife on to chapel by herself. Now was his hour.

Coming from the services, the local beekeepers were looking forward to an interesting afternoon with the bees. They were making plans for the afternoon's pleasure of taking and hiving the large swarm when . . . shock! As they came to the pump, there, lying in a great mass, was the remains of the swarm, all dead. There beside them was the culprit, spray canister still in hand, the murdering Johnny-no-more. Oh! the evil that men do. The beekeepers were all for altering Johnny-no-more's physiognomy for him, but wiser heads prevailed, especially as Inspector Walker was just coming from his little mission a few yards up the street. The inspector looked aghast at the catastrophe. As a keen beekeeper himself he demanded an explanation.

"I am within my rights to destroy these dangerous pests. They were causing a serious threat to my family and I had no option but to take this action." So claimed Johnny-no-more, the ruthless miscreant. At this point in the argument the crowd was joined by the Parish Priest Father O'Brien.

"Oh my goodness, what a mess. Why, why did you do it Johnny-no-more?" Queried the saddened and bereft priest. What have we done to offend you? Do you hate us so much?"

"I hate the sight and sound of you beekeepers and your stupid bees. I swear I'll wipe you all off the face of the earth?"

"Look this is silly Johnny-no-more, there was no need to do what you did. If we have offended you we're sorry and if there is anything we can do to atone for our sins tell us?" exclaimed the Inspector.

The parish priest interrupted the police inspector. "Surely you can see there is no logical reason for destroying these poor bees. What have we, or they, ever done to harm you?"

"I hate being called Johnny-no-more and just want to be called John again. If you do that I'll stop destroying all the swarms I see."

"Very well. If you stop being a pest to the beekeepers we'll call you John again. I didn't realise the nickname was so offensive to you. Do you really want to be called John again." asked the angry priest.

"Yes, that's all I ask, I'm a simple man."

"You're not kidding," laughed the inspector. "We're always happy to oblige."

Henceforth and from that day on Johnny-no-more, as a cognomon no longer existed. The whole village and surrounding district stopped using the name, even his wife, they now call him John-again. His ire at bees and beekeepers is now more bitter than ever and some day we beekeepers are going to regret teasing him so. BC

ho You Tease.

n Your Bees.

HIVING A SWARM

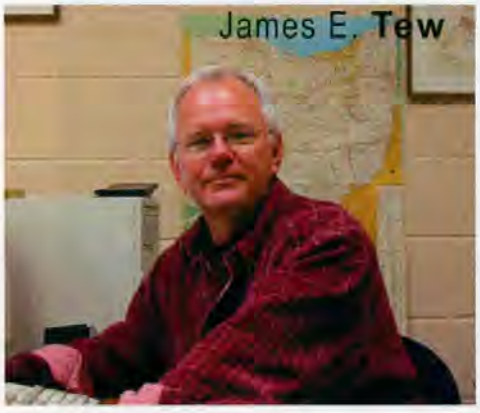
Even Today, Still A Pivotal Moment For Many Beekeepers

It is never a boring event

A swarm of honey bees is a biological wonder. For most people who don't keep bees, a single encounter with a swarm becomes a life-long memory. For the established beekeeper, a hanging swarm is an encounter with free bees. For most of the public, it's an exciting moment of danger and fear – a bit like stumbling across a venomous snake. It's frequently a time for a beekeeper to be a hero and save the community from a "threatening pest." There's not a beekeeper who hasn't savored the thrill of the moment when a swarm was successfully hived and "*all the women and children spared.*"

In years past, many beekeepers got their first start in beekeeping because of a rogue swarm. Maybe they came home from work one afternoon and there it was, hanging on a low limb; or with a lot of fanfare and much community noise, a neighbor was about to spray a swarm with insecticides and the unknowing beekeeper, feeling an embryonic apicultural stir, asks for it (normally not having a clue what was to be done with it). Boom! A new beekeeper is born. Or how about this scenario that I have actually encountered: A swarm of bees has moved into an over-turned bureau drawer in a scrap pile. The property owner finds it, keeps it, and turns it into a hive. Every beekeeper has a special swarm story.

Getting a swarm of bees is an excellent way to either start keeping bees or to increase colony numbers – so long as they are not swarms from your personal colonies. The most obvious problem is their unpredictable timing. One year may bring more swarms than anyone wants, while the next year may bring nothing . . . makes it hard to develop plans.



Some elementary swarm behavior

When a primary swarm issues from a hive, roughly half the worker bees, a few drones, and the old queen leave with the swarm. A swarm in transit is truly a rite of Spring. Watching a swarm move is like watching the minute hand on a watch move. As long as you are specifically watching it, it appears that nothing is happening; but if you look away for a bit, run to the car for equipment, or talk briefly to by-standers, you'll be surprised how far the swarm has gone when you return to it. The issued swarm will normally set up a temporary resting place and will stay there from a few hours to a few days. All the while, scout bees are searching for promising home sites. Bees finding potential living accommodations will return to the hanging cluster and dance on the outer layer of bees. At some point, a cluster decision is made and the swarm is "off" at a speed considerably greater than that seen during the first phase of the swarming. If it chooses to do so, a swarm can really move along quickly.

When is a swarm no longer a swarm?

If the beekeeper gets a call at this point, the game has changed. This swarm is no longer eagerly looking for a home site, but has made a conscious choice on a new abode. If the caller says, "a swarm has just landed on the side of my house and bees are going in the wall beside the chimney – forget hiving that swarm. It's already "hived" itself. You would then move to a discussion about "*Removing bees from a Dwelling*" – a totally different subject.

When a swarm call comes

When you get a swarm call, I would suggest asking the following questions in no order of priority:

1. How long have they been there?
2. How high off the ground are they?
3. Are they, in fact, honey bees?
4. Are they the caller's to give away?
5. How large is the swarm?

One of the special characteristics of a swarm is its docility. Normally, most swarms are in a good mood - but not always. If the caller saw "thousands of bees land on a bush back by the barn just a few hours ago," they are describing a swarm that should be easy to hive. The bees have just landed, are not defensive of the swarm location, and are probably still well fed with food they took for the trip.

Alternatively, if the caller says something like, "they have been there for four days. I thought they would have left by now." Or worse . . . "I tried to spray them with an insecticide but I couldn't kill all of them," the beekeeper should be aware. This will probably not be a happy bunch of bees. If you show up, empty hive in tow, there's an excellent chance you will get your ticket punched (or more appropriately, get your ticket stung). If you suspect they are not a happy swarm, mist them three or four times during a 30 minute period with sugar syrup. Wear a veil and other protective equipment as necessary, and admonish gawkers to stay a safe distance away. Indeed, I would suggest that you wear a veil anytime you are working bees – any bees – not just swarms.

When it comes to bees, the public seems to think they have entomological skills, mainly because most people, sometime in their life, have been stung or bitten by some angry insect. I think what's happening is that the frantic caller is willing to say whatever it takes to get you on the job. None-the-less, you must ask, "Are you sure they are honey bees?" To which the indignant caller will attempt to impress you with their knowledge. My Dad got a call from a land owner on an eight acre plot. The

caller explained that the bees were in an oak tree and that the entrance was nearly seven acres away in the ground. Now to any beekeeper, the possibility of a honey bee nest having its entrance seven acres away is laughable, but it is completely plausible to a concerned land owner. *[It was two nests – one of honey bees and another of yellow jackets.]* Many beekeepers have driven miles only to find a "swarm of hornets"?

A typical swarm from my colony.

The hard-to-hive swarm

Nothing brings out the acrobatics in an enthusiastic beekeeper more than a swarm high off the ground. Picture this: a beekeeper, beneath a tall tree, on the top step of a ladder in the back of a pickup truck and the beekeeper is reaching, at full arm's length, with a paint roller extension pole trying to dislodge a swarm. Yes, that's my truck in the photo. If you look at it logically, the most I would be saving is the price of a 3# package. For the potential cost of the emergency room and subsequent traction, I could buy a complete small bee operation. But I suppose it is the challenge of the moment.

Another clever, but questionable technique is to shoot off the high limb with a rifle. The problem with that procedure is that it sounds like a light infantry fire-fight, which tends to upset the neighborhood. Another technique bound to make the local newspaper is to attach a nylon string to an arrow and attempt to shoot the arrow/string contraption over the limb. Then use the string to pull a rope over the limb. If all that works, you would shake the limb with the rope, and have bees rain down on you. Rather than go in your hive, the swarm will probably fly right back to the same spot. However, nothing ventured – nothing gained. Sadly, if they are really high – completely out of reach – go home and wait for another swarm call.

"Are they yours to give away?" may seem like a strange question. Years ago, I went to hive a swarm only to find that the caller was feuding with a neighboring beekeeper over a property line. The caller thought that, *"the bees had gotten away"* and that giving them to me ridded him of this nuisance. I did the civil thing and asked the beekeeper's wife, whose beekeeper husband was at work, if I could have the swarm. You know the answer. No. But . . . would I be willing to hive the swarm for him in his absence? I hived the swarm and made my departure with a new question for my swarm question list.

Hive equipment for a swarm

What should the swarm box have in it? Bees find old bee equipment attractive. If you can have – at least – a couple of frames of drawn comb in a used box, you're off to a good start. We frequently use four-frame nucs only because they are smaller and lighter.

A former Maryland State Apiarist once told me that, in a pinch, he successfully used his veil as a bag to transport a swarm. My Dad, not having anything at all to hive a swarm, cut the limb and laid the swarm in the back of his car. He and the free-flying bees drove home – with the van windows up – where he put a hive body in the back of van with the doors open and the bees moved in. While these events are a bit desperate, they both have happy endings.

When you are cleared to go

When you've gotten the call, asked all the right questions, gotten all the right answers, made the trip to the swarm site, talked to the homeowner, and found the swarm to be hivable . . . What now?

First, put a hive body with an attached bottom, or some other container beneath the swarm. "Beneath" may be a few inches or a few yards, depending on your swarm luck that day. Then give the limb a couple of hard shakes . . . and then watch everything break loose. Bees everywhere. Normally, a blob of bees drops to the hive while all the other bees take to the air. Almost immediately some bees return to the original site, some bees seem lost and fly randomly, while others will seem genuinely happy with your accommodations.

In general, it's a moment of undecided biological confusion. Almost everything hinges on the queen. If she went back to the original swarm site, assuredly, the bees in your box will, after a while, return to original site also. If the queen settled on another site, bees will begin to cluster around her, some bees will go to the original site, and some bees will probably stay in your box. Ultimately, the swarm will re-cluster at the new site around the queen. At that point, you go back to step one and begin the shaking phase all over again. If, per chance, the queen dropped to your box and stayed there, the remainder of the swarm will finally join her there. Watch for two clues:

Though commonly done, this is still not a good idea.

(1) Bees fanning and exposing their scent gland. Scenting doesn't assure you of success, but at least a few bees liked your hive body as a home site and are advertising for it.

(2) Watch for a small cluster of bees, maybe golf-ball sized, in the vicinity of the swarm. The small cluster maybe on the ground, on a leaf, on the external rear-view mirror or your car or anywhere. That will possibly be the lost queen with a few bees clustered around and are exposing their scent glands to announce her location. If you have the skill and a queen cage (or a match box, McDonald® cup with a lid – anything near at hand that you can find to temporarily confine the queen), capture the queen and put her in your hive body. You will have just improved your chances of successfully hiving that particular swarm by about a 1000%.

But they don't always stay

Bees have little minds of their own. Everything may look perfectly normal, but when you return the next day – they're gone. It happens. I predict that not one bee will ever read what I've just written, but rather will always do things their own way. Even so, swarms are always exciting. Be ready.

For a bit more discussion on honey bee swarming

At the OSU Honey Bee Lab web site, **http://beelab.osu.edu/**, I have posted a short question and answer discussion on other aspects of swarming and at the same site, I have posted a presentation program (*PowerPoint®*) on the subject of honey bee swarming that can be viewed individually or used as a meeting discussion via a web-linked computer and an LCD (liquid crystal display) projector. Additionally other presentations on various bee subjects are posted at this site. Other sessions will be added as time permits. BC

Dr. James E. Tew, State Specialist, Beekeeping, The Ohio State University, Wooster, OH 44691, Tew.1@osu.edu; http://beelab.osu.edu/; http://www.facebook.com/beelab

Swarm Issues

Thoughts Before, During & After a Swarm

Ross **Conrad**

Many articles discuss how to prevent swarming, but how should you respond once a colony has already left the hive?

The month of May means that swarming is on the minds of the honey bees located throughout the Northeast with the possible exception of the hives that are living at the highest latitudes in the northern most reaches and are thus slower to build up a large population. Following the establishment of Langstroth's removable frame hive came the development of hive manipulations intended to eliminate swarming. To watch a swarm fly off with an average of roughly 65 percent of the hive's workforce means a drop in honey production and significant economic loss. Of course this is only if the hive is able to successfully raise a new queen who in turn is successful at mating and begins laying eggs, otherwise it can also mean the loss of a hive as well. Thus, the swarm has become a thing to be avoided by the beekeeping community and swarming has become an indication of poor beekeeping in the minds of many.

There are many creative ways that beekeepers have invented and devised to stop a hive from swarming. We beekeepers have had to put a lot of time and energy into swarm suppression because swarming is what bees instinctively want to do. Thus, bees are liable to swarm despite our best efforts to the contrary. While we could dwell on the lost honey production a swarm foretells and feel bad about our skills in keeping bees, we might also feel some sense of awe and hope that those now feral bees may actually be able to make it on their own and help reestablish the wild bee population which was decimated after the introduction of *Varroa* mites to the U.S. After all, the swarm represents the honey bee's natural reproductive cycle. It is akin to giving birth, and in this day and age of CCD, *Varroa*, unpredictable climate patterns, Nosema, Foulbrood, Hive Beetles, systemic pesticides, viruses, etc., if a hive of bees is strong enough and healthy enough to swarm, it must mean that their keeper is doing something right. They are obviously being cared for in ways that support their immune systems and reduces their overall stress to a level that is tolerable, since overstressed bees that are sickly and struggling to maintain their hive population are not prone to swarming.

In the typical swarm scenario, the queen has reigned over a prosperous colony. The hive is chuck full of honey and pollen, the brood nest is bursting at the seams with barely any room left for new eggs to be laid. The population has grown so large that bees have to hang outside that hive on warm days in order to allow enough air to flow through the colony in order to maintain temperatures cool enough for the developing young. There is no more room to expand and build additional comb, and so the colony begins to feel crowded. This is the time when the mother bee locates the queen cups along the outer edges of the comb and lays eggs in them. Once the eggs hatch the nurse bees raise the larva to be queens and shortly before these new virgin queens are ready to emerge from their swarm cells, the mother bee vacates the premises. She has proven that she is a capable leader and has created a successful hive. So she flies off in a supreme act of generosity, relying on her trusty scouts to lead her to a new home where she will start all over again. She leaves behind her entire estate for her daughters to inherit. This is very different than how we treat our off-spring who may not receive even part of our estate even after we are dead, let alone while we are still alive.

While there is always the exception, the queen in a swarm will usually settle nearby shortly after emerging from her original colony. One of my beeyards is positioned along the perimeter of a field which has a single tree growing in the middle of it, about 100 feet from the hives. Nine times out of 10, when a hive in this beeyard swarms the colony comes to rest in this tree. Once the swarm has landed on this tree, the majority of the bees in her entourage will cluster around her and wait for the scouts to come to a "consensus" as to where the swarm should take up residence next. There is a rich history of beekeepers banging on drums, pots, pans, ringing bells, etc., and making a racket in the act of "tanging" which was historically believed to encourage a swarm to settle nearby after emerging from a hive so that the beekeeper can have a chance to gather them up. I have even heard stories from beekeepers who claim to have had swarms fly right into an empty hive while the beekeeper stood next to the hive banging on a drum. Now if there is one thing I have learned about keeping bees is that I can never be

A hive issuing forth a swarm (on left).

This bee (standing on the edge of the wooden super) has raised its abdomen in the air while pointing the tip of the abdomen downward to expose its Nasanov gland and is fanning with its wings to dispurse the pheromone secreted by the gland.

absolutely sure what a hive of bees will do in any situation. Sure we can have an expectation of what bees will normally do. But with bee hives, as with people, there are those that do what is considered normal and typical and then there are those that just decide to be different. As a result, I can not categorically rule out the possibility that tanging has an impact of some kind on a swarm, but given that swarms typically land nearby after emerging from the parent hive anyway, it is easy to doubt the veracity of the claims attributed to the act of tanging.

Historically however, it is likely that tanging provided some very useful purposes for beekeepers and the community. Tanging would certainly alert the neighborhood that bees were swarming. The raising of such an alarm is likely to have been much appreciated by those who were not beekeepers and had no interest in having anything to do with a cloud of stinging insects. Tanging may also have been a way for a beekeeper to alert other beekeepers that a claim was being made on a swarm. Acquiring new bees by laying claim to a swarm was important in the old days. Catching swarms was the primary way of increasing the number of hives in ones apiary and was critical prior to the establishment of the removable-frame hive since it was routine back then for beekeepers to kill their bees with fumes from burning sulfur in order to harvest the honeycomb safely.

Swarms come in many shapes and sizes.

Judging from the way that the worker bees in a swarm behave, it seems clear that the scent of the queen's pheromones helps to guide and organize the swarm after it initially emerges from its hive. Wherever the queen goes, the swarming bees will follow in an effort to protect her. Workers will then utilize the scent from their Nazanov gland to help stragglers to find their way back into the folds of the swarm's cluster. The homing scent of the Nazanov gland is so effective in drawing in the members of a swarm that once a freshly issuing swarm has settled nearby, another swarm leaving a different hive in the same apiary a short time later is likely to land in the same location as the initial swarm, combining and joining forces. I have seen this occur on two different occasions and suspect that many times when a beekeeper encounters a large "monster" swarm, they are really seeing the results of two or more swarms that emerged around the same time in the same area and have become as one.

It is easy to see the evolutionary benefits of such behavior. The larger the work force of a new swarm, the faster the colony will be able to build comb in the new hive and stock it with enough honey to survive a dearth. It would be interesting to know what happens to the two or more queens that make up these combined swarms. Do they co-exist for some time, or do they fight each other for dominance. Do the workers choose sides? If anyone knows of any research that has looked at such situations I would appreciate your contacting me with information about such studies.

Whether from a single colony or a combination of colonies, swarms are notoriously easy to handle. With no brood or stored food to defend and bellies full of honey swarming bees are not as defensive as bees that make up an established colony. It is simple enough to catch a swarm that is hanging off the end of a branch. Simply place a box or hive body immediately below a swarm of bees and give the branch a quick jerk and most of the bees will usually fall right into their new home. This is easiest to accomplish when the swarm is resting on a branch that is low enough to the ground that you can walk up to it. Complications inevitably arise when the swarm is high up in a tree where a ladder may, or may not be able to reach. Swarms that alight upon the side of a building or on something immovable like a fence post can be transferred into a box of some kind by scooping up clumps of bees with a piece of cardboard or hive tool. Unlike the reaction of bees when we make splits or nucs, swarming bees are in transit and harbor the expectation that when they stop they will be establishing a new home. As a result, they "forget" the location of their old hive to the point where you can capture a swarm and place the newly hived swarm right next to the original colony's location and the experienced foragers tend not to drift back to the mother hive.

The real challenge in hiving a swarm is in capturing the queen. As noted above, as the queen goes the swarm is sure to follow. Thus, when collecting a swarm into a

box or hive body, one sign that the queen has been successfully transferred into the container is the appearance of workers exposing their Nasanov gland at the entrance in an effort to gather their scattered sisters. Keeping the queen contained within her new home can however be a challenge at times which is why some beekeepers like to place a queen excluder between the bottom board and the hive body so that once the queen is placed within the hive body, she cannot get out and the swarm will settle down instead of potentially flying off. Of course this only works if all other openings and exits in the box have been blocked off. After about a week or so, the queen excluder can be safely removed since the queen will likely to have started laying eggs in the combs and the bees will not easily abandon their young. Leaving a queen excluder on such a hive longer than a week or so is ill advised since it not only inhibits the movement of the queen but also of the drones.

This swarm season have fun should you decide to try and capturing a swarm or two. The adventure you will have hiving swarms often makes a great story, even when they get away. BC

Ross Conrad is the author of Natural Beekeeping. You can reach him at dancingbeegardens@hotmail.com.

Managed Pollinator CAP
Coordinated Agricultural Project
The Bee Team

Marla **Spivak**

Laying Groundwork For A Sustainable Market Of Genetically-Improved Queens

While the Managed Pollinator CAP team continues to unravel causes of bee mortality, we are also laying the groundwork for ways to keep bees healthy in the future. Goal Four of our four-year project is to:

"Deliver research knowledge to client groups by developing a technology transfer program for queen breeders and literature on Best Management and Conservation Practices for managed pollinators as an eXtension Community of Practice."

This article deals with one objective of this goal: to develop a technology transfer program for queen breeders. This is an objective near and dear to me, so I have chosen to lead the writing on this topic.

I credit the idea for this objective to Dr. Medhat Nasr and the Ontario Beekeepers' Association in Canada. In the early 1990s, they established a Technology Transfer program with the mandate to "conduct research for Ontario's beekeeping industry, facilitate a honey bee breeding program in Ontario and to transfer information, skills and methodologies to the beekeepers." I picked the brains of Alison van Alten, the former Tech Transfer Team Leader, in 2008 when I invited her to northern California to help me explore whether a modified program could be established with bee breeders there.

Bee breeders are a small but extremely important subset of beekeepers that provide the genetic material for beekeepers nationwide through the sale of queen bees. Given the serious and chronic health problems facing bees and the increasing demand for pollination services, it is critical to provide bee breeders assistance with the production of genetically diverse stocks of bees that can defend themselves against parasitic mites and diseases.

Since 2008, Gary Reuter, my graduate students and I have traveled to CA to work one-on-one with 17 commercial queen producers located between Sacramento and Redding. Our original goal was to

Testing colonies for hygienic behavior. [illegible]ml of liquid nitrogen from Dewar tank is used to freeze-kill a round section of sealed brood, delineated by a 3" PVC pipe pushed into the comb.

Demonstrating to Ted Davis, queen breeder at C.F. Koehnen & Sons, how a hygienic test is conducted.

Buzz Landon shows results of a hygienic te[illegible] at Buzz's Bees. This colony removed 100% [illegible] the freeze-killed brood within 24 hours an[illegible] will be used as a breeder queen.

Steve Park shows off another hygienic colony at Steve E. Park Apiaries. Each queen breeding operation we visited had a number of good hygienic colonies.

Dr. Chip Taylor demonstrating the drone trap he invented to collect drones out of congregation areas. The trap, containing lures scented with queen pheromone, is lifted to 20-30 feet by helium balloons or kites, and is controlled by fishing rod and reel.

encourage these bee breeders to select for hygienic behavior, a trait that helps bees defend against *Varroa* mites, American foulbrood, and chalkbrood. During these visits, we also showed the bee breeders how to sample their colonies for *Nosema* disease by setting up microscopes in kitchens and outbuildings. In addition, Sue Cobey from UC-Davis accompanied us to some sites where she discussed the stock importation program (a UC Davis/WSU collaboration), to enhance the genetic diversity of bee stocks. In 2009, we facilitated cooperative research with Dr. David Tarpy from North Carolina State University to sample queens and drones produced by three of the bee breeders to determine the mating frequency of queens and the sperm viability of drones. We enlisted the fun help of Dr. Orley "Chip" Taylor from the University of Kansas to go "sky fishing" for drones from drone congregation areas (situated 20-30ft above ground where drones congregate to mate with queens).

Over the years, two things became very evident about the CA Bee Breeders: 1) They are extremely competent and produce high quality, well-mated queens to supply beekeepers throughout the nation; 2) the complexity of breeding for pathogenic resistance, while maintaining productive characteristics and pollination efficiency, requires professional assistance to help bee breeders improve stock selection, enhance genetic diversity, and to perform disease diagnostics.

I'm proud to announce that after our years of exploration, funded by the University of Minnesota, the National Honey Board, the Almond Board of California, and the USDA-Managed Pollinator CAP, we now have a Bee Team up and running! We have one full-time person already in place, Katie Lee. Katie has been working on her own since December 2010, but she will be joined by Rob Snyder and Mike Andree by June this year. They will be working out of the University of California Cooperative Extension office in Oroville, close to the heart of the bee breeding operations in northern California.

The Bee Team will provide the

Alison van Alten checking for Nosema spores with Dave Powell at Powell Apiaries.

Left to right: Valerie Severson, Marla Spivak and Sue Cobey examining colonies at Strachan Apiaries.

Left to right: Gary Reuter (Univ MN), Kirk Visscher (UC-Riverside), Sue Cobey (UC-Davis and WSU), Marla Spivak (Univ MN), David Tarpy (NC State Univ) and Orley "Chip" Taylor (Univ KS) after a day of collecting drones for David Tarpy.

Kate Lee, the first member of the new Bee Team to assist bee breeders in northern California.

following services for queen breeders year round:

1. Disease and pest diagnostics
2. Assistance with stock selection and breeding for resistance traits
3. Enhancement of genetic diversity in bee stocks
4. Facilitate cooperative research on relevant topics

The Bee Team will test for hygienic behavior, *Varroa* mites, and *Nosema* in at least 50 colonies at each bee breeder's operation three times each year. The data from the testing will be provided to each bee breeder in a timely manner to help them make informed decisions on choosing breeder queens and on appropriate treatments. The bee breeders have agreed to pay a fee for these services so that in the future, the Bee Team can be self-sustaining. If this model works well, we hope to find funding to establish similar teams to assist queen producers in the Southeast and other regions of the U.S. BC

CATCH A SWARM!

Walt **Dahlgren**

Walt makes improvements to the previous version of his Bee Vac.

When vacationing in Arizona, I met a beekeeper from Minnesota at the RV Park in which I was staying. When honeybee swarms came into the conversation, as it always seems to, he said he was the unofficial honeybee swarm collector for the park. I asked him what equipment he used. Just a cardboard box, a brush, a smoker and a hive he replied.

Wouldn't you know I just happened to have pictures of the bee vac that I built for the article in the February issue of Bee Culture magazine! I said this is what you need for collecting those swarms. Vacationing in Arizona he didn't have his shop vac or room for many extras. He needed a compact unit with the vacuum attached.

When I saw a Mini Shop Vac in a hardware store, the motorized bee vac design fell into place. By turning my unit to place the vacuum chamber on top, the vacuum motor could be added. The Mini Vac handle would also provide a convenient handle for carrying the unit. The window needed to be relocated from the now bottom position to the side of the bee box.

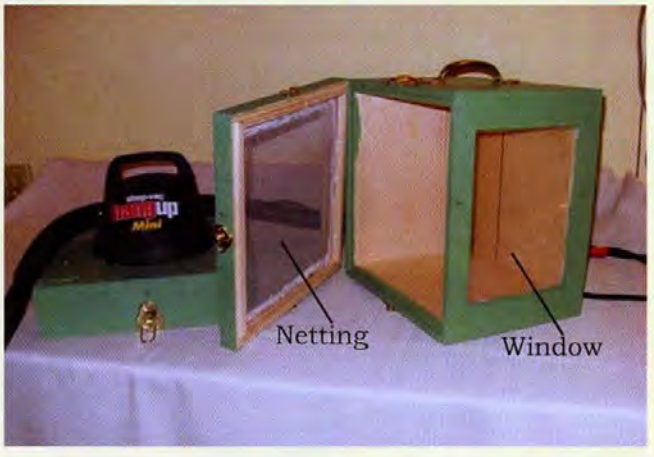
Using a 6 foot 1 x 10 board, .090 styrene glazing, 3/16 wood paneling, insect screen, 4 draw latches, a handle and a Mini shop vac I made the Bee Vac unit shown in the attached pictures.

BUILDING THE BEE VAC

1. Cut six pieces of 1 x 10 11¾ long. Then cut a 3/8 x ¾ rabbet on one end of each piece to make the corners. Four are for the bee box sides and two are cut to make the vacuum chamber and the screen frame.

2. To make the window in one side of the bee box, cut 1" strip from the top and bottom of one 11¾" piece. From the center strip, cut a 1¾" piece from the rebated end and a 1" piece from the opposite end. Now make a 5/16" deep saw cut in the edge of the four pieces to receive the plastic glazing window. Then from the remaining material, cut four 2" x 2" triangular feet.

3. Cut the plastic window ½" longer and ½" wider than the opening produced in the above four pieces. Next apply glue to the four pieces and assemble them around the plastic window, clamp and let glue cure.
4. Cut three pieces of the 11¾" lengths to match the height of the side fitted with the window. Drill a 1-3/8"hole in one piece as shown for the collecting hose.
5. Cut two pieces 1-3/8" wide for the screen frame and two pieces 3" wide for the vacuum chamber from each of the two remaining 11¾"lengths of material for a total of four pieces of each width.
6. Next cut a 3/16 x 3/8 rabbet on the bottom edge of 3" wide pieces, both top and bottom edges of the 1-3/8" pieces and the top edge of the four sides for the bee box. Check with the pictures to make certain the parts will fit together when assembled. The rebate is cut on the inside edge of the vacuum chamber and the bee box and on the outside edge of the screen frame. Complete the machining of all pieces before



changing your saw for the next cut so all joints will fit together.

7. Now cut a 5/16"deep groove 3/16" wide in the 1-3/8" wide pieces to receive the screen frame panel. Be sure to cut on side shown in the pictures.
8. Cut the screen panel frame 11-1/8" x 11-1/8". Then cut a 9-1/8" x 9-1/8" opening in this panel. Cut a 10-1/8" x 10-1/8" piece of insect screen, then glue and staple to the screen frame. (Suggestion, leave the wood cutout in the panel until the screen is installed: this keeps the screen flat during installation.) From this waste material, cut three teardrop covers to be used over the hole for the bee hose and two for the air relief holes.
9. Now you can glue and screw or nail the pieces together to make the vacuum chamber, screen frame and bee box. Assemble the side of the bee box with the hole to the left side of the window. Attach the four triangular feet to the side of the bee box opposite the hole for the hose. They support the bee box after the bees are collected and the vac chamber is removed.
10. Cut two pieces of 3/16" material for the top and bottom panels. Attach one piece to the bottom of bee box. In the top panel cut a hole to suit the vacuum motor and drill holes for the attaching screws. Glue and nail this to the top of the vacuum chamber frame. Drill two 1 ½" air vent holes in the corners of the vacuum chamber top as show.
11. At last! Paint all parts in your selected color to give this a professional appearance.
12. While the paint is drying, cut and file the end of the shop vac hose to fit the 1 3/8" hole in the bee collector box.
13. Now, final assembly! Attach the vacuum motor to the top of the vacuum chamber. Attach two latches to the vacuum chamber and screen frame and two to the screen frame and bee box. Attach the pivoting covers over the air vents and the hole for the bee hose. Attach the handle on the side with the bee hose.
14. Finally attach the vac bee hose and plug the Vac cord into the 110-volt outlet. Flip the switch on and check the hose for vacuum by adjusting the bypass vents as required.
15. COMPLETED and ready for use!

This unit weighs approximately 14 pounds. After collecting the bee swarm, remove the vacuum chamber with vac motor and using handle, turn box so screen is on the side providing ventilation to honeybees. The feet keep the box from setting on the draw latch. You may want to make another screen frame and bee box so you can bring home that second swarm.

I hope that Minnesota beekeeper sees this article and builds one. How much easier it will be to collect swarms with this bee vac than by using the old cardboard box and brush.

If you can't build this bee vac yourself, ask another beekeeper or a carpenter to make one for you. Don't be caught without a bee vac this swarm season. BC

Walt Dahlgren is always looking for ways to make beekeeping easier from his home in Jamestown, NY.

Make A Swarm Pail

Ed **Simon**

Be Ready For That Next Swarm

We all have been caught short when we have had more swarm calls than we had hives to put them. But before we can put them in a hive, we have to get them into a container and get them back to the beeyard. Cardboard boxes work great except they are either too large or too small and they require a quickly added screened opening or small holes to be added so the bees won't overheat. Bee vacuums work. But sometimes they are overkill for the location and size of the swam.

Let the good old five gallon utility pail come to the rescue. Cheap (usually free), adequate size and almost indestructible, the plastic pail is an indispensable around our workshop and barn. So why not use it to collect the next swarm.

Parts

1. Plastic bucket with a lid – 5 gallon size works great
2. 1 square foot of window screen

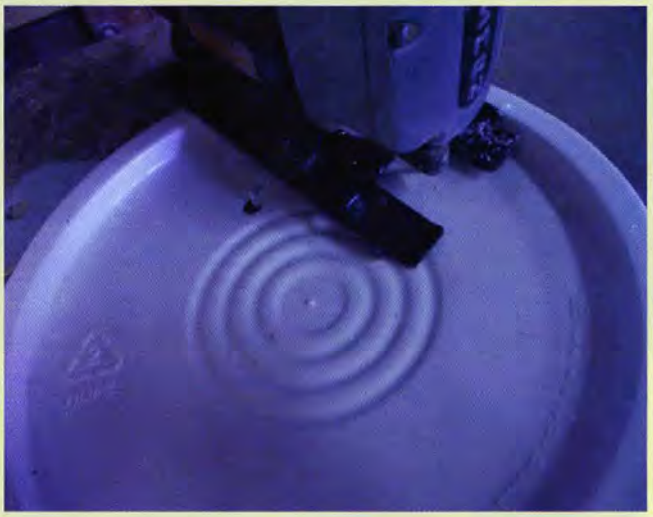
Construction

Step 1: Remove lid seal

A rubber gasket is almost always located under the locking rim of the bucket lid. Use a screw driver to pry the gasket out. There is no need to keep the rim hermetically sealed in when you are going to put a big screened hole in the top. The gaskets also seem to get in the way at the most inconvenient time.

Step 2: Cut a hole

Drill a starting hole in the lid, and then use your scroll saw to cut a bigger hole in the top. Make this hole as large as possible and still leave room to attach the screen. I use the outside rim of the lid to guide the saw. It makes for a nice neat hole.



Step 3: Remove some lid locking tabs

Note: Remove the locking tabs a few at a time. You want the lid to be easy to remove and at the same time be firmly attached when set in place.

Decision time: most buckets have locking tabs that make it very difficult to remove the lid. What you **don't** need is to be fumbling around with the lid while the bees inside are getting madder and madder. The best way to make the lid removal easier is to cut most of the tabs off while leaving a sealing ridge to keep the bees in. The buckets I've been using have eight distinct locking tabs. I completely remove every other one. This leaves four locking tabs. One at each corner. (Did you know that circles have corners?)

Then I also cut all but 1½" off of the remaining tabs. This makes for a very easily removable lid that will still stay locked in place when closed.

Step 4: Clean up cuts

Use some sandpaper or a utility knife to clean up the ragged edges on the cuts you made. Now isn't it pretty!

Step 5: Fit window screen

Use the lid as a pattern and cut the window screen to fit inside the top ridge.

Step 6: Staple screen over hole

Staple the screen to the lid. Use long enough staples to allow you to crimp the staple on the reverse side of the lid. A ½" staple works great. You can staple the lid into your workbench or a piece of soft wood and then pry it off with a screw driver.

Step 7: Crimp the staples

Turn the lid over and crimp the staples so they will hold the screen in place.

That's all folks, ***Happy Hunting***.

Thoughts

In addition to having a simple swarm collection bucket that is always ready, you can use it to carry equipment when the need arises. BC

SELL!

Eric **Schmiedlin**

What works, what doesn't for me.

I just finished reading an article that recommended to us beekeepers that we should report to the universally respected IRS *all* of our honey sales – this way when we get audited, we'll have followed procedure in regards to CYA. Saving on real estate taxes because of the resultant agricultural classification might be another good reason to show the income.

Some will tell you that it takes 100 hives to be considered a sideliner – well I, for one, don't feel like working *that* hard. I feel pretty happy that six hives and about 100 maple syrup taps produced gross income of over $5000.00 last year. Certainly not a living in these days of $4 gasoline but, a sideline income.

Rule #1: Don't give it away! It really galls me to see someone selling a labor intensive product cheap – as if their time is valueless. Your potential customers are the very same people who will pay an appliance serviceman $75 just to show up, and think nothing of it. They most likely can afford to pay you $7.50 for that one pound jar of *local* honey that contains the *local* pollen and is labeled with your name and *local* address.

Rule #2: Make it worth more!

Rule #3: Offer diversification!

Rule #4: Combine rule #2 and rule #3.

Through the years, I've had the opportunity to attend several club meetings where the "elders" taught the newbees how to make candles and lip balms, infuse flavorings into their honey, and produce cream honey. These are things that provide diversity and produce added value. Joe Beeman may give Mary Farmer a "free" five pound jar of honey after providing pollination services. But, she still may be interested in tasting your "own hand picked wild raspberry flavored cream honey." And, if she thinks it's yummy, she may part with some cash for a 12 oz. jar. And, she may want a jar of that jalapeno pepper infused honey "like that last person got 'cause hubby loves to barbeque and it would make a great birthday gift."

In our area, the local clubs work with the county fairs in providing agricultural display and judging of entries of hive products, honey baked goods, etc. In exchange the club members sell their honey as a group, with prices set by the club, so that all are on a level field. Pricing exceptions are custom products, a couple of which were named above. The club gets a percentage, which keeps our dues low, and which I consider rent.

Sample bottles are provided by each member, and sample spoons, purchased from a restaurant supply store, are provided by the club. The fairgoers are often surprised by the variations in taste, both by apiary location and the season. If your club sells at the local fair, work the sales booth even if you're not selling your honey. It's a good way to get yourself into the comfort-zone of talking with strangers. Also, it's a great opportunity to learn from your elders, even if they are younger than you. Among other things, you can learn how to answer the more technical questions with the knowledge you have.

On our farm we have plenty of wild raspberries growing and their tartness works really well with the honey's sweetness. We also have lots of lemon balm around – some in places where it is not really welcomed by Sharyn. Those are the first two infusions I tried, and quickly saw they had no sales competition. They sold out, even with their higher price. (Eight oz. of honey sold for $4.50, and six oz. of infused sold for $6.50.) At last years fair, I offered eight types, most in two sizes. My best seller was the jalapeno, which sold almost double the number of bottles of my regular honey. If people liked it, they had to buy mine.

In addition to the fair, I sold at a farmer's market (eight weekends) and at 16 craft fairs, which are usually fund raisers for churches and schools. Some are much better than others, and getting show suggestions from other vendors is helpful. In Northeast Ohio, there is a promoter who publishes a booklet listing over 450 shows with the contact person, cost, number of dealers, etc. This allows you to plan far ahead. You will definitely want to keep yearly notes, as some of the better shows will sell out their spaces four to five months in advance.

Shows with twenty or thirty sellers sometimes will be better than ones with 80 or 90. Even the big show will generally only have one honey seller, but may have twenty people selling knitted goods.

Let's revisit rule #3 – offer diversification. This is just really another way of saying, "The more stuff you throw on the wall, the more stuff will stick." But keep in mind, not all stuff will stick, and some stuff will stick at one show, but not at another. At an ethnic church, we sold more regular honey, while at a suburban high school, more variety sold. Lemon balm has been a steady seller, but pineapple sage has not done well. The jury is still out on licorice mint – those plants came from a fellow club member. I use my own herbs to infuse the honey – people seem to be impressed with that.

The husband of one of the "elders" who had taught herb infusion, came up with what I thought were some nifty bee sayings and illustrations on tee shirts. I borrowed

some of their inventory, thinking they'd be a great tie-in, but I didn't sell one.

My first wax product was the firestarter/decorative pinecones. They have done okay, and they class up the display. I thought that some hand-dipped candles would do well at craft fairs, but I was way wrong about that. On the other hand a three ounce chunk of wax with a screw imbedded has been a good seller. We all know the lubricating value of beeswax, but it being used on bagpipe valves and as a dreadlock dressing continues to provide fodder for conversation.

Rule #5: Keep It Simple, Silly! Your potential customers will feel more comfortable if things are coordinated and your display is well signed. Most of our infused honeys are in six oz. and 12 oz. bottles, everything else is eight oz. and 16 oz. With the exception of the less expensive Wildflower Ambrosia (regular honey), all the six oz. and eight oz. bottles are the same price, and all the 12 oz. and 16 oz. bottles are the same price. Each type has it's own cap color – both sizes and the tester bottle. Once a customer makes their taste choice, it is simple to pull the right bottle off the shelves. All labels use the same color field ink, with the type-name printed in its specific color.

Rule #6: Stand up, offer samples and talk it up! Each person walking by should be asked "Would you like a taste of local honey? or "Would you like to hear about my honey?" Now of course, this is a big departure from the standard retail selling procedure, where you never ask a yes/no question – but I haven't come up with anything better. If the browser shakes their head no, and if the opportunity is right, I'll respond with "You're sweet enough already, right?" They will usually laugh, or at least their friend will get a good chuckle. "We produce our honey in Eaton Township, right off Rt. 82." A lot of city folk don't know where Eaton is, but Rt. 82 is long and they have an idea where it runs. "Here's a picture that shows some of our hives," I tell them pointing to a bucolic scene of several hives which are in front of a split rail fence, and the Spring green trees go on as far as the eye can see. It is one of several 8x10 computer prints which are displayed in plastic sleeves and taped to the front edge of the table.

At this point, a taste or three is a natural follow – especially when I pick up a clean sampling spoon and put it in their hand. A dish of fresh spoons should be near the sample bottles, and a receptacle should be nearby for the used ones. "Do you put it in your tea? On English muffins? Corn bread? Use it for bar-bee-que?" I'm looking for a clue for which type sample to offer. A good percentage of the tasters will buy. Even one small jar is good by me, since six oz. of product @ $6.50 provides a better return than 12 oz. @ $9.50. I had several people suggest that the jalapeno infused honey would be great on corn bread – after that, I made that suggestion to the potential customers. By offering possible uses, the idea light goes off, and you've made another sale.

A few people will ask how the bees are doing, having seen some of the news stories. Some are aware of the mite problem. Just tell them what you know – "The industry is making a real effort to solve these problems." Most aren't looking for a scientific explanation, they just want to be reassured that nature has a chance. You also have opportunities to talk to potential keepers, and they are usually happily surprised to find out that the club offers classes.

I keep pretty detailed sales records, and in January I worked the numbers. Am I really making money? Yes, and by the hour it is low, but as my farmer's market friend says "Its more than you left home with." At one farmer's market, after advertising expenses were met, they quit charging rent. The hours were only 11 am to 2 pm, and I averaged $149 for six dates. At other venues, the rents ranged from $10 to $55, which translates to a range of 9% - 24% of gross. The 9% rent was $15. This small show with only about 20 vendors produced $171 in sales. The 24% rent was $55 with $226 in sales. This was a larger show with about 90 vendors, and had been recommended by another dealer the previous year. The next rent down was $50, which was 14% of the $352 in sales. This show had 130 vendors.

One thing your records *must* tell you, is which shows are the stinkers – we had five last year, where we won't be going back. Another important lesson from your sales records is determining which types sell in which sizes, and therefore when you'll need to produce more. In my case, the six oz. herb infused honeys sold nearly three to one compared to the 12 oz. size. However, the eight oz. and 16 oz regular honey sold nearly the same.

Happy selling! BC

Eric Schmiedlin and his wife Sharyn keep bees, sell honey and live in Northeast Ohio.

Removing Bees

Richard **Flanagan**

Have help, be careful, and know what you're doing.

It all began with a seemingly innocent question: Can you help me with some bees? From there I began a long and joyful journey into the world of honey bee removal. I'm a member of a local beekeepers club that meets monthly to discuss bees. At one of these monthly meetings the topic of bee removal came up. Almost our entire club members could, in a flash, drive out to capture a swarm off a tree or shrub. However, there was only one in our club that would foolhardily attempt to remove bees from structures. Now that individual was retiring and moving away. The calls still came in for removals but unfortunately we could not assist the panicky homeowners.

Supplies

Vacuum
Vacuum Bucket With Hoses
Ladders (3)
Power Cord
Saws, Electric And Hand
Pry Bars
Hammers
Nail Pullers
Pliers
Screw Drivers
Netting
Buckets (clean)
Wash Bucket With Water
Pump Sprayer
Poison Powered and Liquid
Flashlights
Shovels
Garden Hose
Cameras
Invoices
Business Cards
Honey in Jars
Tupperware/Sealed Containers
Change of Clothes/Shoes
Steel Wool
Hive Tools
Smoker and Fuel
Ax

Then one day at the bee meeting a fellow beekeeper asked if I could help him with some bees. I assumed it was to help move or maintain some existing bees. He had volunteered to remove bees from a home and needed some help. I was very hesitant. I had been keeping bees for a short while and had no true bee removal or even swarm catching experience. My friend Charles said it was going to be okay – he just needed an extra hand. Charles had been a carpenter for 40 years so he knew a lot about how to build and remodel homes. He could provide the knowledge on how to get to the bees but he needed another beekeeper for the grunt work like hauling buckets, ladders, saws, etc.

The first job involved a home that was going to be demolished. The local contractor crew was at a stand still waiting for a beekeeper to remove all the bees. We had permission to remove all the exterior walls with no consequence of damage to the structure. It was like a dream. We got to tear up a home and not repair it. After a few minutes we had the bees exposed and shortly there after had them in a box. We learned a lot that first bee job – bring more buckets! Don't try to hive the bees there. Bring more than you think need. In the end the contractor walked up and handed us a check. A check for tearing up the house and getting bees!

It was unbelievable! We got the bees, the honey, the wax and a check! We thought we were rich.

As the weeks and months passed we got more and more bee removal calls. Each job we learned more and more. Here is a sample list of what we consider the basics we carry on the truck each time we go out on a removal.

The most important item to bring is not on the list. You may think first aid kit or maybe a cell phone would be the primary tool. The most important tool to bring is another beekeeper. Do not attempt to go at it alone.

I can not tell you how many times I have been at my wits end trying to remove some bees and was thankful for the assistance from another beekeeper. You can easily get overheated, tired, or even angry in the hours spent removing bees. To have another individual there to take up the slack and give help is not only wanted but needed.

The jobs soon came in fast and furious.

We calmed many a homeowner down by carefully explaining the removal process. So many homeowners think that the bees had caused damage to the home. Most of the time it is a wood pecker, or squirrel hole that appeared first then was taken over by the bees by moving into their new home. Water damage and rotting eaves are a prime spot for bee scouts to relocate a swarm.

We had to educate the homeowners on the benefits of bees. Most of the callers had wrong or misguided info on the bees. Each call began with an interview. How long have the bees been there? Are you sure they are bees? We asked these simple questions because many a time we have traveled miles and miles to find a hornet or yellow jacket nest instead of a thriving bee hive.

After we have determined that they are bees and having permission to remove them from the structure we pack up the truck.

We pack the tools, water coolers, good maps and directions plus epipens. We are not allergic to the bees but in the removal process innocent bystanders may come in contact with bees and we have to be prepared.

We carry a simple waiver form for the homeowner to sign giving permission to remove the bees. It allows us to take apart, cut, remove, etc the outside structures to remove the bees and wax. We also have a standard invoice with the details on costs and supplies needed to remove the bees.

Most homeowners are so scared or frightened that they stay inside their homes during the removal process. But with kind words and reassurance we are able to coax them outside to see the bees and honeycomb as we extract it from the homes. Each and every removal is different. A job you think will take 20 minutes ends up three to four hours and the hard job can go by in a few quick minutes. Most average about one to ½ hours per job so with travel time a job can last two to three hours.

We try to remove the bees earlier in the morning or most often late in the afternoon. The reason is most field bees will be home and makes the removal easier when we can get all or most of the bees. We remove all outside structure wood, aluminum, shingles, drywalls etc and then carefully cut the comb out We found out by placing a five gallon bucket it makes it easier to remove and transport the bees home.

We place paint strainer netting over the buckets to keep in the bees and allows them to not over heat in an enclosed bucket.

We also share honey and pieces of comb with the homeowner and their neighbors since most have never seen a bee up-close.

After tasting the honey many ask about setting up a hive in their yard. Where do you take classes on beekeeping? Most of our last two beekeeping classes where made up of people who had bees removed from their homes and got interested in bees.

We have had accidents, dropped buckets, broken tools, rain delays, etc. We try not to rush the jobs but make sure we take care of not only the bees but each other as we remove them. Occasionally we have to go inside and cut the interior walls.

We have gone thru roofs and under houses to reach the bees in brick work thru all types of wood, stucco, and mortar walls.

We have had to turn away jobs because the monetary cost to remove and fix the damage in the removal process is so high it is not feasible for us or the homeowner. Sometimes we can't get the bees. We leave it up to the homeowner. Live with the bees or hire an exterminator. We don't like the last option but sometimes it is in the best interest of the homeowner.

After we have scraped the last wax and the last bee into the buckets and placed them on our truck we go back to the opening where the bees had lived. You will find that most of the time there are a few bees left scurrying around lost and confused. We take a local pest control liquid and with a pump sprayer soak the opening, walls, etc., where the hive was originally. Then we toss in a few cups full of powered pest control poison. This is done because when we leave that afternoon a few field bees will return, they will stay for a day or so. The homeowner is anxious to repair the opening but can't if field bees are there. So the poison does two things: first eliminates the few field bees and also keeps away any scout bees from relocating a swarm there. This allows the homeowner to arrange for someone like a handy man to come and repair the opening we made during the removal process. We remind the homeowner and handy man to fill the cavity with insulation and make sure to seal it completely because if it was a great place once sure enough another scout bee would find it for another hive. The least we have removed in buckets of bees and honey has been ½ a bucket, the most is over 10 buckets which weighed about 400 pounds.

We take the full buckets of bees and wax home. Most removals average about three to four buckets per removal. Sometimes we hive the bees into a new home or assimilate them into other hives. We collect the empty comb to remelt into wax bars for sale. We save the propolis and send that off to be reimbursed by a pharmaceutical company. Over all we make money from the removal, from the honey, wax, and propolis collected. The policy with us is if you help in the removal process you share in the rewards, be it free honey, bees and a slice of the check.

We follow up with a call to the homeowner after a few days to make sure they are completely bee free and 100% happy. We have had to go back once in a while to remove small cluster of hanging bees left over from previous job. We have averaged about 50-60 jobs per year. We use to work just three or four months April to July. Now we are working 12 months even in the cold of January and the heat of August.

The costs for tools can be minimal since you will have a lot of them already like bee veil, buckets, etc. Remember, it is a learning experience. Keep records of locations, time and travel, number of buckets of bees removed, charges invoiced and paid. Soon you will find that you will be making a little profit but the rewards are more than money. BC

Richard Flanagan and Charles Stewart have been removing bees successfully for five years and still are learning the art of bee removal in the Carolinas.

May – Busy Bees And Busy Beekeepers

Ann **Harman**

Spring Is The Busiest Time Of The Beekeeping Year

When you travel around the United States you will encounter several different climates. The eastern part has a wide band of a temperate climate – cold Winter with some snow, mild Spring full of flowers, hot Summer, pleasant Autumn, all with moderate rainfall. Here is an ideal climate for our bees. The queen has a rest in early Winter; Spring produces great honey crops but the urge to swarm is present; Summer brings honey harvest and Autumn flowers allow the bees to stock Winter food.

The beekeepers' Spring season is the busiest time of the beekeeping year. So many tasks need to be done during April and May plus the flower and vegetable gardens are demanding some of our precious time. Birds are nesting and want full bird feeders; humming birds are returning north and searching for nest places near our syrup feeders. Bears are hungry from their Winter sleep – is your apiary bear fence in good shape? Those two-year old males that Mama Bear just tossed out may well encounter your beeyard in their wanderings for their own territory.

At this time of year we love to quote an old adage. I'll bet you have no idea of its source. Back in 1557 Thomas Tusser wrote *A Hundred Good Points of Husbandry, A Farmer's Daily Diet.* For *April Husbandry* he wrote "Sweet April showers/Do Spring May flowers." We tend to misquote that a bit today. Interestingly, he also wrote in the same book "...Christmas comes but once a year."

So May can be the big bee-flower time. Throughout the eastern regionof the U.S. the black locust (*Robinia pseudoacacia*) can be flowering profusely. Beekeepers and bees alike enjoy the sweet-smelling, but fragile, blossoms. This tree, given ideal blooming conditions, has the potential of yielding an exceptionally large honey crop, more so than other plants. Our dreams of a huge crop of desirable locust honey frequently turn into nightmares when Mother Nature delivers wind and rain. The ground seems almost snow-covered with the downed white blossoms.

Fortunately the weather seems to settle as the month of May progresses. The once-reliable tulip poplar (*Liriodendron tulipfera*) in recent years has not produced as large a honey crop as it once did. But the brambles (*Rubus* spp.), blackberry and raspberry, are blooming both in our gardens and in the hedgerows. These have only a moderate potential for a large honey crop but are plentiful enough in some areas to produce a good harvest. We will also find all kinds of cherries (*Prunus* spp.) in bloom. Bee pollination of the wild cherries, like chokecherry (*Prunus virginiana*) benefit wildlife. In the warmer regions the American holly (*Ilex opaca)* can be found in abundance. In those areas a good honey crop can be expected.

Dandelions (*Taraxacum officinale*) will always be with us, along with white Dutch clover (*Trifolium repens*). However if you live in an urban or suburban area these two plants are under attack by lawn services and others who want a perfect, smooth, green lawn. It doesn't matter that the clover actually improves the soil. Both plants benefit bees and in areas where the clover is plentiful a good crop of honey can be made. Blooming can be enhanced if the white Dutch clover is mowed when the blossom corollas turn downward; no nectar is being produced.

In some areas where fields have been left idle a vast expanse of yellow blooms can be seen. These are probably one of the Brassicas called yellow rocket. Bees can make a honey crop from such large areas, although the honey may not be popular with customers used to a mild, clover-type honey.

May is too early for many crop plants. Strawberries could be in bloom but these blooms do not yield enough nectar for a honey crop. In some parts of the country canola may be in bloom. A good honey crop can be made if the beekeeper pays attention. The honey can crystallize rapidly in the comb and be too difficult to remove. May is also too early for the various herbs and garden plants that could contribute a little bit to a honey crop.

Dandelions (Taraxacum officinale).

White Dutch clover (Trifolium repens).

So is it time to get honey supers on your hives? I hear experienced beekeepers saying: "white wax – time for supering." White wax? What is it? Bees are quite aware when the strong nectar flows are beginning. Beekeepers are usually digging the garden or watching TV – too busy to notice those early blossoms. The bees are indicating that comb must be built to store the forthcoming nectar. So newly-made wax, almost white in color, is being stuck in various places in the hive, such as on top of the top bars. That is what the beekeeper sees.

Can we assume your honey supers are ready to put in place? Those who are good members of the Procrastinators Society (prosoc.wikidot.com) will suddenly be up half the night getting them ready. Now just how many honey supers to put on each hive? Beekeepers have their own answers to this question but we are going to take a look at what is happening from flower to honey jar.

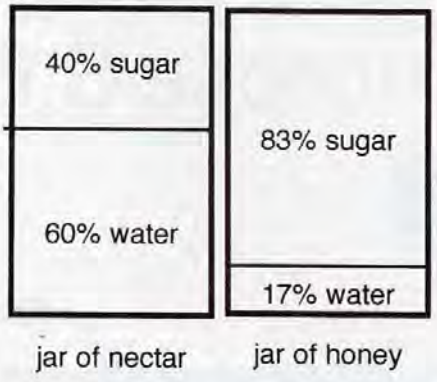
Research has shown us that bees respond to empty comb. The more empty comb the stronger the urge to fill it. If you have only foundation to offer the bees you will lose a bit of your crop. But a strong nectar flow encourages the bees to draw out foundation. They need somewhere to put all that nectar. Depending on the weather and the abundance of nectar, the loss may be negligible

We are being encouraged to renew brood nest comb every couple of years to reduce effects of contaminants. Some beekeepers whose equipment allows them to use honey-super comb in the brood nest boxes are using some of that drawn comb for renewal. Therefore, some honey supers may have just foundation. A new beekeeper, of course, will have all frames with foundation. Take advantage of a strong nectar flow to achieve good drawn comb.

Nectars from about one thousand plants have been examined. The sugar content ranges from five to 80%. Bees prefer nectars with high sugar content, generally 30-50%, but such plants may not always be available to them.

Honey is generally considered to be safe from fermentation at a water content at or below 18.6%. So when we see capped cells of honey we assume that the bees have evaporated enough water to prevent fermentation. Unfortunately sometimes in highly humid weather the bees will cap honey slightly over 18.6% water.

So let us take a look at a jar of nectar and the same size jar of honey. For ease of comparison nectar of 40% sugar and 60% water and honey of 83% sugar and 17% water will be chosen. Take a good look because we are going to use these diagrams to decide our supering.



Now I would like you to imagine those jars as honey supers. For example, you have put one super on your hive. The nectar flow is increasing rapidly. Your strong field force is busy bringing in nectar and it is being stored. Sixty percent of that comb, that super, is filled with water.

The house bees are working as hard as they can to evaporate that water down to 17%. But the plants are still producing profuse nectar. Where are those bees going to put it? When there is no more room, collection will decrease or almost cease until the house bees can evaporate water and consolidate the honey, making room for more nectar.

In the meantime weather conditions could halt blooming or prevent bees from collection. With such a scenario it seems that you will harvest only a small amount of honey. A bit of very rough arithmetic will be done here. Seventeen is sort of close to 1/3 of 60. (Don't be picky. I'm trying to avoid all sorts of awkward fractions and decimals.) With that one super on, collecting nectar of 60% water, bees evaporating it down, you have just harvested about 1/2 of a super.

So let's put on two (or more!) honey supers all at once. Now we have lots of empty comb to stimulate hoarding and a place to put lots of nectar. Using that very rough arithmetic, from this approach you will harvest a full super of honey.

Maximizing your honey harvest does take paying attention. Unfortunately in our busy schedules, especially in "...the merry month of May." (1598, Richard Barnfield), we tend to ignore some of the signals for our honey crops. We do know that global warming is having an effect on the flowering of plants, especially trees. In the temperate zone they are blooming earlier than they were 20 or 30 years ago. Blooming date information found in beekeeping books may not have kept up with changing dates.

Of course weather is another factor. Beekeepers need to monitor their plants. Early warmth and sun may be followed by a late hard freeze. You welcome rain for your garden but think about the bees kept from collecting nectar.

Don't forget the health and strength of your colony. The larger the bee population, the larger the field force. With all the problems facing honey bees today, beekeepers need to keep current on advances in *Varroa* control as well as information about good nutrition. Read, attend meetings.

Are those empty supers ready yet? Good. Go put them on. BC

Ann Harman is busy this Spring taking care of her bees at her home in Flint Hill, Virginia.

Buckwheat

Plant some this year

Connie **Krochmal**

The common buckwheat is an exceptionally fine honey plant. Bees are very fond of the flowers. On the average, an acre of buckwheat can bring 150 pounds of honey per hive as well as a crop of grain.

Background Information

The Latin name for this plant is *Fagopyrum esculentum*. This fast growing, vigorous Summer annual has escaped from cultivation and naturalized in some areas of the country. Buckwheat has many common names. These include fat hen, French wheat, willow-wand, heathen corn, Tartar corn, Greek corn, and Saracen corn. It is also known as brank – a name used in both Britain and the U.S.

The sharp edged seeds remotely resemble beech mast, which is how it came to be called beech wheat. Another name, heath corn, comes from a German term, heiden korn. Both the Latin name for the genus (*Fagopyrum*) and the common names refer to the beech-like seeds. The name buckwheat could have come from various sources, and was possibly based on a German word, buche, which means beech. Others say it is derived from boc, an Anglo-Saxon word for beech, and whoet for wheat.

Long used both as a human and animal food, this is considered a pseudograin since all true grains come from grasses. The plant is a member of the buckwheat family. All parts of buckwheat are useful –even the hulls and straw. The flour is used for a long-time favorite – buckwheat cakes, which are an especially common American dish. The grain is a popular side dish among certain ethnic and immigrant groups. It is also prepared as a porridge or breakfast cereal.

History of Buckwheat

This species is native to northern and central Asia. It still grows wild in China and Eurasia. Buckwheat was grown in China prior to 1000 A.D. It was introduced to Europe in the 1500s. This was also a fairly common crop in Britain during the 16th and 17th centuries.

Early on, this was introduced to the New World by colonists. It was especially popular in New England. This was grown in the Dutch colony of New Amsterdam on Manhattan Island in the 1600s. It was most commonly grown in the northeastern colonies.

Right after the Civil War, the peak of production was reached in the U.S. In the 1920s there was close to a million acres in cultivation with nearly half of that being in New York.

Beginning in the 1950s its popularity in America began to waver for a number of reasons. One factor was likely the advent of chemical fertilizers, which allowed farmers to begin using marginal, poor, infertile land for more profitable crops. In addition, other animal feeds, such as alfalfa, largely came to replace buckwheat. At any rate, the acreage fell below 60,000 by the early mid-1960s.

As it happens, this rapid reversal didn't remain permanent. In fact, there was a revival of interest as the public demand for health foods and breakfast cereals began developing from the 1970s onward. At that point, demand among the Japanese also skyrocketed as they love buckwheat noodles in particular.

Description of Buckwheat

This species reaches three feet in height. The freely branching, erect plants have reddish, somewhat hairy stems. The alternate foliage is large, up to three inches long and nearly as wide. The leaves can have long petioles. The dark green foliage is long and pointed. It can vary in shape from triangular to heart-shaped and arrow-like.

Typically the first blossoms begin to appear about 30-35 days after the seeds are planted. This will flower and fruit until frost kills the plants. Buckwheat contains both self-fertile and cross-pollinated flowers. Each plant only has one kind of bloom.

The self-fertile blossoms don't set seeds until very late in the season. They won't yield as much grain as the cross-pollinated flowers. Though pollination is largely considered beneficial, some Pennsylvania studies found that this isn't essential.

The majority of the blossoms emerge from the upper part of the plant. They open mostly from the axils and terminally in dense, long-stalked clusters.

The calyx consists of five petal-like sepals arranged in a whorl. Though they're often white, the sepals can also be pinkish-green, greenish-white, or rose. Most flowering occurs from July onwards. However, most nectar is collected in August. The nectaries are in groups of eight or nine. They're located between the stamens at the base of the ovary.

The triangular, bright brown seeds can be shiny or dull. These can be smooth or rough. They're 1/3 of an inch long.

The two flower types also differ by containing different sized pollen grains as well. The color of the pollen varies from yellow to brown. Some reports indicate that the dried pollen is potentially toxic to bees.

Climate and Growing Conditions

Buckwheat is suitable for various regions of the U.S., especially New England and the North. It is commonly grown in New York, Pennsylvania, Wisconsin, Minnesota, North Dakota, Ohio, and Michigan. It is also suited to most of the states within the Appalachian region.

In order to bear a grain crop, this requires a growing season of 90 days. It is well suited to cool moist climates. Buckwheat does fine at high elevations provided the growing season is long enough. This plant can't tolerate even the lightest frost. Both ⇨

Buckwheat seedlings in a California vineyard serve as honey bee forage in an otherwise inhospitable surroundings, and, when bloom is finished, can be plowed under to help with soil conditions.

heavy soils and hot dry conditions are undesirable.

Buckwheat is adapted to a range of soil types so long as it contains adequate moisture and isn't poorly drained. While this is adapted to poor, infertile soils, it thrives in well drained, sandy and loamy soils. Disliking limestone soils and heavy clay, this will tolerate much more soil acidity than most cereal crops.

Growing Buckwheat

For best results, beekeepers can make successive sowings two to three weeks apart. Do a total of three to four sowings. This method provides bees with plenty of forage for the Summer months into the Fall.

Though the seeds can germinate in a relatively cool soil (a minimum of 45°F.), the real limiting factor is late Spring frost. Typically planting is done from the last week of May through July 15th. Sow at the recommended rate for your area if you expect to harvest a grain crop in addition to the honey.

Generally, 40 to 50 pounds of seed per acre is recommended. The seeding rate can be increased slightly for those varieties with larger than usual seeds.

Sowing can be done by broadcasting and disking. A grain drill with 12-18 inches spacing is also suitable. The optimal sowing depth is one to 1½ inches. Sow seeds that are less than a year old. Germination takes about three to seven days.

A soil test will indicate whether fertilizer is needed. Though buckwheat generally has few insect and disease problems, there are some potential pests. These include aphids, Japanese beetles, and wireworms. The most common diseases are fungal leaf spot and root rot. Regarding weeds, buckwheat can often outgrow and smother most weeds.

Silverhull Buckwheat

There are a wide number of buckwheat varieties. Two of the main ones are Japanese and Silverhull.

Silverhull is an improved variety. The plants are smaller than Japanese buckwheat. They also have smaller foliage and seeds. The shiny seeds are nearly round. This variety is named for the color of the hulls.

Japanese Buckwheat

This heirloom variety has been around since at least 1890. Very popular in the U.S., this is noted for its very large, rich brown, triangular seeds. This very productive plant can yield two to three times more grain and straw than ordinary buckwheat.

Very fast growing and quick maturing, Japanese buckwheat provides the best yield in light, well drained soil. This also tolerates more soil moisture than most cereal crops. Very sensitive to frost, it won't germinate until the soil is warm. The tall plants are coarse. These have arrow-shaped, large, two-inch-wide leaves.

Other Buckwheat Varieties

A number of other varieties are also grown in the U.S. One known as New Type gives a very high yield. This has large kernels. The plants are stout and heavy.

Common isn't as uniform as some varieties. This variety yields seeds in a range of sizes from small to medium with the weight varying as well.

Kaneko is an heirloom Japanese variety. Three feet tall, this gives a

high yield. It is the preferred type for Soba noodles in Japan. The grain crop is ready to harvest in 95 days.

Mancan was released by Agriculture Canada in Morder, Manitoba. Introduced in 1974, this grain is ready to harvest in 80 days. The medium to tall plants usually have white blooms. The grain yield is above average, and the seeds are very large but somewhat lightweight.

Manor was released in 1980. This is quick growing and very vigorous. An extremely productive type, it can yield 1000 pounds per acre. It was released by Agriculture Canada. Though the seeds are considered to be relatively lightweight, this is a popular variety among consumers.

Pennquad was released in 1966, and was bred for USDA by Dr. Harold Marshall at the Pennsylvania Agricultural Experiment Station. This large seeded variety is resistant to lodging. The seeds are large and uniform in size. This variety is a favorite for milling.

Spanky is one of the best varieties for buckwheat cakes. This improved variety is ready to harvest in two to three months.

Tempest was released in 1971 by Agriculture Canada. It bears small, heavy weight seeds. This was selected from a lot of seeds from Russia.

Tokyo was bred by Agriculture Canada from Japanese plants. The seeds are small but heavy weight.

Winsor Royal was released in 1982 by Winsor Grain Company of Minneapolis, Minnesota. This bears large, rather lightweight seeds.

Buckwheat as a Honey Plant

In general, most of the total sugar content will be secreted by the flowers during the first couple weeks or the first half of the flowering period. Buckwheat reaches its flowering peak, and then slowly diminishes as the season continues. The flowers can bloom up until November, depending on frost and the time of the grain harvest.

Typically, the plants will yield nectar mostly in the early part of the day, and cease at around 2:00 p.m. Beekeepers should be aware that the bees can become irritable in the afternoon once the flowers halt nectar production for the day. The nectar flow is very much affected by the weather, climate, soil type, and growing conditions. Optimal levels of nitrogen, phosphorus, lime, and moisture can increase the nectar flow by 20 to 50%.

Buckwheat is one of the most reliable honey plants in the Northeast and northern U.S. Over the years, the most productive states have been New York, Pennsylvania, Ohio, and Michigan. On the other hand, it isn't always a reliable bee plant in the West.

Cool nights, warm days, and moist conditions bring heavy nectar flows. A mean temperature of 70° or below is ideal. Hot dry weather can cause nectar flow to cease or the flowers to abort. Windy conditions are also unfavorable. On the whole, sandy soils yield much more honey than heavy clay and limestone soils.

Buckwheat Honey

Usually in short supply, buckwheat honey brings a very high price. Bakers like this because it keeps baked goods moist. This is widely used for honey cakes. In France, it is the top choice for gingerbread. Buckwheat honey is preferred for mead and beer.

This honey is so thick and heavy bodied that it resembles molasses. The consistency makes it hard to extract. Slow to granulate, this crystallizes with coarse flaky grains. It is so heavy that it can weigh 14 pounds per gallon.

Though the color can vary somewhat, buckwheat honey is typically very dark, almost black. However, it can also be light to dark brown, dark amber, purple, or reddish.

This has a characteristic aroma, which is also present in buckwheat fields and the apiary. The flavor is very distinctive. Strong and sharp, it can taste bitter and burnt. BC

GLEANINGS

MAY, 2011 • ALL THE NEWS THAT FITS

OBITUARIES

James Ray Baxter, 60, passed away December 11, 2010 in Conroe, Texas. James was a resident of Spring, Texas for the past 10 years, prior to that, Mission, Texas and Baton Rouge, Louisiana. Memorial services were held January 8 at 11:00 a.m. at St. Mark United Methodist Church in McAllen, Texas.

James is survived by his wife, Phyllis, his two daughters, Amy Brown and Beth Baxter, both of Spring. James was born May 3, 1950 in Mercedes, Texas to Robert and Elizabeth Baxter, and grew up in Edinburg, Texas, where he graduated from Edinburg High School. James held the rank of Eagle Scout in the Boy Scouts of America. James graduated with a Bachelor of Science in biology from Pan American University.

James was a beekeeper for many years. James worked for the USDA-Agricultural Research Service in the

Honey Bee Genetics Research Lab in Baton Rouge, Louisiana and at the Kika de la Garza Research Center, Honey Bee Research Laboratory in Weslaco, Texas. he was a well-respected research, whose area of specialization was honey bees.

Richard Gannon passed away February 10. He was born in Stockton, CA August 2, 1940 to Elwood and Eileen Gannon. His schooling was accomplished between Redding and Chico, CA. He graduated from Chico High School, Shasta College, and Simpson University.

He married his high school sweetheart, Joan Richmond, on June 18, 1960 and was drafted into the U.S. Army in 1963.

Upon discharge from the army he entered the family business and set his goal of becoming a commercial beekeeper operating Royal Air Force Apiaries. He was involved in many beekeeping associations and activities. In 1982 Richard was president of The California State Beekeepers Association and in 1991 he was awarded the Beekeeper of the year.

In 1973 Richard moved his family to Redding for permanent residency and quickly became involved in his community. He served on the Centerville Volunteer Fire Company, Grant School Board, the Shasta County Board of Education, and was a charter member of Westside Church of Redding. He thoroughly enjoyed his work at All Saints Thrift Store, teaching English as a second language, and cycling and sailing with his friends and family.

Richard passed from the loving arms of his family into the arms of his Lord and Savior.

In passing he leaves his parents Elwood and Eileen Gannon, his wife Joan, his children Stephanie (Richard) Hermann, Peter (Christine) Gannon, and Marlo (Don McClintock) Gannon; grandchildren Lindsey Maier, Tyler Dodge, David Gannon, Steven Gannon-Carter, Dylan Hermann, Christian Data, Tristan Hermann and many close family members and friends. He was preceded in death by his granddaughter Sara Christine Rose.

AIA RESOLUTION MADE IN GALVESTON

The Apiary Inspectors of America (AIA) appreciates the action taken by USDA-APHIS to close the United States border to further introduction of honeybee queens and packages from Australia. Surveys conducted by USDA-APHIS and AIA members show that the Apis cerana honey bee and Slow Paralysis Virus which has been reported in Australia do not occur in the U.S.

At the same time AIA would like to express concern that APHIS is giving consideration to allowing honey bee importation from Argentina, Brazil and/or Chile.

Imported honey bees have been used to supplement domestic honey bees for almond pollination in California. However, the market is relatively small while the risk of introducing a new bee pathogen when most of the U.S. bees are in California could have widespread consequences. With U.S. bee losses of 32-35% attributed to viruses and other pathogens it would be careless to introduce a new problem.

AIA Wants: 1) USDA-APHIS PPQ protect American agriculture by keeping our borders closed to honey bee introductions until such time as science can identify the impact of viruses and other pathogens to beekeeping. And, 2) That USDA-APHIS PPQ enter into trade discussions with North American Plant Protection Organization (NAPPO) members encouraging NAPPO to unilaterally protect North American beekeeping from the risk of pathogen introduction into North America – especially NAPPO members to agree to uniform arguments on acceptance of queen bees and packages into NAPPO member states.

ASIAN BEE PROBLEMS CONTINUE IN AUSTRALIA

Australian beekeepers are becoming militant over the federal government's decision to abandon the attempt to eradicate invading Asian bees (*Apis cerana* – Java strain) now spreading in far north Queensland.

A new grassroots group, Food Security needs Bee Security, has organized a protest that will see beekeepers from around Australia drive their trucks and machinery to a protest rally in Canberra March 2.

They are angered by a decision from the Asian Honeybee National Management Group, which has voted to end the eradication program March 21.

One of the campaign instigators, Jodie Goldsworthy of Beechworth Honey Pty. Ltd. says Asian bees threaten to reduce the number of European honeybees which will mean fewer plants are pollinated, therefore reducing the volume and variety of food able to be produced in Australia.

"This is a food security issue and this campaign became really urgent because at the start of this month, the Australian government said it was abandoning attempts to eradicate the Asian bee," Goldsworthy says.

"The Asian bee had a severe impact when it was introduced to the Solomon Islands in 2003, reducing to just five the number of managed hives by the year 2008 – from a starting point of 2,000 hives," she says.

"It also disrupts queen rearing of the European honey bee which is essential for honey production and for hive build up required for pollination services. And it has a robbing

Continued on Page 75

Cont. from page 73

instinct, taking honey from hives, which means the European honeybee may starve."

The impact on the European honeybee will mean there will be fewer managed hives in Australia to pollinate all the food varieties which rely on bees for fertilization.

"This is not primarily about honey, it's about all food varieties which rely on bees," Goldsworthy says.

The Food Security needs Bee Security campaign is asking the Australian government to: immediately allocate A$10 million over two years to eradicate the Asian bee in Australia; implement the recommendations of the 2008 More than Honey report by allocating A$50 million annually to maintain healthy bee populations; provide funding for the establishment and operation of the Co-operative Research Centre for Bee Research and Food Security.

Goldsworthy says the campaign developed from a grass roots interest in food security and is supported not only by beekeepers and industry but also by food producers, food stakeholders and people interested in Australia's ongoing ability to feed its population.

The campaign is being driven by Goldsworthy and Max Whitten, adjunct professor, Department of Integrative Biology at the University of Queensland.

They say the campaign has the support of the Australian Honey Bee Industry Council and all of the state beekeeping associations.

The Victorian Farmers' Federation's horticulture group is supporting the campaign.

Group president Gaye Tripodi says the Asian bees needed to be eradicated before they wipe out the European honey bees in Australia.

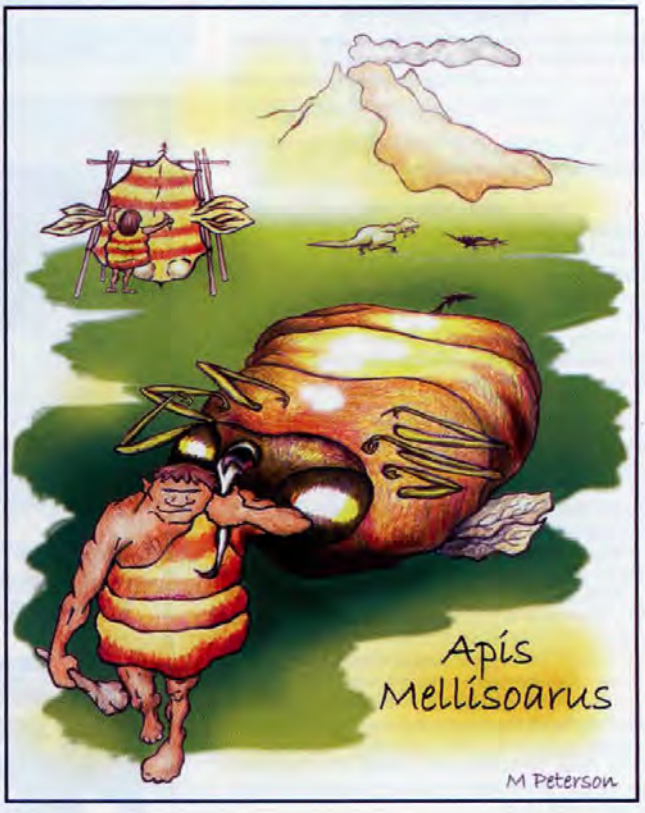
"Asian bees have the ability to attack European honey bees, which over time will reduce the number of European honeybees meaning fewer plants will be pollinated, therefore reducing the volume and variety of food able to be produced in Australia," Tripodi says.

"This campaign goes well beyond protecting the bee industry. As much as 65 percent of our Australia's fresh produce requires pollination by bees. Not only will our nation suffer, but our agricultural export markets will also be placed at risk."

She says the federation supports the call for urgent funding for the eradication to continue and urges the federal government to take immediate action.

"Beekeepers have played a key role in detection and eradication efforts of the Asian bee despite its wider impacts affecting pollination dependent crops, the environment, human health and amenity," Tripodi says. "Beekeepers need the support of the government and the wider agricultural industry to eradicate this dangerous species once and for all."

Alan Harman



Continued From Page 80

death could be attributed to a mix of factors in addition to pesticides.

The bees that entomb the cells are not the bees that collect pollen from plants, but are rather likely the housekeeping bees.

Pettis said it appears the pollen-collecting bees can not detect high levels of pesticides, but the pollen underwent subtle changes when stored.

A lack of microbial activity compared with pollen that has fewer pesticide residues may be involved in triggering the entombing effect.

Pettis said the bees are also sealing off pollen that contains substances used by beekeepers to control pests such as the *Varroa* mite, a sign these substances may also be harmful to bees.

"Beekeepers – and I am one – need to look at ourselves in the mirror and ask what we are doing when we use chemicals to control parasitic mites," he said. "It's a balancing act. If you do not control the parasite, bees die. If you control the parasite, bees will live but there are side-effects. This has to be managed."

All Party Parliamentary Group chairman George Freeman MP said where complex issues such as those surrounding bee health and agriculture are being legislated for it is very important that Parliamentarians are able to hear scientific analysis.

Crop Protection Association chief executive Dominic Dyer told the committee there are a number of stresses for bee health and he is disappointed pesticides are so demonized, including by some journalists who appear to be following the environmentalists' line rather doing their own research.

National Farmers Union (NFU) entomologist and horticulture specialist Chris Hartfield said the NFU took its advice based on sound science and the consensus on bee health was that there was not a single cause of poor bee health, although Varroa continues to be the common problem.

Lovett said there are six issues recognized within the association on bee health with pests and diseases always the biggest issue.

The others are the weather; habitat – getting enough food throughout the active season; bad beekeeping; regulatory control of treatments for *Varroa* and other diseases because bees are "food-producing animals" under EU law and any treatments are governed by the veterinary medicine regulations; and pesticides.

Lovett said the association takes a pragmatic approach to pesticides, recognizing that insecticides have to be used, but the stewardship of their use was of critical importance.

In principle, systemic insecticides such as the neonicotinoids should be a step-forward in reducing bee exposure, since they are not sprayed but applied to the seed.

Lovett said there was some lab evidence of a potential issue and that needs to be investigated, but ***did not*** *see a need to ban the products in the meantime.*

A question and answer session focused on the use of neonicotinoid and other systemic insecticides compared with the older chemistry.

Pettis said these products represent a newer class of insecticide that could be described as replacements for previous "dirtier" chemistry.

Lovett said that there were concerns about more subtle effects of this chemistry, but "heaven forbid" if farmers had to go back to extensive spraying to control the insects that they needed to control.

Hartfield said in the absence of neonicotinoids, it would be difficult to control pests in some crops such as sugar beet and such crops might become unviable as a result.

Pettis concluded that not only was there little evidence for any direct affects of the introduction of GM crops on bee health, the reduction of insecticides used on insect-tolerant crops, especially GM cotton, had undoubtedly had a positive impact on bee health.

Pettis said his research is in the process of peer-review with a scientific journal and will be published shortly.

"Despite the disparity between clear negative effects in the lab and no observable effects in the field, pesticides are not off the hook and we must continue to look at the level of exposure and the effects of exposure on pollinators."

Meantime, the Entomological Society of America said bees will be on the agenda at Entomology 2011 from Nov. 13-16, 2011 in Reno, Nevada.

One of the program symposia on the agenda is bee declines. Called Identification, Clarification, and Communication of the Real Truths, it is being organized by Rosalind James, Jeff Pettis, Theresa Pitts-Singer, and James Strange. BC

Display Advertisers

Jeff Goes Pettis To London

Alan **Harman**

Top level *laboratory* research showing low levels of systemic pesticides are impacting honey bee health but are *not* being repeated in the field.

Dr. Jeff Pettis, research leader at the USDA-ARS Bee Research Laboratory in Beltsville, MD, tells British Members of Parliament his research doesn't explain bee losses seen in the U.S.

Pettis was the first researcher to suggest a possible link between insecticides called neonicotinoids and bee deaths.

"The lab study certainly seemed very clear that low levels of pesticides were impacting on honey bee health," Pettis told the All-Party Parliamentary Group on Science and Technology in Agriculture at the House of Parliament in London.

"But when we look in the field we don't see the same results. Even in those colonies that were exposed to low levels in the field, we're not seeing outbreaks of the gut parasite pathogen that we saw in the lab."

All-party groups are informal cross-party gatherings of MPs with similar interests and have no official status within Parliament.

The MPs were looking at the continuing controversy into the systemic pesticides called neonicotinoids that can enter every part of the plant, including the pollen and nectar.

Pettis said he has found bees are more vulnerable to infections by the nosema parasite when they are in contact with microscopic doses of imidacloprid, the most popular neonicotinoid, manufactured by the German agribusiness giant Bayer.

"Pesticide is an issue, but it is not the sole driving issue," he said.

Poor nutrition and pathogens are also a problem.

"We can't just point to any one single factor as being the dominant thing in the decline in honey bee health. Of late, it seems that this has been the dominant issue, that pesticides are driving everything in bee health.

"I think there's more of what I call the 3-P principle – poor nutrition, pesticides and pathogens. Those three things are interacting greatly. Nutrition is the foundation of good bee health, and certainly there's some pesticide exposure going on, but it varies widely over time and space. And the pathogens in my opinion are often acting secondarily. But it's the interaction of these three. You get three of them lined up then surely you'll have bees in poor health. Even the combination of any two could be problematic.

"My own view is that pesticides are one of the major issues confronting pollinators, but not the driving issue in honey bee health.

"The reason I am conducting research on the neonicotinoid group is that they have a new route of exposure to bees, through pollen and nectar, and I continue to be concerned about their potential negative impacts on pollinators."

Pettis said his research also found that bees in areas of intensive agriculture are suffering from poor nutrition compared with bees with a diverse diet, and this then compounded other problems, such as infection with the gut parasite nosema.

"It is about the interaction of different factors, and we need to study these interactions more closely," he said.

Pettis tells the MPs that he and Penn State University researcher Dennis vanEngelsdorp had discovered the bees have the capability to detect pesticide residues in the pollen.

Once they bring the pollen back to the hive and detect pesticide residues, they isolate it from the other pollen in the colony.

They use propolis to seal up wax cells full of pollen to put it out of use and protect the rest of the hive from their contents. The pollen stored in the sealed-up cells was found to contain dramatically higher levels of pesticides and other potentially harmful chemicals than the pollen stored in neighboring cells, which is used to feed growing young bees.

"This is a novel finding, and very striking," Pettis said. "The implication is that the bees are sensing the pesticide and actually sealing it off. They are recognizing that something is wrong with the pollen and encapsulating it. Bees would not normally seal off pollen."

But he said the bees' attempt to save themselves appears to be unsuccessful because the sealed off pollen is found in many hives that subsequently die off.

"The presence of entombing was the biggest single predictor of colony loss in one of our studies," Pettis said. "It's a defense mechanism that has failed."

He said these colonies were likely to already be in trouble and their

Continued on Page 78