Aug 2013

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Bee Culture

The Magazine Of American Beekeeping

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Make Creamed Honey

The WHITE HOUSE Bees

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EARTHQUAKE!

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Bee Culture

Features

The Rest

Going Down? No!

Great magazine.

Bruce the "Bee Whisperer" from Pinckney, MI wanting to share a recent experience, with fellow beekeepers. I was the smiley face at Dadant in Albion, MI dispensing packaged bees to customers. At the end of my work day, 4:30, Chris the manager of Dadant let me leave a little early as I had four packages of bees to install in Glennie, MI, 200 miles north.

The weather was terrible – 40° with 30 mph winds, rain and snow. I only had a 20-hour window to install the packages. Having read about, putting a empty deep on a full frame deep (to shield from the wind). Release the queen, lay the cage on its side, and in eight to 10 hours the bees will exit the cage and go down onto the lower frames. WRONG! The night temp went to 28° when I took the outer cover off the first empty box the bees came with it. They had formed a cluster, because of the frigid temp (50 hours earlier they were in CA).

"What a mess." I took six frames out and dumped as many bees as I could into the box and replaced the frames. I don't know what I will have in two weeks when I return to check them.

Soooooooo, My thinking now is, I should have put the empty box on the bottom board, and put the deep with frames on top. The bees would have moved up (normal direction + low outside temp). Then lift deep with frames off empty deep. Put on bottom board, put on feeder, and sleep confidently until harvest time.

Bruce Sabuda
Pinckney, MI

Waxless

I read with interest the quandary Dr. James Tew has had in deciding whether to change wax foundation in his hives when they become old and dark!

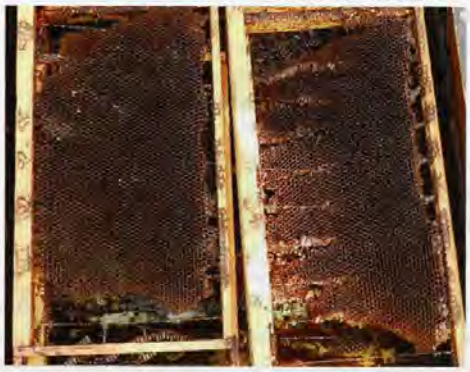
And lately I read in Dr. Phil, a question whether or not to change foundation in dark frames!

I use my solar melter to remove wax from foundation! The enclosed picture shows wax foundation that has been in the solar melter for several sunny days of temps reaching 130°F or above. As you can see, the new or yellow drawn out wax is gone but the dark drawn out wax foundation is still there and has not even sagged!

Something has changed the structure of the old dark wax so it will not melt! Why? Beats the heck out of me but I know I change dark foundation when I find it. I date the frames and have found some take longer than others to turn dark: two years to five years!

Thanks for your magazine. I find lots of info I can use!

Bill Tompkin
Ohio Beekeeper



Editor's Note: *Even at the temperatures you describe, some wax will cling to what you show in your photo – old cocoons mostly, but propolis, dirt and other debris lining the cells and the edges of the cells.*

Bloom Timing Off

I've been keeping bees for almost 40 years now. Nothing big. Never more than 50 hives. One of the first things I wanted to learn about bees is what they made their honey from. I learned that I lived in a region known as the tulip poplar region. So named because that was the largest source of nectar in my area. That would be Southern Maryland (St. Mary's County). It was by this tree that I made sure my honey supers were in place. I also learned that black locust was also a big producer. And it bloomed before the tulip poplar. After the tulip poplar there was the American holly tree. The tulip poplar and the American holly were in my own yard. The several black locust trees were just up the road. I watched these trees with great anticipation that I would get a good honey crop.

One year I noticed that I did not get any tulip poplar honey. How did I know that? Tulip poplar honey is a dark honey, but it is mild tasting. We didn't have any other dark honey that amounted to much. Then came all the questions. Was there enough moisture in the soil? Was it too cold or too windy for the bees to fly? Was there some other flowering plant that was producing more nectar or nectar with more sugar content? Each year there were new questions to answer. I only had about three weeks to look and see if there were bees working these trees. After the honey flow someone would ask another question like; "Did you look early in the morning?" Then I would have to wait another year to answer the question. I've ruled out all the questions I've been asked.

I've been watching these trees for over 30 years. Bees and any other insects were no longer visiting the very same trees that I stood by and watched in awe of all the bees and other insects gathering the nectar in the past. When I noticed that the bees were not bringing in tulip poplar nectar I made it a point to look closely at all the trees when they were in bloom. All three trees had no visitors. How could that be when they used to produce nectar? I particularly remember going to pick up my mail up the street and stopping for awhile to listen to all the buzzing on the several black locusts that were there at the mailbox. I also remember a neighbor that had two large American holly trees. He would call me and ask me to come down and watch my bees as they swarmed over his trees. Now they produced nothing.

I realize that I might live in a microclimate. I live near a river that is six miles wide. That cuts out about 180° of forage area. There are two main roads that run to my home from the north. It was easy to ride down the road and spot the black locust when they are in bloom. I stopped six times on one trip home and nine times on another. The greatest distance from my home was about 30 miles north on both roads. There were no bees working these trees. I hear other beekeepers say that they have seen the bees working these trees where they live. The tulip poplar were too hard to spot and not as many and did not look at them.

It dawned on me one day that I should look to see if there is nectar in the flowers. And so I did. The blossoms on the black locust were first. As hard as I squeezed the flowers I could see no sign of any moisture. The same thing happened with the tulip poplar and the American holly: NO NECTAR.

I did not have any answers so I began to ask other beekeepers. No answers. I would say that most of them watched their bees bringing in nectar and knew that trees were in bloom but never really went looking at the three trees that used to produce the most honey. I have asked many knowledgeable people about what could be happening and got no answers. For the most part there was little interest in finding out. It just did not generate much interest except for a few beekeepers. And why would it? What does it matter that a few trees in one area do not produce nectar. And if the cause were to be found, what would be the implications? For one, if there are no insects visiting these trees then there will be no pollination. No pollination, no new trees. This is especially true with the American holly that has both male and female trees.

My only conclusion is that the nectar starts in the roots and as the weather warms the nectar flows up. It seems like the nectar flow and the timing of the blossoms do not coincide. What could happen? Perhaps the trees will move farther north and cease to exit here. But we are talking about many years for this to happen. Will anybody take notice? Could it be from climate change? I don't know. I just wonder about what I have stumbled upon by just being a beekeeper.

Bill Bartlett
Leonardtown, MD

Varroa Control

In my April letter I took issue with a previous article on the non-treatment approach to *Varroa* control. I went on to criticize a variety of natural or alternative treatments, and I questioned the wisdom and competency of those who blindly preach the benefits of non-treatment in spite of overwhelming evidence to the contrary. I concluded with a few basic mite control recommendations. This follow-up letter is intended to illustrate the basic differences between casual backyard, side lot, or roof top beekeeping, and production beekeeping, regardless of scale.

I fully understand anyone's reluctance to randomly dump chemicals into a beehive. I've lost more than a few colonies specifically because of that reluctance! I've also saved or maintained an uncounted number of colonies by applying timely and appropriate mite treatments. And like most long-time beekeepers, I've listened to others tell of their beekeeping experiences, absent any references or concerns relating to *Varroa* control. In most instances these individuals are either just starting into beekeeping, or have very limited managerial experience. There are numerous variations on this theme, but you get the general idea. When these folks lose bees, everything but *Varroa* gets the blame. When you mention the possibility that *Varroa* may be at least partially responsible for their losses, you're curtly informed that they're "natural" or "non-treatment" beekeepers and they haven't seen any mites.

While somewhat over simplified, small apiaries coupled with the lack of management skill and swarm control know-how, combine to provide a considerable degree of mite control. The drifting of drones and especially worker bees is a major form of mite transfer between colonies. Small apiary size limits the drifting potential and thereby the overall *Varroa* threat. Swarming and the resulting break in both the

brood and mite reproduction cycles is perhaps the premier form of natural or non-chemical mite control. Feral colonies survive largely due to this methodology. When you include the lack of general management skill, it's no accident that new and inexperienced beekeepers are able to survive or avoid the onslaught of *Varroa*. In addition, many of today's new generation beekeepers voluntarily practice minimal management beekeeping. Their primary focus seems to be, let's keep bees, but with as little managerial input as possible. There is absolutely nothing wrong with this approach, provided the practitioner is aware of the associated risks. Many aren't. The danger or damage occurs when these folks start to preach or imply that their management philosophy is appropriate for everyone else, regardless of circumstance.

Contrast the inexperienced or minimal management approach to that of the production apiarist. By definition, a production apiarist is anyone from the serious hobbyist, to a commercial operator who is attempting to produce a product or service for profit. This type of beekeeping requires an entirely different management strategy. For example, when necessary, both carbohydrate and protein supplements will be provided in abundance. Overwintered colonies will be equalized or split to even out colony populations, and to help discourage swarming. There will be an established requeening program, possibly spring orientated, but just as possible, requeening efforts will be concentrated in the latter half of the previous season. In short, the production beekeeper is going to do everything possible to build and maintain the strong colonies, and to maintain the integrity of that broodnest. This form of management creates the ideal *Varroa* reproductive opportunity. To totally ignore mite control under these circumstances

would be catastrophic.

If this brief explanation hasn't convinced you, perhaps some personal experience will. For the past couple of years I've been trying to determine both the timing, and the minimal treatment dosages for my specific territory and operating conditions. The following incidents occurred in my Mulberry Road yard in 2012. The yard contained fifteen colonies at the start of the main flow in late May. Eight were supered for honey production, six were setup for new comb production, and the remaining colony was a recent split. Based on individual sampling results, about 30% of these colonies had been treated with formic strips (MAQS) in August of 2011. 2012 started out with an extremely warm period in mid-March, followed by a very cold April. By mid-June, half way through the honey flow, a number of colonies were showing signs of stress. Three of the supered colonies had ceased to produce honey, midst a strong flow, and a couple of the comb production colonies were exhibiting obvious signs of virus activity. Remember, this was an experiment so no corrective measures were undertaken.

The three underperforming colonies had their surplus removed on July 1. As expected, virus activity had virtually eliminated all brood-rearing activity. These colonies were immediately treated with MAQS and closed up. The remaining five colonies had their surpluses removed approximately two weeks later, with the same result. Virus activity had decimated the broodnests, but their adult populations remained largely intact. Again, MAQS was applied immediately. The three colonies that had been treated two weeks earlier now contained small, healthy looking broodnests. However, when sampled, their adult populations had mite counts that rivaled the just treated colonies. Obviously, inter-apiary drifting was responsible. Although it violated label instructions, these colonies were re-treated with MAQS. The lesson here is to treat all the colonies in a yard at the same time, not on a piecemeal basis, a fact clearly stated on most mite control labels. For what it's worth, other than the split, the only colonies that overwintered into 2013 were those that had been treated in 2011. You don't have to be a rocket scientist to understand the take-home lesson here.

I'll conclude with the same advice I offered in the April letter. The most valuable assets in any apiary are the bees. Do everything in your power to keep them healthy and productive. Their long term future, and possibly your beekeeping career, may depend on that!

Roy Hendrickson
Chardon, OH

Dear President Obama

We write to highlight a very important concern: the negative environmental and economic impacts of outdoor uses of the EPA-approved neonicotinoid insecticides: imidacloprid, clothianidin, thiamethoxam, dinetofuran and acetamiprid. On April 29, the European Union voted for a two-year suspension on major uses of the three most common neonicotinoids: imidacloprid, clothianidin and thiamethoxam. The decision came on the heels of comprehensive, peer-reviewed research conducted by the European Food Safety Authority (EFSA), which indicated that those three insecticides pose both acute and chronic hazards to honey bees and that significant gaps exist in the data needed to assess their safety. The EU decision signals the way forward for your Administration to suspend neonicotinoids in the United States.

The undersigned groups are very concerned with EPA's past approvals of these insecticides. Agency officials have acknowledged that here, as in Europe, the original risk assessments and registration data requirements focused on acute honey bee mortality and failed to adequately consider other key risks to colony health. This means the hundreds of EPA-approved neonicotinoid products were approved based on inadequate assessments. This is unacceptable in view of the fact that honey bee pollination is a $20 to 30 billion per year contributor to U.S. agriculture and vital to the majority of fruit and vegetable produce.

In the face of severely declining bee colonies nationally – with beekeepers reporting record losses this year – it would not be responsible to continue to allow these threatening compounds to be used so broadly. Independent scientists and commercial beekeepers attribute dramatic bee die-offs to a combination of factors, but exposure to neonicotinoids is a key contributor. We are asking you as Chief Executive to direct the EPA to follow the EU and EFSA lead and recognize the risks are unacceptably high. Pollination services provided by honey bees and the other even less-studied wild bees are far too important for agriculture, gardens and wild plants to treat them in a non-precautionary manner. Many thousands of beekeeper livelihoods, and indeed the future viability of commercial beekeeping and the crops relying on these pollination services, are potentially in jeopardy. Experts have identified the potential for "domino effects" of cascading inadequate crop pollination due to shortage of viable pollinators. This could rapidly evolve into devastating, perhaps irreversible, losses to farmers, consumers and the economy as a whole, which relies on domestically-produced bee-pollinated food and fiber crops.

In recent statements about the EU's decision, EPA officials highlighted a recent USDA report, the *Report on the National Stakeholders Conference on Honey Bee Health - National Honey Bee Health Stakeholder Conference Steering Committee*. Unlike the peer-reviewed, scientific EFSA report, the USDA report was not peer-reviewed; it derived from a meeting of numerous stakeholders including many non-scientists. It is dated and not comprehensive. Further, there was not consensus among the stakeholders on the statements in the final report.

We would like to bring your attention to recent acknowledgments of key facts by EPA officials, made in public statements at recent

meetings, in media statements, in EPA documents and other venues:

- They acknowledged EPA's enforcement guidance for neonicotinoid use was inadequate.
- They acknowledged EPA's bee kill incident reporting system was inadequate.
- They have stated the labels on neonicotinoid products are inadequate to mitigate adverse environmental effects, specifically to avoid seed dust-mediated mortality to honey bees and other beneficial insects in or near corn fields.
- They recognize the current corn planting machinery poses significant dust-off risks and needs changing, while also recognizing that such changes will likely take many years and stating that EPA lacks authority to mandate machinery changes.
- They acknowledge that bee health and populations, and crop pollination, are in a near-crisis state based on several synergistic factors including insecticide use.
- They indicated the agency has not consulted with the U.S. Fish and Wildlife Service on potential effects on threatened or endangered species under Sec. 7 of the Endangered Species Act for the neonicotinoid insecticides.

Despite the above, EPA has refused to exercise its regulatory power to address the one factor it could address tomorrow – the major contribution of these insecticide to bee declines – and instead has pointed to land use decisions, crop planting choices by farmers, pathogens, bee nutrition and other factors over which EPA has no authority. Indeed, no other Federal agency has the power to help stem bee declines by addressing any of those synergistic factors within a reasonable timeframe.

We would like to further highlight a broader threat: water contamination by imidacloprid, clothianidin, thiamethoxam and the other compounds, the effect of which is to "sterilize" much of the invertebrate food chain, threatening insects, fish, amphibians and other taxa, including, but not limited to, aquatic and insectivorous birds. Recently, the American Bird Conservancy (ABC) released a report, *The Impact of the Nation's Most Widely Used Insecticides on Birds*, researched by an internationally-recognized avian toxicologist, Pierre Mineau, who examined the key EPA risk assessment documents and found numerous failures in the agency's approvals. The report showed high direct and indirect mortality risks to a broad suite of birds, as well as to aquatic invertebrates and ecosystems generally. It found that the observed acute threats from water contamination by EPA-approved neonicotinoids "may be totally unprecedented in the history of pesticide registration". It also stated: "EPA has not been heeding the warnings of its own toxicologists". Dr. Mineau examined the approved product labels and found them inadequate, stating "regulators are clearly mistaken in believing that exposure to treated seed can be minimized by label statements or adherence to good agricultural practices". The report describes EPA's analysis as "scientifically unsound". It urges the agency to suspend use of these products and to ban neonicotinoid seed treatments altogether.

The leeway for your Administration to somehow disregard the ABC report was drastically reduced by the peer-reviewed publication in PLOS ONE on May 1 of this year of a major Dutch study, *Macro-Invertebrate Decline in Surface Water Polluted with Imidacloprid.* This multi-year, comprehensive, field study states (emphasis added):

While a large amount of evidence exists from laboratory single species and mesocosm experiments, our study is the first large scale research based on multiple years of actual field monitoring data that shows that ***neonicotinoid insecticide pollution occurring in surface water has a strong negative effect on aquatic invertebrate life, with potentially far-reaching consequences for the food chain and ecosystem functions.***

In short, we could face a second "*Silent Spring*" above and beyond the threats to managed and wild pollinators. Unfortunately, EPA's planned deadline of completing its Registration Reviews for the major neonicotinoids by 2018 is far too slow in view of their potentially calamitous risks.

We trust you do not want to preside over this pending crisis. Directing EPA to follow the EU's lead would be a first step but even more protective measures are needed, including a minimum two-year suspension for all outdoor uses of neonicotinoid insecticides pending resolution of their risks.

Thank you for your consideration of this urgent appeal. We look forward to your response.

George Fenwick
American Bird Conservancy

Patty Clary
Californians for Alternatives to Toxics

Andrew Kimbrell
Center for Food Safety

Wenonah Hauter
Food & Water Watch

Kim Leval
NW Coalition for Alternatives to Pesticides

Michael Brune
Sierra Club

Jay Feldman
Beyond Pesticides

Michael Green
Center for Environmental Health

Jamie Rappaport Clark
Defenders of Wildlife

Erich Pica
Friends of the Earth

Scot Hoffman Black
The Xerces Society

Look What's New For You –

Kim **Flottum**

I'm fortunate in that I'm able to visit many places in pursuit of my job. I've been to the coasts, the mountains, the prairies, cities and country. When I visit a new place I try to learn three things from the people that live where I am only a visitor. I read the editorial page of the local paper (or rarely papers) to get a feel for the politics, the want ads for some measure of the local economy, and I ask as many people as I can...where do you get your water? I've found, over the years, that if I know the level of involvement of the local people in those three things I know much about the whole of the place. But when it comes to water I continue to be absolutely stunned by the fact that most people have no idea...like milk from the grocery, water is from the sink. Unless, that is, they have their own well or cistern and have to deal with it on a somewhat routine basis. Today self-support relative to daily water is even less common than growing your own food.

Because of the coal mining once common near my home, water here is tainted and wells aren't possible. I've lived with a roof-water cistern for almost 30 years (the cistern is over 85 years old), and I know where my water comes from, the quality, what happens when it doesn't rain, and how much to use. And I'll ask you...how much water do you use a day, on average over the course of a year? I'll bet most folks don't have a clue. I know almost to the quart.

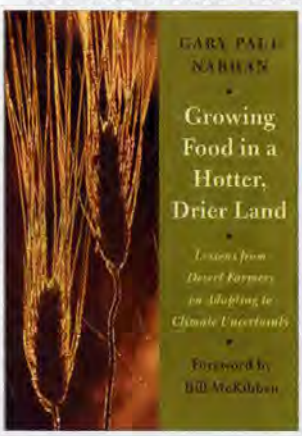
About 10 years ago the county ran a water line right by my house, and offered me a 'deal' to hook up. The 'deal' was expensive, and I choose not to tap that pipe that began up in Lake Erie (the worst E. Coli lake in the U.S., by the way). But about a year ago, governments being what they are, they made it a law...tap now, or shortly, in the future we will do it for you...and you'll still have to pay. Oh, and you can't sell your home if you don't have our water. So, my fate, and my cistern were sealed (almost).

I still know where my water comes from, but I have no control over it at all. There are several valves that can be closed between me and the lake, and they are on occasion. I hate that more than anything I think. Someone else has that control. But there is a bigger issue here, and that's why I introduced our new products this month with this short story. Water everywhere is going away, and not coming back.

Call it climate change, abuse, waste, whatever you want there is less water, and more too-dry places today that there were 50 years ago. And in 30 years we will have to feed two billion more people on about the same amount land, but with less fresh, clean water. But there are some answers.

Growing Food In a Hotter, Drier Land. Gary Paul Nabhan. Chelsea Green Publishing. ISBN 9781603584531. 260 pages, 7" x 10". Color. $29.95.

You may recognize Dr. Nabhan's name from The Forgotten Pollinators, or as part of Ross Conrad's latest work. But his life's work is more focused on foods, deserts, and water. Living on the Mexican border he spends his time farming, teaching, and learning the New Normal of a drier world. He has for years drawn on the skills of traditional farmers in the Gobi Desert, the Arabian Peninsula, the Sahara, as well as the Sonoran, Chihuahuan, and the Painted deserts of North America. This is a how-to book, no doubt about it, but it is also a think book. It is based more on traditions that have allowed populations to live in deserts for eons, but also, what has changed during those times and how they coped. You can use these skills in your backyard, your farm, your neighborhood, and in your life. There is no doubt at all that Industrial agriculture in North American will have to change. We have less water. We waste water. We use politics to control who gets what water there is. This is a good start if you don't know how much water you use every day.



Rainwater Harvesting For Drylands and Beyond, volumes 1 (ISBN978-0-9772464-3-4) and 2 (ISB N 978-0-9772464-1-0). Chelsea Green Publishing. By Brad Lancaster. Both 8.5" x 11", black and white. Vol 1, 280 pages, $29.95; Vol 2, 400 pages, $39.95.

Volume 1 has just been updated. It covers the basic principles to welcome rain into your life and landscape. It has to do with learning about the water in your place, whether farm, urban, suburban or wherever. Estimating how much you need, where it comes from, and goes to, harvesting water, and an interesting chapter on design that covers shade, sun and the season, raised paths and sunken basins and then spreading this into your neighborhood.

Vol 2 is heavier duty. It's about water harvesting earthworks. And though shovels are often used, so are bulldozers. Again it assesses your place, looks at water flow from and to, talks about berm n' basins, terraces, drains, infiltration, mulching, hardscape and permeable paving, swales, dams, vegetation, graywater and erosion. There is more here on collecting and saving water than you can imagine. There's math, and science, and tradition and design all

together to make it all work. Both of these books have won numerous awards and it is easy to see why. Gary Nabhan wrote the Foreword for the new edition. These people have much of this figured out. But a whole lot of other people need to listen to what they have to say.

There's a Volume 3 on the way. It's about cisterns. I'm going to get that one, too. I may not be able to use my cistern water for inhouse use right now, but it is NOT going to to waste. I have all this vegetation to water, gardens to supply, and the next time some government guy turns that valve upstream, he can keep it off as far as I'm concerned. And besides, my cistern water tastes way, way better than that treated stuff.

In Oregon in June a massive bumblebee kill was recorded due to a pesticide spray of linden trees in a parking lot of a big box store. Aphids were dripping aphid poo on cars, customers were complaining and a landscape company called in to fix the problem. They did. They sprayed those lindens that were in full bloom to kill the aphids. The bumblebees visiting the linden blooms were killed by the thousands, littering the parking lot. The trees were bagged to keep more bees out, but damage was done. Ecologists estimated at least 300 nests were destroyed.

Bumble Bees of the Eastern United States. By Sheila Colla, Leif Richardson, Paul Williams. Published by Pollinator Partnership. Available at **www.pollinator.org**. $15 shipping cost or as a free pdf. 6" x 8.5", all color. 103 pages. Spiral bound.

A product of the USDA Forest Service and the Pollinator Partnership with funding from the National Fish and Wildlife Foundation. Now, for the very first time, there's a guide to all 21 species of bumbles bees occurring east of the 100th Meridian in the United States. Detailed color photos of bumble bees on their favorite blossoms are presented, along with detailed dot distribution maps for where they occur. Additional facial photos, crucial for identification, are illustrated. Information on the natural history of each species is discussed including common food plants and life history information. Some of these species are "cuckoo bees" social parasites in the nests of others and these species are also included. A unique dichotomous key to the species (males and females) is an indispensable part of the guide.

Bumble Bees Of the Western United States. By Jonathan Koch, James Strange, Paul Williams.

This too is published by the Pollinator Partnership, with funding and support from the same agencies. It is available on their web page for the $15 shipping fee or as a free pdf. It is the same size and binding, color, and 143 pages. 30 species are detailed here with similar photos and descriptions and an excellent key.

Plastics

Just getting started in marketing your honey? Don't know what the best container size and type is for the customers you don't have yet? BL Plastics has a great idea. Try their Sampler Pack, a little bit of every kind and size of plastic container. They chose their most popular styles in their most popular sizes and you can try them all. Combined, there's 144 bottles, all with lids, including 24 2 oz bears, 24 6 oz bears, 36 12 oz bears, 12 1 lb inverted, 24 8 oz classic, 12 1 lb classic and 12 2 lb classic, all shown here. All this for only $82.00, plus shipping (that's only $0.60 each), and you don't end up with a thousand containers you can't use. Find out more at www.blplasticiowa.com, or call 515.266.6112.

Modern Beekeeping USA, a subdivision of Modern Beekeeping UK, has recreated the production of bee hives. With the advances of modern technology, Modern Beekeeping has been the seller of polystyrene beehives dating back to 2004. Owner and entrepreneur, Robert Carter, purchased the company, Modern Beekeeping USA.

The use of polystyrene hives has grown. The polystyrene hives are made from food grade expanded polystyrene. Expanded polystyrene is made from hollow beads which are filled with air and then fused together under pressure and high temperature. The polystyrene itself is chemically inert – only steam is used in the manufacture of the hives. Therefore, you need have no concerns over any gasses escaping from the material. These types of hives are widely used around the world and are well established in Scandinavia and Germany – which have some of the toughest laws in Europe on food quality.

Polystyrene beehives have been used in Europe for over 30 years, where they have proved both durable and effective, so much so that today in Denmark virtually 99% of all new hives sold are made of plastic, either expanded polystyrene or polyurethane. In total there are over half a million polystyrene hives in use in Europe today, which is testament to their effectiveness and durability.

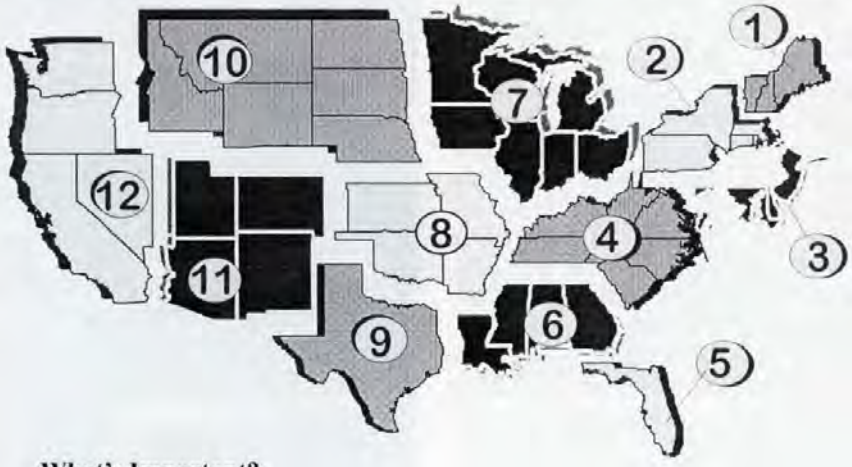
Modern Beekeeping UK was receiving various inquiries from consumers in the United States showing a strong interest in the polystyrene hives. The continuous inquiries received in regard to our hives inspired the company to reach out to a new demographic. As of January 2013, Modern Beekeeping USA was formed and they are now available for sale in the USA. Along with the polystyrene hives, we also offer feeders, nucs, clothing/gloves – for adults and children – honey presses, instructions for care and maintenance of your hives and many other products. Rodney and Michele Reider are the USA Sales Representatives for Modern Beekeeping USA. Since starting Modern Beekeeping USA, the requests for the polystyrene hives have been overwhelming and the sales have been growing steady.

For more information about Modern Beekeeping USA or available products, please visit **www.ModernBeekeepingUSA.com**.

10-Frame hive.

Nuc.

AUGUST – REGIONAL HONEY PRICE REPORT



	% Important		% Less Important	
	2012	2013	2012	2013
Price	80	59	20	41
Label Design	64	46	36	54
Name on Label	71	67	29	33
Local Honey	96	61	4	39
Variety of Honey/label	27	32	62	78
Second Label	17	5	83	95
Location I sell	61	57	39	43
Time of Year	36	17	64	83
Glass Container	52	35	48	65
Plastic Container	25	19	75	81
12 oz. size	55	32	45	68
1 lb. size	74	56	26	44
2 lb. size	65	35	35	65
5 lb. size	43	38	57	62
Quart jar	57	46	43	54
Pint Jar	52	42	48	58
Specialty Jar	30	10	70	90

What's Important? Selling Honey!

What a difference a year makes! Last year we surveyed our reporters on the value to them of various marketing issues, techniques and practices. What's important to them, and what's not. Take a look at the chart. An interesting set of numbers. Especially this year.

Price has become much less important, and I suspect, looking at prices, isn't the competitive issue it has been in recent years. When demand increases and supply is short, lots of things become less important…honey in a bottle is what's wanted…the packaging, the price and the kind becomes less important. Honey in a bottle is the key.

But some things don't change… your name on the label so folks can find you is still important, but the label itself…design, LOCAL, variety – all have reduced value this year. Most, it seems, still have an affinity for where they sell their honey, but when isn't as important and glass jars…just look at that. Two thirds of sellers find glass jars not as critical as before. My contention has always been that a squeeze bottle is more convenient than a glass jar, but the number never supported that…well, what people wanted to sell in as opposed to what people wanted to buy. If you only offer glass, that's what people will buy, it's a closed circle. Give them a choice and see what happens. Maybe that's what happened this year.

Second labels are still not popular which continues to surprise me. Variety, local, season produced, raw…all tell more about what's inside. And think of what folks see when you're at a farm market – they see the tops of your jars. To read the label they have to pick up every jar, and hunt until they find it, or not. It just seems to make sense to me, but then, I don't sell honey for a living.

Jar size, too, seems to be less important. But the numbers seem a bit distracted. None of the jar sizes seem important, or, the law of averages has taken hold and all of them work, no matter what is used, so none of them are critical.

Although quarts and pints have become a bit less important, they are still critical to some geographic areas in the country. Primarily in the southeast and south, but also in the southwest. It ain't honey if it's not in a mason jar seems to be the customer's feeling, and the customer is always right.

	REPORTING REGIONS												SUMMARY		History	
	1	2	3	4	5	6	7	8	9	10	11	12			Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS													Range	Avg.		
55 Gal. Drum, Light	2.14	2.25	2.14	1.73	2.14	1.98	2.10	2.00	1.90	2.14	2.20	2.58	1.60-2.75	2.11	2.02	1.82
55 Gal. Drum, Ambr	1.95	2.00	1.95	1.69	1.95	1.85	2.02	2.00	1.60	1.95	1.90	2.40	1.58-2.40	1.91	1.90	1.69
60# Light (retail)	185.00	190.00	157.50	108.50	163.62	171.67	158.50	157.50	141.00	255.00	170.00	210.00	60.00-255.00	169.73	176.81	154.90
60# Amber (retail)	189.00	185.00	157.50	176.67	175.67	166.67	161.33	157.50	132.50	255.00	156.00	240.00	100.00-255.00	173.84	169.00	148.21
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	77.80	73.08	60.27	65.50	68.24	68.24	58.07	68.24	49.20	66.00	75.00	88.00	31.20-100.80	70.48	67.86	66.83
1# 24/case	113.47	92.63	108.40	87.00	144.00	113.75	94.00	99.00	71.40	108.00	93.92	125.73	42.00-160.00	104.29	106.21	101.18
2# 12/case	104.44	79.88	90.33	76.00	144.00	91.74	83.30	105.00	80.31	96.00	78.00	95.40	67.20-144.00	91.29	95.01	85.02
12.oz. Plas. 24/cs	83.12	84.48	69.95	85.13	75.74	94.00	73.25	99.60	53.04	84.00	86.88	78.80	16.50-124.80	80.83	81.54	79.82
5# 6/case	120.04	103.98	100.50	97.88	104.09	120.00	101.90	112.50	88.20	96.00	86.25	115.00	81.00-126.00	104.68	106.22	94.33
Quarts 12/case	149.00	128.88	118.09	103.33	118.09	101.25	140.60	111.00	119.68	129.00	116.94	140.00	50.52-178.80	121.52	119.68	117.87
Pints 12/case	90.33	70.95	99.00	95.50	80.38	64.80	94.00	60.00	52.00	80.38	69.00	81.00	50.00-115.00	78.26	75.83	71.88
RETAIL SHELF PRICES																
1/2#	4.75	4.25	3.39	3.64	4.11	4.00	3.29	2.99	3.25	2.98	4.11	5.00	1.96-6.75	3.87	3.96	3.61
12 oz. Plastic	6.05	4.80	3.98	4.46	5.13	4.75	3.97	4.67	4.72	4.26	5.24	4.80	3.27-7.75	4.75	4.88	4.50
1# Glass/Plastic	7.11	5.59	6.16	5.37	7.00	6.90	4.92	5.92	6.05	5.86	5.87	8.81	3.00-10.00	6.16	6.13	5.91
2# Glass/Plastic	11.96	9.19	11.71	9.40	10.55	10.00	8.73	11.50	9.73	12.00	9.61	12.50	6.00-15.50	10.35	10.16	9.62
Pint	8.83	8.10	9.45	6.94	8.36	7.00	9.97	7.70	5.00	8.67	8.34	9.10	4.00-13.50	7.97	8.07	7.86
Quart	15.67	12.90	13.14	12.23	13.14	12.50	13.08	13.92	12.25	14.00	12.97	16.00	6.00-20.00	13.28	13.15	12.80
5# Glass/Plastic	26.38	19.04	25.23	20.67	25.00	29.00	20.93	23.00	22.25	19.43	21.58	25.00	12.00-35.00	22.31	21.84	19.96
1# Cream	9.75	6.40	8.10	6.38	7.99	6.00	6.86	7.99	5.95	8.35	7.59	7.75	4.90-12.00	7.54	7.22	7.20
1# Cut Comb	10.06	5.00	8.60	4.85	8.97	6.67	6.67	11.48	9.00	11.50	10.00	10.00	3.00-16.00	8.44	8.52	8.40
Ross Round	10.00	8.74	8.19	6.53	8.74	7.00	7.00	10.00	8.74	9.00	9.75	8.74	6.00-12.00	8.49	7.97	7.61
Wholesale Wax (Lt)	6.33	6.95	5.92	4.87	5.53	4.57	4.88	5.00	6.00	5.53	3.20	5.58	2.40-9.00	5.37	5.12	4.45
Wholesale Wax (Dk)	5.38	6.95	5.88	4.52	5.02	4.53	5.02	4.85	5.02	5.02	2.20	4.00	2.20-8.00	4.93	4.43	3.97
Pollination Fee/Col.	90.00	92.73	90.00	56.75	100.00	65.00	61.60	80.00	92.73	60.00	92.73	120.63	35.00-175.00	80.46	79.29	71.68

INNER COVER

What do you know about Project Apis m? They have a request in this month's issue asking you for money for a boatload of research projects, and their name keeps coming up as one of those groups in the middle of a lot of things honey bee.

They got their start a few years ago at a meeting with representatives of the Almond Board of California, the California State Beekeepers Association and others when the need to fund more bee research required serious attention. Because it's an industry group, unlike a University, they don't take that 40% or more off the top of donated funds for 'overhead'. PAm is built mean and lean and, in a word, efficient.

But Almond industry voices felt that the beekeeping industry should be more involved in funding their own research because the almond industry was funding a lot of it for them. PAm was developed simply to bring more funding into improving bee health – for ALL pollinated crops.

But to be honest it is extremely difficult to get any other crop on board to help with funding. Crops that need bees or die. You'd think they'd be interested, but so far not so much. A part of that is because colonies get artificially built up for almonds way early in the Spring and then get even better in almonds. When that bloom is done there's a surplus of strong bees looking for work. Midwest and eastcoast bees can't go home . . . there's still snow on the ground. West coast bees have to hunt and peck to find a place, and southern bees can go home to not much yet. So those other crop groups have easy picking – lots of bees with nowhere to go and they simply don't see the problem. As a result they don't have to pay nearly as much for bees . . . hey, what's the problem? The economics here are obvious. Joe Traynor, a pollination broker in California has been saying for years that almond growers have been subsidizing the pollination fees of all these other growers for years. He's right.

But much honey bee research funding doesn't come from the beekeeping industry. So, since their inception PAm's all-beekeeper-board has infused new technologies, new scientists and new programs into the honey bee world. That Board includes Gordy Wardell (Paramount Farm's pollination resource), Dan Cummings, John Miller, Joe Traynor, Zac Browning, Dave Mendes, Gene Brandi, Doug Hauke, and Executive Director Christi Heintz.

A high priority for PAm is honey bee health and *Varroa* control, and they have funded work on RNA interference to that end. So last year, when the Heartland Apicultural Society held their meeting at a University in St. Louis, Missouri, it seemed natural for them to contact the local company that had recently purchased Beeologics – the Israeli company that was working on a technique that would interfere with the RNA of a virus implicated in CCD. The connection here was too good to pass up and, Interestingly, the bee person that that local St. Louis company hired had been a major part of the Beeologics research in Florida for a few years before they were bought, and a prominent name in the beekeeping industry for years before that. Getting him as a speaker at that HAS meeting was a stroke of genius – or not – depending on your perspective. Nevertheless, Jerry Hayes (former Florida State Apiary Inspector and before that Dadant equipment Manager) came to the HAS meeting and told us about the adventure he was on with the ongoing work of the Beeologics people and Monsanto, the company that had purchased them.

But Jerry had invited several of those attending the HAS meeting to come in early and meet with the Beeologics people and those from Monsanto involved with the project. The PAm people were part of that gathering. What came from that, among other things was a substantial donation from Monsanto to Project Apis to purchase seeds for an experiment in feeding bees in holding yards before almond bloom. They wanted a lot of flowers, and it took a lot of money. Note that this has nothing to do with virus, but lots to do with healthy honey bees, and this money for bees didn't come from beekeepers . . . but Monsanto.

Not surprisingly from that meeting came the germ of an idea of holding a honey bee health summit to be organized by PAm and The Honey Bee Advisory Committee. But there's a cost to this sort of project and money spent on a meeting isn't money spent on research or making honey bees healthier. So Monsanto volunteered to host this meeting at their St. Louis headquarters after some negotiation and cajoling from Jerry, some of the other beekeepers and the PAm people. Plus, the Monsanto folks actually wanted to get a better picture of the bee industry they are now a part of because of Beeologics. Overall, it was an ambitious project and an auspicious group from within and some from outside of our industry that were invited to the summit.

So invitations were sent, a speaker program set up, tours organized, hotel room blocks set aside and the meeting was a go.

The summit was designed to cover familiar topics – the first afternoon was an overview of industry economics, the full second day devoted to Nutrition and Habitat Loss, Pesticides and Tech Transfer which included some of the other diseases, and the final morning was all about the *Varroa*/virus complex. Two full days of A Summit On Honey Bee Health. The speaker list is a Who's Who in Honey Bee Health Science, practical research and funding . . . Jeff Pettis, Reed Johnson, Chris Mullin, Jim Frazier, Dennis vanEnglesdorp, Eric Mussen, Jay Evans, Diana Cox-Foster, Jamie Ellis, Christina Grozinger, and a host of others covering all of the topics mentioned. Plus, the leaders of

the major beekeeping groups, and the Beekeeping Advisory Committee were there, with opportunities to speak and offer opinions.

Summaries of the talks, some thoughts on the data, and various other opinions and reactions are, or will be available from several people who were there but did not speak. The Editors of both beekeeping journals were in the audience, representatives from Monsanto, Bayer, local beekeeping groups, Board members from Project Apis, local press, The Cotton Council, CA State Beekeepers, Syngenta, almond pollination brokers, Beeologics, and too many others to name here all listened in.

Dr. Eric Mussen, in his newsletter released shortly after the meeting offers his observant and insightful thoughts that you must read (E-mail: **ecmussen@ucdavis.edu**, or **www.entomology.ucdavis.edu/faculty/mussen.cfm**) to get to the letter on his web page. Randy Oliver has published thoughts on his web page Scientificbeekeeping.com, and I put up some thoughts on *Bee Culture*'s blog page at **http://blog.beeculture.com/**. More, I'm sure will or have already appeared, and much has already been scattered about the digital universe pro and con on both the beekeeping industry in general, and the individuals who attended on dealing with Monsanto. I urge you to read the reviews and get insights into what's going on with these reports. Those from the summit are enlightening, some of the rest are humorous, slanderous or ignorant. But read all you can find for the full story.

But you know, with all the good science and intentions and ideas taken away from this by most of the attendees, my take wasn't quite the same.

Look again at the topics discussed. Loss of Habitat, not enough good nutrition, diseases, pesticides, and varroavirus (I think that should be one word – varroavirus).

Obviously, nothing new here. But you knew that. One of the words repeated, and repeated, and repeated was that the cause of CCD was – Multifactorial – many factors, acting alone, in unison, in concert or in combination with each other to cause – CCD. Still, nothing new.

So here's what's come from the money that's been spent on this malady over that last half dozen years. We know lots and lots and lots about those few things. Essentially, more and more about less and less. We know there's not enough good food, the food that's out there for the most part isn't the best food there is, that everyday more of the food disappears due to conservation land turned into farm land, farm land turned into development land, and developed land turned into pavement. Not enough good food. And we know it is a nobrainer that a diverse diet is better for bees than a monocultural diet, but somebody proved it. More and more about less and less.

We know that we can't control *Varroa* in a sustainable way (that is, continue to put band-aids on and in the colony to kill the bug on a bug), that efforts to breed resistant bees is not convenient, and not cheap for the regular user or producer. But we've studied a host of drugs, doses, application methods, natural and nasty – more and more about less and less.

Then, add in the additional stresses of pesticides, pesticide tankmixes, pesticide interactions with other ag chemicals in the field and in the hive, and sublethal doses and chronic exposure, and beekeeper added chemicals and you've got problems. The more we look, the more we find . . . more and more about less and less.

And finally, those other diseases, when joined with pesticides, *Varroa*, viruses – you have a multifactorial situation with no easy answers. But you knew that. And now Monsanto knows it. Why they didn't run from the room screaming is to their credit I suppose, but there's a bigger point to make here. We already know enough about all this stuff to fix all this stuff. Yes, we have to know more and more about less and less, but first, FIRST, we have to stop doing what we are doing. You know the old saying, when you find yourself at the bottom of a hole, the first thing you do is stop digging. We need to stop digging.

The farm bill that didn't pass had provisions for additional set aside land for pollinator food that would have helped, not solved, but helped. The PAm program to supply forage for almond's bees is a good start, but a mere drop in the bucket for what's needed. But so much more land is needed – land that's safe from agriculture, and now even safe from urban parking lots – but what are we doing about any of it? Zip. Nada. At least so far. And even what's been done is not nearly enough . . . we're still digging.

Varroavirus? We know oh, so much about this beast and its demons. And we learn more every day. And we know that the virus issues coupled with the *Varroa* issues are serious enough to be called a complex, and if *Varroa* isn't unsustainably controlled (routinely putting poison in the colony is not a sustainable method of control), the viruses run amuck and colonies die. We know more and more viruses are showing up and we don't know nearly enough about them – but we do know that to stop them – stop *Varroa*. And stopping *Varroa* isn't a pipe dream. Some folks are doing it now – I'm not talking about the "I don't treat because I'm natural" folks, but the actual hygienic/tolerant/resistant breeders' bees that are – yes, hygienic/tolerant/resistant.

You almost can't get any, but some are around. And you almost can't get any because almost nobody is producing them, and you almost can't get any because we don't ask for them. Yet we know more and more about less and less. We're still digging.

Monsanto has a good plan because they bought a technology that has some promise in *Varroa* control. And they have the funds to develop this technology, and to use it in other fields. But our job – beekeepers, growers, funders, is to first stop digging. That's where the energy, the money, the efforts should be. Get more land, stop the chemicals, breed better bees.

If it were only that simple.

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On a lighter note, I had a good talk with Charlie Brandts shortly after I returned from St. Louis. Charlie retired from his position as Carpenter at the White House a while ago but stayed on as the keeper of the White House Bees. And with help from Bill and Susie in the kitchen, they are doing just fine this year.

He requeened the hive last fall with a lady he raised himself. She was the daughter of a Maryland Mutt,

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It's Summers Time —

Deadlines, Summer, Friends and Those Chickens

As I write this we are getting ready for the Fourth of July holiday. Actually we're preparing to work most of the holiday weekend. That's the way it goes sometimes when you're life revolves around deadlines. Sometimes you have to work weekends – but when you love what you do it's OK. And we love our job. We love creating *Bee Culture* for you each month. But sometimes it gets a little crazy especially when you throw a holiday in there close to the deadline and we're off to a meeting next week for four days so you have to get it done before you leave.

There are times when we are dealing with three issues at once and even a seasoned veteran can get a little confused. Last week you got your July issue, right now I'm finishing up the August issue and Peggy and Kim are gathering ads and stories for me to start the September issue as soon as we get back from our meeting. And there is that Journal that you need to finish and Kim is working on two books and we're off to EAS in about four weeks. Yikes!

At the end of the day – and that time varies – we come home to the chickens, the cats, the garden and the yard. This is where we find peace and quiet. Feeding the chickens, gathering eggs, pulling weeds and talking to the cats – it's all very relaxing.

Here in Northeast Ohio we had almost the wettest June ever recorded. It's been a difficult Summer for getting the garden going. It's been so wet that some plants are almost rotting in the ground. We dug holes to plant some sourwood trees and the holes are still full of standing water after several days of rain. We've lost maybe 10 tomato plants – we only planted 39, so we'll be short a bit.

I'm trying Kale in the garden this year. I don't know much about it, have never cooked it – I'm not even sure I've ever tasted it. But I keep reading how good it is for you. One of those top nutritious foods that everyone should eat. So, if you are a Kale Connisseur please help me out and send along your ideas and recipes. I do have one recipe from a friend for Portugese Kale Soup. Sounds pretty good.

Our dear friend Ruth from England visited last week for a few days. We met her and her husband Jeremy maybe 10 years ago on our first trip across the pond. Our first meeting took place at Apimondia in Dublin, Ireland. Kim and Jeremy had been business friends for quite some time. Jeremy runs Northern Bee Books in England and publishes the *Beekeepers Quarterly*. We have visited in their home several times now and so enjoy their friendship. This is Ruth's second visit and both times she's been to Northeast Ohio we have record heat – much hotter than what she's used to, but she doesn't seem to mind too much.

Ruth is an expert musician – she plays the recorder, harpsichord and flute and maybe others I don't know about. She comes to the states every Summer to teach at a week-long recorder workshop in Connecticut. And she's a knitter of supreme talent. We went yarn shopping while she was in Medina and I have a wonderful hat and hand warmers coming my way.

Ruth is very easy to have around. She's comfortable with our lives because hers and Jeremy's lives are very similar to ours. They work together, so they spend a good deal of their day with each other, like Kim and I. They have grown up boys that come and go and extra boys, so do we. They have cats and fowl. But their fowl are peacocks – beautiful and very loud. When we were there in April the male put on quite a show for us. I had never been that close to one. They're very comfortable with people and come right up to the door looking for Ruth to feed them. Their house is cluttered, like ours. Only their house is a big stone house built in, I think, the 1700s.

Hopefully we're making this a tradition and Ruth will come back each Summer and spend a few days with us. She is a delight. We haven't been able to talk Jeremy into coming yet, but we're trying.

The chickens are doing well. It's been very hot here so I've been experimenting with new water supplies. But like most of us they don't like change. But if you have chickens make sure they have plenty of water. Every book I read talks a lot about water.

I hope you are having a wonderful Summer, that it is not too hot and that your garden and your chickens and your bees are doing well.

Happy Summers

A Closer LOOK

SENSORY NERVOUS SYSTEM

Clarence **Collison**

Seeing, tasting, moving, humidity, smelling, and more.

The central nervous system of the honey bee consists of a brain and seven ganglia or nerve centers, at various junctions throughout the body. Much of the nervous control exercised by bees is performed not by the brain but by these centers, which provide local control over some of the bee's musculature (Winston 1987). The brain is located in the head above the pharynx and the ventral nerve cord is in the lower part of the body extending from the head to the posterior part of the abdomen.

The brain is principally a sensory center, as it receives the nerves from the eyes and the antennae. The ventral nerve cord consists of a series of small, segmental nerve masses or ganglia, united by paired intervening connectives. The first three ganglia of the ventral system are always condensed into a large composite ganglion, termed subesophageal ganglion, lying in the lower part of the head and supplying nerves to the feeding organs (Snodgrass and Erickson 1992). The first body ganglion pertains to the prothorax. The second in the bee lies in the posterior part of the thorax, but it is composed of four primary ganglia belonging to the mesothorax, metathorax, the propodeum, and the first abdominal segment and supplies nerves to all these segments. In the abdomen are five ganglia. The first two are displaced forward so that each innervates the segment behind it, the third lies in its own segment (V) and gives its nerves to this segment, the fourth is in segment VI but innervates segments VI and VII; the fifth in segment VII, supplies nerves to segments VIII, IX, and X.

The brain and the ventral ganglia are masses of nerve cells and nerve fibers. The cells of the central system give rise to the fibers of the motor and the association nerves, but the fibrous parts of the ganglia include also the branching ends of the incoming sensory nerves from the peripheral sensory nerve cells (Snodgrass and Erickson 1992).

The brain is composed of three components: protocerebrum, deutocerebrum, and tritocerebrum. The greater part of the protocerebrum is made up of the very large optic lobes, great bundles of crossing and recrossing nerve fibers (chiasmata) connected with the thousands of units of the compound eyes. The deutocerebrum is similarly made up of bundles of nerve fibers connected with the sense organs of the antennae. The tritocerebrum is small and obscured by the other parts; its sends nerves to the labrum and frons (for the cibarium, sucking pump) (Dade 1962).

From the receptive cells of the sense organs, sensory nerves extend inward to the central nervous system. Another set of fibers, called motor nerves, goes outward from the cells in the central system to the body muscles and glands. A third set of intermediary association fibers connects the ends of the incoming sensory nerves with the roots of the outgoing motor nerves. In this way there is established a nerve circuit from the outlying sense organs through the central system to the muscles or glands and the stimuli received from outside the body thus set up a nerve impulse that finally activates the motor system, or causes certain glands to produce a secretion. What the bee does in response to an external stimulus is called a reaction (Snodgrass and Erickson 1992).

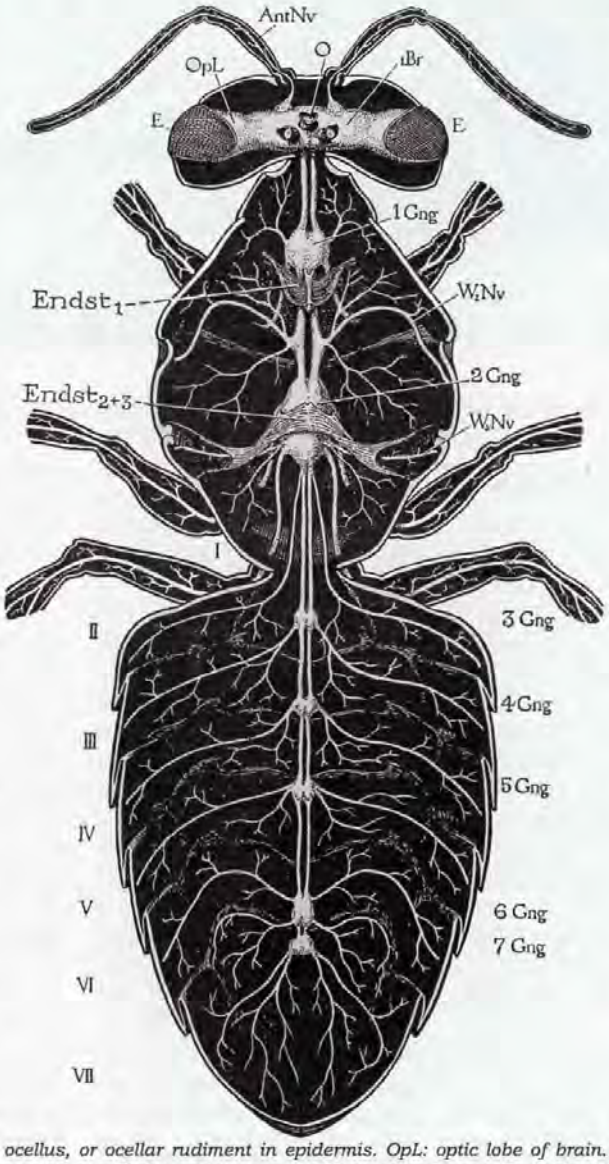
The antenna-sensory system of the honey bee plays a key role in the life and survival of this highly social insect. The antennae of the bee house a diverse array of receptors that are involved with the detection of odors, touch, taste, temperature, relative humidity, vibrations and CO_2 levels (Esslen and Kaissling 1976). There are seven types of sensory structures found on the antennae: a) small-thick-walled hair (sensillum trichodeum), b) thick-walled peg (sensillum trichodeum), c) slender thin-walled peg (sensillum trichodeum olfactorium), d) large thin-walled peg (sensillum basiconicum) e) pore plate or plate organ (sensillum placodeum), f) pit organ (sensillum coeloconicum) and g) pit organ (sensillum ampullaceum) (Winston 1987).

Primary odor reception on the antennae takes place in sensilla that house olfactory receptor neurons which transmit olfactory input to the antennal lobe of the brain. Three types of olfactory sensilla are present in the honey bee: sensilla basiconica, sensilla placodea and sensilla trichoidea. Olfactory receptor neuron axons project via four distinct sensory tracts (T1-T4) to four corresponding glomeruli clusters in the antennal

lobe, the first central relay station for processing of olfactory information in the insect brain. Here, olfactory receptor neuron axons synapse on local interneurons and projection (output) neurons. The axons of projection neurons terminate on Kenyon cells in the mushroom bodies, higher sensory integration centers and brain centers associated with learning and memory (Kropf et al. 2012).

Taste is crucial for honey bees for choosing profitable food sources, resins, water sources, and for nestmate recognition. Taste, the sense that distinguishes between chemical compounds and the sensations they produce based on contact with chemoreceptors, allows discriminating edible from nonedible items and is, therefore, crucial for survival. Gustatory sensilla take the form of hairs (chaetic sensilla) or pegs (basiconic sensilla). Gustatory sensilla have a characteristic aperture at the apex (a pore or a papilla) through which gustatory substances can penetrate after contacting the hair or peg. Gustatory sensilla are mostly located on the distal segment of the antennae, on the mouthparts, and on the tarsi of the forelegs. These sensilla respond with varying sensitivity to sugars, salts, and possibly amino acids, proteins and water. So far, no responses of receptor cells to bitter substances have been found although inhibitory effects of these substances on sucrose receptor cells can be recorded. When bees are free to express avoidance behaviors, they reject highly concentrated bitter and saline solutions. However, such avoidance disappears when bees are immobilized in the laboratory. In this case, they ingest these solutions, even if they suffer afterward a malaise-like state or even die from such ingestion. Central processing of taste occurs mainly in the subesophageal ganglion, but the nature of this processing remains unknown (de Brito Sanchez 2011).

Gustatory sensilla on the antennae are used to assess food quality during foraging and ingestion. Antennal gustatory sensilla are very sensitive to sucrose stimulation resulting in a proboscis extension response (PER) in laboratory trials (Takeda 1961). Approximately 300 chaetic sensilla were found distributed over the antennal flagellum (Esslen and Kaissling 1976). An important concentration of these sensilla was found on the ventral surface of the distal segment of the antennae which constitutes the primary antennal contact region with tastants. About half of the chaetic sensilla observed on the antennae are innervated by six gustatory receptor neurons and one mechanoreceptor neuron; the other half has five gustatory receptor neurons and one mechanoreceptor (Whitehead and Larsen 1976).



O: ocellus, or ocellar rudiment in epidermis. OpL: optic lobe of brain. E: compound eye. Endst: endosterum. AntNv: antennal nerve. Br: brain, (1Br, protocerebrum; 2Br, deutocerebrum; 3Br, tritocerebrum). E: compound eye. Gng: ganglion I, lamina ganglionaris of optic lobe; II medulla externa; III medulla interna. W2Nv: wing rudiments. W3Nv: wing rudiments.

From Snodgrass, with permission

Physiological mechanisms of antennal sucrose perception were analyzed using behavioral and electrophysiological methods (Haupt 2004). Following sucrose stimulation of the tip of a freely moving antenna, the latency (measure of time delay) of proboscis extension was 320-340 ms (millisecond, 1/1000 of a second), 80-100 ms after the first activity in muscle M17 controlling this response. When bees were allowed to actively touch a sucrose droplet with one antenna, contacts with the solution were frequent with durations of 10-20 ms and average intervals between contacts of approximately 40 ms. High sucrose concentrations led to short and frequent contacts. The proboscis response and M17 activity were largely independent of stimulus duration and temporal pattern. Taste hairs of the antennal tip displayed spike responses to sucrose concentrations down to at least 0.1%. The first 25 ms of the response were suitable for discrimination of sucrose concentrations. This time interval corresponds to the duration of naturally occurring gustatory stimuli.

Mouthparts include the mandibles, maxillae, and the labium. The maxillae and the labium form the proboscis. Chaetic sensilla of different sizes were found on the galea of the maxillae, and on the glossa and labial palps associated with the labium. Basiconic sensilla were also found on these structures except the glossa (Whitehead and Larsen 1976). Sensilla were also found on the mandibles but they have only one sensory neuron besides a mechanosensory cell but the role of these sensilla is unclear. At the base of the mouthparts, the preoral cavity forms a sac where the food is ingested. The preoral cavity is prolonged into the cibarium, a cavity whose muscles

in its walls form a suction pump, which facilitates food ingestion through the proboscis. Sensilla are also present in the oral cavity. Food entering this cavity contacts approximately 50 to 60 hypopharingeal sensilla, which are located on the base of the cibarium. Light microscope observations suggest that these sensilla are innervated by four neurons (de Brito Sanchez 2011). The proboscis presents many sensilla that have been related to gustatory processes.

Taste sensilla are located on the tarsus and pretarsus of the forelegs (de Brito Sanchez 2011). Sensilla are mostly chaetic and are distributed evenly between the five subsegments of the tarsus, with a high concentration on the terminal claw-bearing pretarsus. Chaetic sensilla share similarities with those found in the mouthparts, with a mechanosensory cell ending at their base and four cells running to the tip of the shaft (Whitehead and Larsen 1976). Proboscis extension response (PER) can be elicited upon sucrose stimulation of the tarsi, thus indicating that sugar receptors have to be present within tarsal gustatory sensilla. Marshall (1935) found that bees exhibited PER at a concentration of 2.85 % when stimulated at the antennae but that a concentration of 34% was required to elicit PER when the tarsi were stimulated. Similar results were found by de Brito Sanchez et al. (2008) as they showed that over a wide range of sucrose concentrations sucrose responsiveness is always significantly higher for antennal than for tarsal stimulation. A mechanistic basis for this difference could be found at the level of taste sensilla, existing on the antennae and the tarsi. Whitehead and Larsen (1976) reported 318 chaetic sensilla but no basiconic sensilla on the antennae and 10-20 chaetic sensilla and 0-6 basiconic sensilla per tarsomere of the forelegs. Thus, a simple numeric comparison shows that, at least for chaetic sensilla, the antennae are equipped with 15-30 times more receptors than the tarsi, a fact that could be related to the higher responsiveness for sucrose shown upon antennal sucrose stimulation.

The sensillum coelocapitulum, a hygro- and thermoreceptive sensillum of the honey bee was investigated by electron micrsocopy (Yokohari 1983). The cuticular apparatus of the sensillum is a mushroom shaped protrusion, devoid of pores, set in a narrow cylindrical pit positioned centrally within a cuticular, shallow depression. There may be three or four receptor cells. Three receptor cells have unbranched sensory cilia, containing densely packed microtubules, which extend distally into the cuticular apparatus and completely fill its cavity.

Hygienic behavior is a desirable trait of honey bees, as hygienic bees quickly remove diseased brood, interrupting the infectious cycle. Hygienic lines of honey bees appear to be more sensitive to the odors of dead and diseased honey bee brood and Africanized honey bees are generally more hygienic than are European honey bees. Gramacho et al. (2003) compared the number of sensilla placodea (plate organs), antennal sensory structures involved in the perception of odor from hygienic and non-hygienic Africanized honey bees. The sensilla placodea of three of the terminal segments (flagellomeres) of the right antenna of each bee were counted with a scanning electron microscope. There were no significant differences in the mean numbers of sensilla placodea between the hygienic and non-hygienic bees, though the variance was higher in the hygienic group. Flagellomere four had significantly more sensilla placodea than flagellomeres six and eight. However, there was no significant difference between the other two flagellomeres. As hygienic bees are capable of identifying dead, injured, or *Varroa* mite infested brood inside a capped brood cell, sensilla placodea probably have an important role in enabling worker bees to sense sick brood. However, greater numbers of this sensory structure in the antennae of hygienic, compared to non-hygienic Africanized honey bees was not found. BC

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Bees In A Building

Removing bees from a building requires tools, patience, and sometimes luck.

Jim **Thompson**

Beekeepers often receive calls from individuals with honey bees in their house – in the walls, behind brick fireplaces, in the ceiling, the soffit, the attic, or other locations. The bees may be entering at any level and there could be multiple swarms in the house. In 1968, I heard a man from California mention that he took 18 swarms out of the four sides of a house. In the 1970s, I know of a man that removed a swarm from a grain storage building that had 2x6 studs and no fire blocking. That swarm had covered an area 6"x24"x16'. Still other swarms have attached themselves beneath a solid (with the single hole) iron manhole cover, inside a discarded hot water heater, inside a squirrel box and even been found in bird feeders. Thus the beekeeper usually visits the scene to make an assessment as to what needs to be done and the equipment needed, and if the bees are actually honey bees.

Some swarms are easier to remove than others simply due to their location and if the initial structure is going to be saved or not. Obviously if one can stand on the ground to remove the swarm it is safer to remove. Bucket trucks and scaffolding are expensive and useful for high swarms. Working off tall ladders is dangerous and should be avoided. If the bees are high in the air, the stinging danger on the ground is less and it could be determined to leave the bees alone. If the house is going to be resided or remodeled the bees must be removed.

Honey bees lack the necessary mouth parts to chew solid wood however they can remove paper and insulation. Thus, honey bees usually occupy an existing cavity. Once in a space they investigate and are drawn by the light so it is common for bees to emerge inside the house through electrical outlets or window casings. Bees occupy the cavity and in the Spring of the year begin their natural tendency to reproduce. When this happens, the current queen leaves the nest and takes about half of the bees with her. They will seek a new home that provides a protected area. About three days later a new queen will emerge in the "house" and fly, mate, and return. If she is successful the hive is set to operate for another year.

Honey bee swarms can gather large amounts of nectar in a short period of time. I have seen a swarm fill a deep super of comb in one week. The honey is used by the bees to be their food source through the Winter. Therefore if the swarm is to be removed in the Fall, you can expect an abundance of honey. If the swarm is to be removed in the early Spring less honey will be present however it may be too cold for the bees to be exposed. The bees need the months later than July to build up strength for Winter. This leaves the time from late March to late June as the optimum months for bee removal.

One method of bee removal by nondestructive means is by using a swarm trap and has very critical timing. A hive is placed about 50 feet away from the house attracting the swarming queen and her bees. The swarm leaves, finds the new home and moves in. This hive is removed in the evening as soon as it is occupied. Another way is to trap them out using a 12-inch cone with a ¼" outside opening placed over the entrance and all other entrances are securely blocked. A miniature hive (nuc) is placed near the cone with a frame of brood attracting the bees that are displaced by the cone. The miniature hive is used because it is light weight and usually must be hung and removed. When the nuc becomes full of bees, it is replaced with another empty one. This operation is repeated until there are no more bees coming from the house, and the cone and other entrance blocks are removed. Then, a new different hive is placed close by that will rob out the remaining honey in the house. Then the cavity is filled, the entrances are caulked or blocked shut. If the timing is correct, the whole process takes about one month. If your timing is off or the bees find another entrance you can spend six months and still be unsuccessful in removing the bees.

Honey is the issue in whether the bees are removed or not. As long as the bees are alive, they keep the honeycomb cool enough to contain the honey. If they are sprayed and killed the wax would melt on a warm day and the honey would run all over the place. Once the drywall becomes soaked in honey there is no way to paint the surface. Once an active hive is killed by an insecticide the honey may also be contaminated and is worthless. There could be a smell of dead bees in the walls and eventually there will be an ant, beetle, or moth problem.

Professional exterminators are reluctant to remove bees, and may infer that it is illegal to spray honey bees. In reality to remove a colony from a house and still guarantee their work, they must remove the honeycomb and honey. Therefore the easy excuse is to say that it is illegal to spray and kill honey bees.

Many beekeepers will shy away from bee removal

Bee vac.

String frames.

Screen frame.

from houses because they lack the proper equipment or the proper carpentry skills. Some have a fear of being sued and often the acquired bees are not really worth the effort. Obviously if you lack the proper safety equipment such as scaffolding, circular saws, reciprocating saws, bee vacuum, screw guns and more, you shouldn't attempt bee removal. You should know how a building is put together so no structural damage is done to the building. For everyone's safety, you should be bonded. Some people could claim that you trampled their favorite rose bush and thus file a law suit for damages more than your fee. Therefore you should have a written agreement prior to doing any work. Many times the queen of the colony is lost or killed so the beekeeper doesn't gain much from the removal. The bees in the vacuum system must be changed and placed in a cool place because they overheat quickly and die. The honey gained from the removal is used as bee feed.

The decision has to be made as to the outcome of the bees. Are the bees going to be ignored? Are the bees going to be removed and transferred to a hive? Are the bees going to be killed and then the honey and honeycomb removed?

If the bees are ignored, there is no immediate cost to the landowner. However the landowner should keep a watchful eye on the bees in the Spring as there is a chance that they use all the honey and starve. If the bees stave the landowner may want to plug the opening to prevent a new swarm from moving in. However there might still be a possibility of some honey in the walls and an open space without insulation, so an internal inspection would be recommended. The other two choices involve opening the cavity and fixing the problem. You can't expect a person to accomplish all of this work without compensation.

I no longer remove bees from buildings but I have found that each situation is different. Most of the houses have had wood siding however those that have acrylic, composition, or aluminum siding must have the long strips of siding removed if you take the bees from the outside. Sometimes one must take apart an inside wall or ceiling to get the bees. In those cases sealing off the room with plastic and having an outside open window is helpful. It is also helpful to have electricity to run the power tools however sometimes you must have either gas powered tools or a generator.

The removal of the bees and transferring to a hive would be similar to the following. The boards on the side wall should be numbered on both the removable section and the stationary side. A circular saw is set to the depth of the siding. Then the boards are cut on the inside of both studs so the remaining pieces can be anchored and are flush to the opening. The center pieces are carefully removed to leave the comb still in the cavity. The bees are smoked lightly and you should have an empty hive to hold a variety of special frames and some empty queen cages near. I have found a bricklayers trowel is very helpful but you can use spatulas, knives and even hive tools to cut, carry and install comb into the frames. The comb normally has about a 21° upward angle, so it should be reinstalled in the frame observing this angle.

I have used two special frames in the operation. The first is a standard empty frame where I have driven several common brads into both sides of the top and bottom boards of the frame leaving the heads of the nails protruding about 1/8". The heads of the nails will hold a cotton kite string and are staggered about 2½" apart. One side of the frame is laced and tied. The open side of the frame has the string tied at one end. This makes a pocket for you to place the comb pieces in.

An alternative to the nails is to use a stapler. When complete, you simply lace and tie off the other side and place the frame in the hive. Let the bees cling to your completed frames. Use this type of frame for the brood cells. You should have a bucket of water and a towel to clean your hands and always look for the queen.

If you find the queen catch her and put her into one of your queen cages along with some attendants. Place the queen cage on the bottom board of the hive and get it out of the sun as soon as possible.

The second type of frame that I have used has the end pieces cut from a 2x4. They are 1½" wide and about ¾" to 1" thick. The ends have a solid slat bottom bar and ½" hardware cloth on both sides. These frames provide a pocket for any size and shape comb. Therefore I have used them to put the comb honey and odd pieces in. When you get one super of frames full, place it in the shade nearby and fill the next one until the house cavity is empty. Some beekeepers use ordinary frames and tie the comb in by looping string or strips of cloth while other beekeepers use rubber bands. Most of the bees should now be with the hives which you have put together to be moved in the evening. Scrape and wash the house cavity to eliminate any bee attractant. Cut 1x2s slightly longer than the opening and nail or screw them to both studs. Place insulation into the opening and replace the removed siding by the numbers. Secure the siding to the 1x2 strips and caulk the joint.

For bees in the ceiling, I have used long pipes to extend beyond the swarm and smoked the bees out toward the opening. When the bees came out I vacuumed them and then removed the comb with a tile shovel. This method is not as successful as taking the ceiling apart

Bees removed shows rubber bands holding comb.

and removing the bees.

A similar removal is taking bees out of a tree. All of the tools used are the same except for the addition of a chain saw. The tree section that contains the bees is trimmed until you can see comb at both ends. Cut the tree section on both sides making sure to cut only the wood. The blade should be aligned between the combs, so very little damage is done if the blade goes too deep. Transfer the bees and discard the tree trunk from the area. This operation should take about one hour to complete.

Bees on the underside of manhole covers can be cut off and transferred while the bees in a discarded hot water heater may have to be trapped out. Don't make any guarantees because you will still have comb inside the tank. Squirrel boxes and bird feeders usually have to be disassembled.

Most of this bee removal is done to satisfy the safety of the general public however there might be a chance that somewhere the beekeeper may obtain a special genetic strain of honey bee. BC

Jim Thompson is a beekeeper and collector living in Smithville, Ohio.

From Our Perspective

A. Gary **Shilling**

Each year, we give away my bees' honey, about 2,000 one-pound jars, to our clients and friends. Since we are in the economic consulting business, our honey jar label each year contrasts my bees' work with a current economic, investment or political development.

"America is beautiful, so is our honey" in 2001-2002 refers to the 9/11 terrorist attacks. "Our honey's sublime, not subprime" in 2007-2008 obviously related to the beginning of the subprime mortgage bust, which we predicted in 2006. For 2012-2013, as the Federal Reserve under Chairman Bernanke floods the country with liquidity, we used "Bernanke's money can't buy our honey."

The year 2005 was a memorable one for the Supreme Court, and our 2005-2006 label, "By 9-0, our honey is supreme," evoked a memorable response from my friend, Supreme Court Justice Sandra Day O'Connor. She wrote in a very carefully legally crafted letter, "I join in your opinion that your honey is supreme."

Earthquake! Earthquake! Earthquake!

John **Kefuss**

Sometimes I get out of bed faster than usual!

It was 3:34 a.m. on Saturday morning February 27th, 2010. In the distance I thought that I heard the local train going through the tunnel in the mountainside near our queen rearing station at Limache, Chile. Even though it is at a distance, every time the train passes through the tunnel it causes the house to shake a little. This time it was taking a very long time for the train to pass and the house was really starting to vibrate. Suddenly it seemed like the locomotive was coming out from right underneath my bed and was going to run over me. This is probably the same feeling a dog gets when it is about to be run over by a big truck. At that moment someone shouted "earthquake, earthquake." I grabbed my brain (Macintosh computer) off the desktop and tried to fit under the small desk. First the computer, then myself . . . at least what I could get underneath. When the shaking slowed down Francisco called and asked if everyone was ok. He said to be careful when we come out because there was broken glass on the floors. I put on my shoes and got outside as fast as I could. Since all electric lines were down the truck radio was our only source of information.

Francisco Martinez and John Kefuss.

Bad news, an 8.8 magnitude quake had just hit Chile and tsunamis were coming. We were several hundred km north of the epicenter but we still had a lot of "Shake, Rattle and Roll." This was the 6th largest earthquake ever recorded in the world by seismographs. To give you an idea it was 500 times stronger than the 7.0 magnitude quake that hit Haiti in January 2010). It was so strong that it moved the town of Conception Chile three meters to the west[1].

As the reports were coming in we realized that today was going to be a very special day for us. After a while everyone went back to bed except for me. I preferred to remain in the truck and listen to the news. The others laughed at me but I thought better safe and alive in the truck than a dead in a bed! You never know when the aftershocks are coming. Besides the reclined seat of the truck was very comfortable, especially during the 6.2, 5.4 and 5.6 magnitude shocks that actually occurred during the 60 minutes following the 8.8 shock. Later when I got tired of listening to the news I started to make the rounds

Replacing nucs on stands.

Nucs at workable height.

of the nuc yard putting nucs back on the stands. The first nucs were ok but after that it was three km of mess. After a few stings I decided that it would be best to wait until it got light and I had some bee gloves. I walked around the bend and saw a fire burning on the mountain in front of us. Fires start easily here in Chile. So dry. The clear moon was beautiful. I stopped by the house of one of our workers. Everyone was outside talking and looking at the fire. No one was hurt. I walked up the hill and back to the truck. Being on the side of the mountain we did not have to worry about the 1.29 meter tsunami that struck near us at Valparaiso later on that day. We were much luckier than those further south of us. Over 525 people were dead and 370,000 homes damaged[1].

Normally in Chile we do not work on Saturdays but earlier in the year our employees had taken an extra day off and so they were scheduled to come to work on that Saturday to replace the day they had taken off. At 8:00 am despite the earthquake everyone was there. We have really good employees. No panic or resignation. Just the motivation to get a job that had to be done . . . done. Situations like this make you appreciate people even more. After a short discussion it was decided to get all of the nucs that had fallen put back on their stands before they could be attacked by the red ants or robbed out. We split into several groups and maintained contact with walkie-talkies. We always use walkie-talkies for communication because they are a lot cheaper than portable telephones and everyone knows what is going on. After checking the nucs we went to the out yards where we had queen storage colonies and regular hives. It took several days to clean up the mess as we had about 2500 nucs and 5000 hives to check out. We don't know how many queens we lost in the storage colonies. Some things you just don't have time to count.

Now back to the beginning. On February 7, 2010. I flew down to Santiago Chile from Toulouse France where my beekeeping associate and good friend, Francisco Rey Martinez and his companion Kenka picked me up at the airport. Even though it was during the busy season Francisco said that our younger workers had made a special effort to get everything cleaned up before my arrival. They know from experience that I am a stickler for order. I have a sledgehammer that I use to take care of any junk equipment. Makes nice wood for the barbecue. In fact I just need to point and say barbecue and the object is taken care of. So when we drove into the breeding station at Limache I was happy with what I saw. Everything was well stacked and in its place.

Every time I come to Chile I see that things have improved. When I first came to the breeding station at Limache in 1994 it was in an abandoned avocado orchard at the bottom of a mountain. Higher up gold used to be mined (I never found any). After three months of bulldozer work we had a real nice mating station with truck access everywhere. When the bulldozer would cut the road, I would follow it in the pickup truck to make certain that we could maneuver correctly. Posts with two deep five-frame langstroth nucs were placed on each side of the road. Their lids were located at the height of my belly button for easy working. So that gave us about three km of road with nucs on each side with just enough space in between so that our pickup trucks could pass and we could pull off equipment from the truck bed as we needed it without doing a lot of walking and bending. As years went on things just got bigger and more efficient.

Queen storage nuc dividers.

This time the new improvement was how we stored queens. In the beginning we used to sell the queens directly from the nucs and then put in a queen cell the day after. However when there were shipping delays such as airline strikes in France our grafting system would be disorganized. In addition since we export to Europe and other places outside Chile we had to store queens until the end of our queen rearing season for shipments in March (Fall in Chile, Spring in Europe). That blocked up a lot of nucs and was very not efficient. So the new improvement when I arrived was to mate the queens at the breeding station in Limache and then carry them to storage nucs at out yards. This permitted us to graft and pull queens on a regular basis independent of shipping conditions.

All our colonies are on pallets

Storage nucs. Each pallet holds 16 queens.

Our queens are good queens.

One big mess.

After this, we add a cleat to stop the sliding.

because of the red ants. The four colonies on the queen storage pallets are divided in the middle to hold two nucs. This means that we can store eight queens on a pallet under ideal storage conditions for each queen. Each queen has her own bees and four deep Langstroth frames to lay eggs in. When a pallet has eight queens, four more divided hives are placed on top and filled with eight queens. So 16 queens are stored on a pallet.

Although expensive in time, bees and equipment, this method gives us a chance to control the brood laying pattern of the queen and she does not have shrunken ovaries when shipped in contrast to queens stored in queen banks. I imagine that queen acceptation for the beekeeper is probably better but I don't have the data to back this statement up. At the end of the season the bees and brood from the storage colonies are used to replace any losses and reinforce other colonies for avocado pollination so nothing is lost. But most important, under our conditions we can work more efficiently, not be stressed by airline strikes and produce excellent queens. This method is probably not so interesting if a beekeeper has access to cheap bees, no airline strikes and does not have to store queens for delayed shipments.

Every time I am in Chile I test out new ideas. The advantage of keeping bees north and south of the equator is that I can test out my ideas 12 months a year. This time I tested a new automatic syrup feeding system and was able to work out the problem of syrup delivery to the hives on the pallets. Syrup feeding is important because it takes us a lot of time to feed the nucs and grafting colonies. I had a few other problems with the feeding system such as bees clogging access to the syrup but I was able to work those out later on in France.

So you could imagine what happened to all those storage colonies and everything else on the day of the earthquake. One big mess. As we worked through the yards we noticed differences in the amount of damage. At one storage yard we had only a few nucs damaged. This was on a flat location near the river. Perhaps the loose sand-gravel nature of the soil reduced the impact of the earthquake. Also there were only four divided nucs on each stand instead of eight. At Limache the nucs slid sideways off the wooden bars nailed on the top of the posts and some rolled down the mountain. For future earthquakes a cleat nailed on each end of the wooden bars should reduce this damage due to sliding. One of our next goals is to find ways to make everything more earthquake proof without slowing down our work.

In Chile there are a lot of earthquakes so Chileans are more used to them and better prepared. Earlier when Kenka was thinking about buying her apartment Francisco had suggested that it would be best to wait until after a big earthquake to see how well it would hold up. Since the building held up quite well it could be a good buy if the price is right.

On March 16th I got on the plane at Santiago and flew back to Toulouse France to start the queen rearing season. Since the airport building was damaged tents had been set up but everything was going very smoothly and planes were loading quickly. Looking at the damage inside the airport building I am glad I was not there during the quake. Decorations are nice but not when they can fall on your head. BC

John Kefuss is a queen breeder and beekeeper living in France.

Reference

1. **Http://en.wikipedia.org/wiki/2010_Chile_earthquake**

FORCED TO GLEAN FOR A LIVING

A review of one of the several elephants in the middle of my apiary.

This may not be an article. You tell me.

I'm not sure where my thoughts are going this month. I know what is on my mind, but I cannot predict at this moment that my comments will ultimately be article-worthy. If it doesn't work, I suspect some of you will let me know.

In the January, 2013 *Bee Culture*, I got it off my chest. I had some populous bee colonies die from an obvious *Varroa* attack. The questionable colonies were started from packages the previous Spring and built up in great form. I did not see the attack coming. I had never before treated packages during the same season that I hived them. But enough of that – I learned a lot. This year will be different.

Spring, 2013

I got six packages and installed them in the traditional manner. As of today, I have suffered no queen losses. They have built up nicely and have numerous brood frames. In the previous paragraph, I mentioned that my doomed packages last year built up nicely, too. The 2012 packages did that because an organic farmer about a thousand yards from me allowed his one hundred acres of wheat/alfalfa mix to go to flower. This year has been much the same. Colonies built up nicely. Rain came pretty much on time and the organic wheat/alfalfa bloom began.

Just as bloom was well under way, with a fine piece of John Deere mowing machinery, the farmer mowed the field – every standing stalk of it. *With bees, if it's not one thing, then it's another.* I was sick. I have been monitoring my *Varroa* levels. I supered on time. I provided supplemental protein sources. I provided a dependable clean water supply – and my neighboring farmer mowed my nectar source. From his management standpoint, it was the correct thing to do. Last year was too wet for him to get the cutting off. This year, he made it. So, should I have wished him bad luck?

Some frustration reasons

Part of my early season smugness was that *I thought* I had a nectar flow pretty much guaranteed. My bees are the only ones in the community – of which I am aware – that were near the large planting. Everywhere else is typically nectar scant. Suddenly, I too, became nectar-scant.

There is an elephant in the middle of my apiary

You know the adage, *"There is an elephant in the middle of the room?"* Well there is practically a herd of elephants in the middle of my apiary. The bigger elephants could be named *Varroa* and *chemical pesticides*. Some of the smaller elephants could be named *small hive beetles* and *poor queens*. We talk about these herd members all the time – especially *Varroa* and insecticides. But as I watched the new piece of advanced farm equipment mow down my nectar flow, I realized that many of the bees from my pumped-up colonies were going to spend most of their foraging lives as gleaner bees or bee foragers that "catch as catch can" on minor source food plants. The major plants in my area are corn, wheat, soybeans[1] and green-grassed lawns?

Nectar flows

I grasp that nectar flows vary significantly across the U.S., but nearly all areas get *some* flow. I presently have my seven colonies in a residential area that is typical for NE Ohio. This year, early fruit bloom was okay but not great. Locust and poplar were below average as is typical. Clover and sweet clover is just beginning to bloom as I write. That should be my big flow, but increasingly, I am not expecting anything great from clover. Every year, there is less of it left in my community.

Last Saturday (during early June), I took about a 250 mile round trip drive to the annual Ohio State Beekeepers spring meeting. I took the trip during the short nectar dearth that comes between locust and clover bloom dates here in Ohio. Except for a few patches of small yellow flowers, there was really nothing available. It was an oddly beautiful day. Warm, clear blue day and everywhere everything was green.

[1]Some beekeepers' colonies get a nectar flow from soybeans, but in much of the Midwest, bees do not get such a flow.

George Capwell Apiaries, Cottonwood, KS 1920.

(Now this is the point where I admit that this may not be worthy of being an article.) I was not around a hundred years ago. I don't know how the world looked, but I ask, *"Was it always this green or was the environment more punctuated with wildflowers and flowering weeds?"* I don't know. Again, I admit that I wasn't here.

At this very moment, I am writing you from South Alabama. Last week on a longer trip I drove through Ohio, Kentucky, Tennessee and nearly all of Alabama (early June). Again, green is the primary color – by far. In the mid-1950s, the U.S. had approximately seven million colonies of bees. I have to ask, *"If we suddenly had seven million colonies in our national apiary, on what would all these bees forage?"* During the past decades, we have become very adept at killing nearly all weeds and growing beautifully sterile lawns. *(Time for a disclaimer – I am not at all opposed to nicely manicured lawns. Indeed, I try to keep my front lawn in perfect condition).* But we have nicely manicured nearly everything. Roadside ditches, park grounds, farm lanes, and even fence rows presently seem to need to be weed-killed and mowed. And interestingly, anything the herbicides don't get, the string trimmer or the hydraulic mower will.

We probably learned to keep our lawns pristine from modern agriculture that has successfully developed techniques for killing nearly all field weeds. Does anyone remember "weedy" fields that had to be hoed by hand or constantly worked by plow? I have no idea how many species of flowering plants (weeds) that have been brought under control by modern chemical techniques, current seed varieties, and modern tillage techniques, but it has to be a significant number. As a kid, with bare feet, I would wander down the dirt road that passed my grandparents' house searching for Maypops[2] which I would promptly burst to hear a slight popping sound. Now there are no Maypops (*Passiflora incarnata* L), no sloe plums (*Prunus spinosa*), and no exotic Chinaberry (*Melia azedarach*) along that road. These three plant species were all minor nectar and pollen plants. They represent the many other lesser bee food plants that resulted in nutritional diversity and dependability. Now the county mowers come by and trim ditches with sophisticated hydraulic equipment. Ubiquitous grass seems to be the natural replacement.

[2]Probably Passiflora incarnate Also called: Purple Passionflower

The apiary in the first photo never saw plastic anything. The apiary in the picture never had any meaningful control or understanding of American foulbrood. The whole area never knew herbicides or complicated mechanical mowers. Was this a better time for you and me? Absolutely not. Was it a better time for flowers and bees? Absolutely.

I have told the following story several times. As late as 1950, my great-grandmother and my grandmother both insisted that their South Alabama yards be swept clear of all leaves and plant litter – right down to the sandy soil. Grass sprigs were pulled to prevent grass growth. The reasons were simple. Any insect that started a journey across that swept barren yard would be eaten by free-range yard chickens. Any snake, of any species good or bad, foolhardy enough to make a break for the house would be beaten to death on the spot. My great grandmother did not live long enough to see the yard world change, but my grandmother reluctantly accepted some grass and the coming green norm. It is not solely for the sake of this article that I tell you that she never accepted this change but only tolerated it.

I am not young any more, but neither am I aged. I can readily remember times when field gates, due to weed growth, became inoperable it they were not regularly opened. There were no herbicides other than diesel or burnt oil. *(I know, I know, but it was accepted then.)*

Bees have to eat something. There our apiary and it's not just Va

It was common to pour burnt oil on dirt roads to help keep the dust down. The paths through the fields were two ruts with grass and plants in the middle and on both sides of the path. If you wanted to cut weeds, you did it with a hoe, a weed sling or a scythe. *(None of these tools left a carbon footprint, but they did leave a lot of sweat.)* Again, I must say, was this a better time for you and me? Absolutely not. Was it a better time for flowers and bees? Absolutely. Do I want to go back to these times? No, I love my digital life.

One of my points

We have, over the past fifty years, significantly changed the everyday flowering plant environments of both suburban and agricultural settings. My adult children and my grandchildren have no idea that such a change just occurred in my lifetime. In their lives, lawns have always been only grass and all farm fields have always been free of knapweed, thistles and such. I argue that it was not that long ago that another world existed. Ironically, due to readily available broadleaf insecticides, in my adult daughters' lifetimes, lawns of yellow dandelions have greatly diminished. I have no way to estimate how many flowering plants have been reduced to inconsequential numbers during this time. Many of these plants, when numbers were combined – both weed and otherwise – were of significant importance to many bee species. Make no mistake. Many of these plants – like sand spurs (Genus *Cenchrus*) and cockleburs (Genus *Xanthium*) – were obnoxious and seemingly were of no use

to either human or bee but not withstanding that, we are presently suppressing a lot of flowering plants (and weeds) with herbicides and mechanical devices – a lot.

Another of my points

In this altered ecosystem with some invasive plants nearly out of control, is it surprising that honey bees and other hymenopterans will readily forage on invasive plant species that we wish they would completely avoid. You remember that multi-state ride that I described above? One of the common flowering plants that was in abundant supply was the multiflora rose (*Rosa multiflora*). Yet there it was – offering foodstuffs to a variety of generalist pollinators including honey bees. Autumn olive (*Elaeagnus umbellate*), purple loosestrife (*Lythrum salicaria* L.) and Chinese tallow tree (*Triadica sebifera*) are three other examples of plants that most people don't want to thrive. We can't stop their spread, and our bees play a part in helping them spread.

But increasingly as we destroy "*weeds*" that are useful to bees and other pollinating insects, are we to be surprised if these insects search out food rewards from undesirable plants? I presently have two off-line fact sheets that list these various noxious plants as nectar and pollen plants. Even though I clearly list these plants as invasive, there are those who would argue that these plants should not even be on any list lest other beekeepers promote them. *Sericea lespedeza* is a valuable forage plant to some and an invasive weed to others. Bees readily pollinate the plant with disdain for both pro and con opinions. Yellow and White sweetclover (*Melilotus officinalis* and *Melilotus albus*) are invasives in some circles but valuable honey crops and soil-holding plants in other circles. Bees cover the blooms on these plants.

efinitely an elephant in the middle of a mites and chemical pesticides.

A tangled web we have woven

We want no weeds and we want clover-free lawns, but neither do we want bees turning to undesirable plants to procure ever decreasing food resources. All the while we want greatly increased bee populations because seasonal food crops are in dire need of dependable, cheap pollination. This does not seem realistic to me. Are we not conflicted with ourselves? We want the good ole days without having to suffer the discomfort of the good ole days. Even if I can keep my bees free of pesticide chemicals and maintain controlled *Varroa* levels, my bees will still need something other than mowed fields and sterile lawns on which to forage. Where will they find these resources?

A comb honey yard in the mid 1920s. This world is gone.

An explanation and disclaimer

I am not opposed to neat lawns. My first paying job was cutting grass with a push mower. I am not opposed to the current concepts of modern agriculture and the invaluable food supply they produce. Honestly, I have spray equipment fitted to my small tractor. I don't want invasive weeds overrunning my environment and I don't want to live in the 1920s. But if society wants the return to large, healthy, and dependable bee populations, wherever we can, we must be prepared to implement large plantings of appropriate bee nectar and pollen crops. Bees have to eat something. There is definitely an elephant in the middle of our apiary and it's not just *Varroa* mites and chemical pesticides. BC

Dr. James E. Tew, State Specialist, Beekeeping, The Alabama Cooperative Extension System, Auburn University; **tewbee2@gmail.com**; **http://www.onetew.com**; **http://www.facebook.com/tewbee2**; **twitter@onetewbee**; **http://www.youtube.com/user/onetewbee**

All The Buzzzz in...

Hello Friends,

It's my birthday month! I will send a special gift to everyone who sends me a poem or a picture.

Bee B.Queen

How many different words can you make from the letters in PROBOSCIS?

How in the world do you say proboscis?

"pro – BOSS – iss"

Mimi Gong, 7, PA

Nic, 7, Pa

Jenna, 5, TX

Smoothy Sweetness

Cool down this summer with this delicious smoothy. Place all these ingredients in a blender. Twirl and whirl into a tasty treat.

- 1 cup yogurt
- 1 cup orange juice
- 1 tablespoon honey
- 1 banana
- ½ teaspoon cinnamon

Seeing is Believing

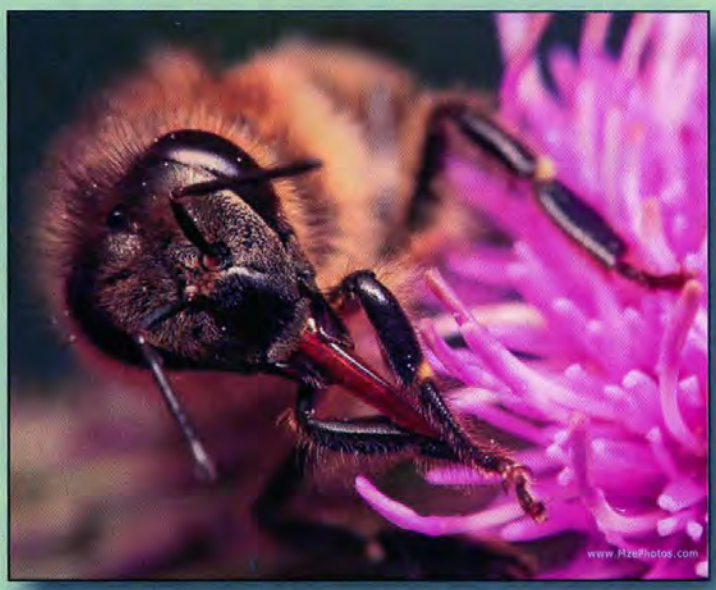
Would you like to see a bee sticking out it's proboscis?
There are a number of interesting videos showing the proboscis extension reflex posted on YouTube by James Nieh.

Proboscis Bliss

Honey bees have two sets of mouth parts. The mandibles are used for chewing. The proboscis is a straw-like tongue used for sucking up nectar, honey, and water.

Let's take a closer look at the proboscis.

The proboscis is made up of several different parts. Think of the proboscis as a tube within a tube. The outer tube is useful for sucking up large amounts of water or even honey when the bees are robbing a hive or preparing to swarm.



Used with permission from www.mzephotos.com

The smaller tube inside the larger one is used for collecting nectar inside flowers. This tube has a hairy spoon-like tip that helps to lap up the small drops of nectar. The tip also has taste receptors.

The proboscis is also used for exchanging food with other bees in the hive. This process is called trophallaxis. Bees do this in the process of making honey and as a way to exchange information.

Proboscis Extension Reflex

When a honey bee's antennae sense something sweet, it automatically sticks out its proboscis to eat. This is called a proboscis extension reflex. You experience something similar when you smell popcorn and your mouth starts to water. You want to eat!

Researchers are using this reflex response to study bee learning and memory to better understand bee foraging. You can even train a bee to respond to different scents by using sugar water as a reward.

... Bee kid's corner

Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
August 2013

Just Suck It Up!

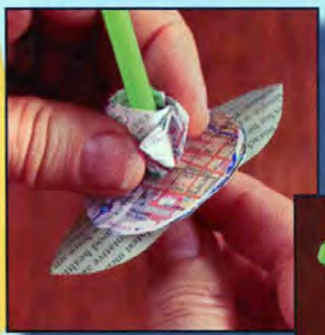
Make your own bee proboscis complete with a flower filled with nectar.
You will need:

- Recycled paper: Use a map, a catalog, or pages from an old book. Thinner paper is better.
- Honey bear cap, or any small lid
- Scissors
- Hole punch
- Clear Tape
- One straw

1. Cut out 8 circles from recycled paper. Use the cap of a honey bear as a pattern.
2. Punch a hole in each circle.
3. Cut out a leaf shape and punch a hole in the middle.

4. Wrap a piece of tape around the straw about a third of the way down. This is a "stopper" for the circles.

5. Slide the leaf onto the straw first, then stack all the circles.
6. Wrap another piece of tape above the circles to keep them from sliding off.



7. Crunch up the circles around the straw one at a time.

8. Place your proboscis in a glass filled with a smoothy and suck up that great sweetness.

Bee Buddy

Maggie Sill, age 7, lives in Washington State. Her mother Britt is the lead beekeeper of the household. She refers to Maggie as her "sous-beekeeper", much the same way that Maggie is the sous-chef when it comes to preparing meals in the kitchen. When working the hives together, Maggie is in charge of making sure the smoker doesn't go out. Great teamwork!

Photos by Dave Schiefelbein

Bee Bank

Maggie made this bee bank as a gift for her friend Corky Luster, owner of the Ballard Bee Company. Maggie reasoned that since Corky ran a bee business, the business would need a bank to hold the money that was coming in. Maggie said, "When you "feed" the bank coins, the bee's belly gets bigger."

Beecome a Bee Buddy

Send two self addressed stamped envelopes and the following information to: Bee Buddies, PO Box 2743, Austin, TX 78768.

Name
Address
Age
Birthday Month
E-mail (optional)

We will send you a membership card, a prize and a birthday surprise!

Send all questions, photos and artwork to: beebuddies@hotmail.com or mail to the above address.

ROOT® CANDLES & CASE WESTERN

Building A Better Bee Future For Northeast Ohio

Buzz **Phillips**

Saturday, May 11, the good folks at Case Western University's Squire Valeeview Farm, including Chris Bond, Horticulturist, Anna Locci, Farm Manager, and the wonderful staff, designers and builders, dedicated the A.I. Root Observational Apiary just behind the Farm's Honey House.

The site was initially a small, almost empty field, located between experimental and residential gardens, a small rock retaining wall leading to staff housing, and the building holding the honey house, workshop, fish hatchery and hydroponic garden research facility.

When Case wanted to expand the apiary portion of the farm, they came to the A.I. Root Company because of the long-time beekeeping heritage both The Root Company and family have in northeast Ohio. They were looking for good ideas, some leadership in moving them in the right direction and of course some financial support. Brad Root, President of Root Candles, asked me to go and take a look at the facility and what it needed. I was able to meet with both Chris and Anna, and look at the existing buildings, equipment and other facilities. At the time, the apiary was in a field behind the honey house, and visitors – and there are a LOT of visitors to this apiary – had to watch any outside activity through a window in the honey house, some 25 or more yards from the actual hives.

It was immediately obvious that some way that visitors could get closer to the hives was needed. Other facilities wishing to assist close-up visits often use multiple sets of protective clothing so those close to the bees have protection, and can feel safe. But bee suits are expensive, are often ill fitting and far too often there are not enough of them.

A quick look at the setting and the use of a tall, screened observation area seemed ideal. First, visitors needed a safe and easy way to get to where the bees were, so it was suggested an ADA door be installed in the honey house so anybody could have access to the apiary. To accommodate that further, a cement walkway was installed leading from the honey house right to the hives, and then, the best part, a tall, screened fence was installed, such that bees leaving and returning to the hives had to fly upwards to 10 feet high to get over the fence, and thus away from visitors. The curved fence allows several indented areas for small gatherings and a large curved area for crowds. Beekeepers can take hives apart, show individual frames and talk about the bees up close and personal with visitors only inches away, safely standing behind the screen.

The dedication took place during a meeting of the Greater Cleveland Beekeeper's Association, with Ross Conrad as the guest speaker. A ribbon cutting ceremony was held and Brad Root and Case farm management staff gave short talks before the cutting.

Afterwards, several live bee demonstrations were

The new sidewalk leads from the existing honey house up a gentle slope that accommodated ADA requirements. People here were gathering for the ribbon cutting.

Cutting the ribbon from left to right were Corinne Burr, naturalist and Anna Locci from the farm and A.I. Root President Brad Root and his children, Kyle and Emilie.

Case erected a sign with A.I. Root History and Company information. The official name is The A.I. Root Apiary.

Ross Conrad, Bee Culture *columnist and author was the speaker and demonstrated hive management inside the fence.*

held both inside the screen and on both sides for those attending that did not have protective equipment – the perfect use of this new equipment.

The builders and designers at Case took the very simple design I suggested and made a much better and more functional structure. An employee did the paintings on the lower part of the screen of native flora and fauna, and the cement sidewalk makes access possible for anybody wishing to see bees, and beekeepers up close. They did a great job.

And, if you're looking for a good way to get bees and people together in a relatively inexpensive fashion, take a look at how this works – it's easy to build, and easy to use, and you'll get a lot of curious people dropping by – just to watch the bees. BC

The official sign for the A.I. Root Apiary.

The view from the bee side . . .

. . . and the people side.

Got A Question?

Ask Phil

Phil **Craft**

He Knows!

Send your questions to Dr. Phil at
phil@philcrafthivecraft.com
www.philcrafthivecraft.com

A beekeeper in Pennsylvania writes:

I have a hive which swarmed itself senseless, well Queenless. After countless after-swarms, the hive was left Queenless. What is your experience with this phenomena? Is this rare or does this occur more often than not?

I wait a couple of weeks before I get back into hives after they have swarmed. Hives which I red flag, are those who were quite powerful before swarming and have been reduced to only a couple quart of bees afterwards. Too me, it is these hives that need to be investigated.

I am thinking that after multiple after-swarms these colonies are left with only two or three virgin queens in the hive out and about. When nature calls again and the hive gets so excited, I believe the remaining queens get caught up in the fray and all leave at one time, leaving the colony queenless. Just my two cents worth.

Phil replies:

As you obviously know, the typical scenario for swarming is that after constructing and capping a number of queen cells (a dozen or more), the swarm takes flight along with the existing queen and more than half of the bees in the colony. A number of queen pupae are left inside the cells, one of which, it is to be hoped, will emerge, mate successfully, and become the new queen for the bees that remain behind. For some colonies, however, one exodus does not satisfy the swarming urge. In these, as the new queens begin to emerge after the departure of the first swarm, one or more secondary or after swarms decamp also. Beekeeping textbooks tell us that these secondary swarms are sometimes accompanied by multiple virgin queens. I have received confirmation of this over the years, in the form of reports from beekeepers about finding swarms with more than one queen.

As to the frequency of secondary swarms, my best evidence for that comes from years of talking to beekeepers rather than from accounts in books. The conversations often start something like this: "I have three hives and had five swarms (so far)! What in the world is going on?" I would not say that secondary swarms are common, but they are not rare either. They may occur more frequently than beekeepers realize, but go unrecognized – except by beekeepers with more swarms than hives! I do hear about its happening more often when conditions are especially favorable to swarming: hives healthy coming through the winter, lots of food sources in the Spring, good weather. The Spring of 2012 was such a time in and around Kentucky. A number of beekeepers reported experiences similar to yours – hives "swarming out," leaving few bees behind.

You are right to keep an eye on hives after they have swarmed. That's when incidents of queenlessness tend to increase. According to the textbooks, although swarms leave multiple queen cells behind when they depart, most of the virgin queens never have the opportunity to mate. When the first one emerges, she normally proceeds to open the cells of her sister queens and kill them – often aided by workers who have already accepted her. When several queens emerge at once and meet, they usually fight until only one remains. If the survivor fails to mate successfully and make it back to the hive (whether because of being damaged in combat, or because of being eaten by a bird or other accident), the colony is left queenless. I warn beekeepers to check hives a couple of weeks after they appear to have swarmed. The presence of eggs will confirm that the colony has produced a new queen and that she has mated and is laying. If that is not the case, it could be because the lone queen met with disaster as above, or because all the remaining virgin queens exited the hive with secondary swarms as you theorize. I honestly do not know. Swarming is most certainly one of many fascinating and mysterious activities carried out by honey bees and there are aspects of this behavior we have yet to understand.

If you have an interest in learning more about the swarm process, I highly recommend The Biology of the Honeybee by Mark L. Winston and Thomas Seeley's Honeybee Democracy.

A beekeeper in Kentucky writes:

I'm planning to use sticky boards to determine if I need to treat for Varroa when I remove honey supers from my hives. What are the thresholds for Kentucky?

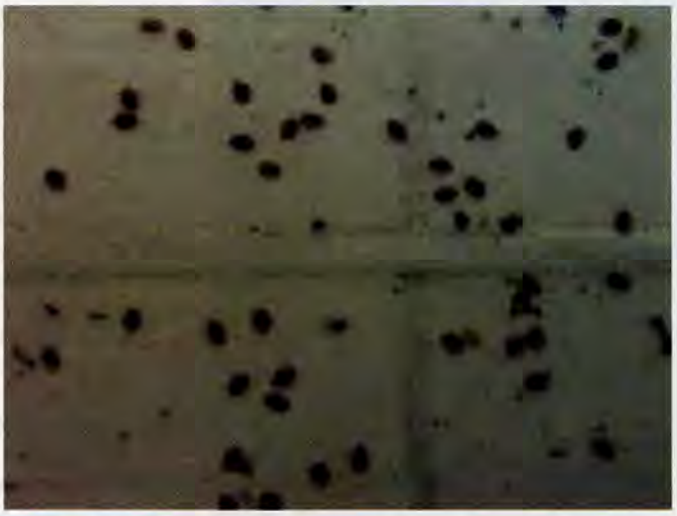
Phil replies:

I'll start with a little background on sticky boards and their use in monitoring for varroa mites. It isn't difficult to determine when honey bees are infested with mites. Though they do not show up well on the bees themselves, the red/dark brown mites stand out very prominently on white pupae. Since varroa reproduce on honey bee pupae in the capped cells of brood comb, they are easily seen when the pupae are removed from the cells with forceps. By removing 20 or more pupae, you can get some idea of whether your bees **may** be heavily infested. However, all honey bee colonies in North America have varroa mites. The more daunting task is to determine **how badly** infested a hive is and whether or not the colony is in danger of succumbing to varroa if left untreated. While removing pupae provides a quick, rough survey, the small sample size makes it a poor tool for evaluating the real risk to a colony.

A more effective method exploits the fact that a few mites are continually falling from honey bees in the hive as a result of the bees' self-grooming. We can capture the falling *Varroa* mites by using sticky boards, and count them to get an estimate of how many mites fall during a 24 hour period. To conduct a sticky board survey, a sheet of cardboard or rigid plastic coated with vegetable shortening or oil is inserted beneath the brood area of a hive, often under a screen bottom board. After 24, 48, or 72 hours, the board is removed, and the mites trapped on the sticky surface are counted. (Leaving the board in place for two or more days yields a more accurate count, but after three days, pollen accumulated on the board can interfere with seeing the mites.) The total is divided by the number of 24 hour periods that the sticky board was in place, providing an average 24 hour mite fall count.

A great deal of research has been conducted to determine when varroa numbers require intervention, i.e. chemical treatment, by the beekeeper. Scientists have established levels, called economic thresholds, of 24 hour mite counts which, if exceeded, constitute a threat to the survival of the colony. If your monitoring indicates a mite count in excess of the threshold for your area, you will need to treat or risk losing the hive. I say in your area, because economic thresholds vary based on the geographic location of hives. *Varroa* mites require brood in the hive in order to reproduce, and brood production is influenced by local factors such as temperature, drought, and the length of nectar flows. For that reason, I always recommend that beekeepers consult their own state apiculture extension specialist or state apiarist about thresholds for their area. Since, like you, I live and keep bees in Kentucky, I can tell you that the threshold I use is an average 24 hour mite fall of 30 or more.

But did you really think that determining whether or not to treat would be as simple as, "Over 30 treat, under 30 don't treat?" You must have known it would be more complicated than that. Economic thresholds are based on healthy hives, with bees covering most of the frames in two deep boxes (or the equivalent if you use mediums or shallows). If your hive has significantly fewer bees, you



should lower the threshold at which you would consider treating it. A hive with a small population might be at risk with a 24 hour average fall of 15. Another consideration is the season during which the count is performed. The number 30 is appropriate in Kentucky for late Summer or Fall. Surveys done in early spring demand a lower threshold, since *Varroa* mite numbers will increase rapidly as brood rearing explodes in the hive during Spring and early Summer nectar flows. In early Spring in Kentucky, I would recommend treating if sticky board counts exceed five to 10 mites in 24 hours. As you see, even with standardized mite count procedures and established economic thresholds, determining when to treat for *Varroa* mites is a complex process. It's part of what makes modern beekeeping so different from the good old days.

A note from Phil to Bee Culture readers:

As some of you may be aware, I recently became the U.S. technical adviser for Véto-pharma, a French company which manufactures and distributes the miticide Apivar®. I will not be recommending specific brands of *Varroa* control products in this column. However, I believe that *Varroa* mites have been and continue to be the greatest threat to honey bee health in this country. Advocating vigorous monitoring and the use of miticides when necessary is not a new position for me.

One of my duties for Véto-pharma will be to appear at beekeeping meetings across the country as their representative to answer questions concerning the use of Apivar® and other aspects of beekeeping. I look forward to the opportunity this will give me to visit with you. You can find a list of meetings where I will appear or speak (or both) at my personal webpage at **philcrafthivecraft.com**. BC

You have finished with your extraction and the honey is sitting in your basement waiting to be sold. While it is sitting there it is turning into a semi-solid which requires liquefying before it can be bottled. Here is a product that is easy to make that will help you sell some of that honey.

It's called Creamed or Whipped Honey.

Creamed Honey is a smooth-textured, creamy, crystallized honey product that spreads with the consistency of butter. During manufacture, the crystallization process is controlled so the honey crystals are extremely small. This results in an easily spreadable product that will not flow until it warms up.

First a primer on super-saturated liquids.

Definition: Supersaturation is a measure of the deviation of a dissolved salt crystal from its equilibrium state.

In every day terms, it is a solution that contains more of the dissolved material than could be dissolved by a solvent under normal circumstances.

Small particles called seeds can start the separation of the dissolved material from the solvent. In a solid form these seeds lead to the formation of crystals. The newly formed crystals tend to mimic the shape and size of the seed crystals.

See Wikipedia at **http://en.wikipedia.org/wiki/Supersaturation** for a more complete discussion.

What we actually have is a basic definition of HONEY as a solution of supersaturated sugars in a solution.

So let's make some creamed honey!

Here is a list of the equipment and supplies that can be used to make your creamed honey.

- Honey
  Non- crystallized Starter culture (Whipped or Creamed)
- Pails
  Mixing, with honey gate
- Containers
  Jars + lids and tubs
- Supplies
  Labels
  Shrink wrap
  Flavoring (optional)
- Mixing equipment
  Spatula, whisk, heavy duty
  Stirrer, electric mixer

Step 1: Honey Preparation

First go to the grocery store and buy a pound or two of commercial creamed honey. You will use this as a comparison to your naturally crystallized honey and eventually as a starter culture for your creamed honey.

Since you already have crystallized honey in the basement, why not use it directly? The problem is that it is not smooth. To test this out, place a small sampling of the crystals on your tongue and then run your tongue against the roof of your mouth. Most of the time, the crystals that you feel on the roof of your mouth are like pieces of sand. This is too rough for sale. The crystals must be smaller so the creamed honey feels smooth. Compare this to the commercial creamed honey you just bought.

To replace these large crystals you must first eliminate all of them. This is accomplished by heating your honey until all the old crystals are dissolved. Just because you cannot see them, it doesn't mean that they are not there. Therefore you need to heat the honey for a long time (a week) at 110° or a short time at 140°. Then let the honey cool to 80-85°.

Step 2: Starter Culture

To crystallize honey it is recommended that at least 10-20 percent of the initial solution consist of the starter solution (by weight). Don't worry about the cost of the starter. It will be returned when you repackage it as part of your product. The higher percentage of starter the quicker the creamed honey will set up.

Starter being mixed in.

Skim off bubbles and foam.

Step 3: Mixing

Mixing two pounds of the commercial creamed honey into ten to fifteen pounds of honey is not easy. The lumps just keep avoiding your mixing device. To solve this problem start small. Mix the two pounds into a small portion of honey. Once this is thoroughly mixed, add more honey. Eventually you can pour the thoroughly mixed starter into the remaining container of honey, again making sure it is thoroughly mixed. For ease of use, the final container should have a honey gate that will allow filling jars or tubs. If you are using a pail with a honey gate be sure to get the mixture into the gate area.

Warning: Do not add the starter culture to your honey when it is hot or it will liquefy.

Step 4: Wait

Now comes the hardest part – WAITING – for the mixture to set up. Place your mixture in a cool area where it will not be disturbed and wait. The temperature range that seems to work best for a quick setup is 55 to 58 degrees. I have had the honey set up at 65 degrees, it just took longer.

Step 5: Mixing

Keep an eye on the mixture. First the air that was introduced into the mixture will rise and form bubbles on the surface. Then the mixture will start thickening. Now is the time to skim the bubbles off the surface and remix the solution. This time, you need to be careful to introduce as little air into the mixture as possible. A very sturdy spoon or mixing paddle is needed to stir this thick mixture.

Step 6: Wait Again

Now wait until the mixture partially sets. It should be thick, but not so thick that it won't flow. It has to be able to be dispensed into your final containers.

Step 7: Bottle It

Package your creamed honey. Be careful not to get any honey on the lids. Remember it will still move around since it has not completely set up yet. When finished, set the containers back in your cool area and wait again.

Step 8: Label

Once the creamed honey has set up enough so it won't move around in the container you can label it and get it ready for distribution.

That's all it takes.

Here are some additional notes that will be of a help to you.

- If you are flavoring your creamed honey, add the flavoring during the first mixing. That way it will be evenly distributed throughout the mixture.

  For a cinnamon flavor add dry cinnamon powder to the mixture at a rate of 1/8 tsp per 10 pounds of honey. It makes a great creamed honey for toast or English muffins. Be sure to remove the excess cinnamon that floats to the top when you remove the bubbles.

- When bottling, you will eventually get to a point where there may be bubbles or foam getting into the jar. This does not look good for sale. But there is nothing wrong with this honey. Set it aside for your own use.

- Make a little extra creamed honey and store it in a bulk container. Use this honey for the starter culture when you make creamed honey again. Be sure you test it for fineness before using it. The more starter culture you use the faster the solution will set up.

- As a test, pour a little of the initial mixture into a small conttainer. Then add some flavoring. This way, if it doesn't pass the taste test, you have only lost a little honey.

Bottled and ready to go. Keep cool!

Keep some for next time.

Conclusion

Creamed honey will keep in its creamed form as long as it is not heated. Do not leave it in your car during the Summer or it will turn back into a liquid. BC

Moving Bees by AIR . .

Marcelaine **Lewis**

"Are you afraid of bees?" he asked.

I didn't know any better, and I had never given it any thought. My mom's friend Mary Baldwin had kept bees at her home outside Tucson. During our visits, I enjoyed watching her suit up and work her hives. In the 1920s, my Great Grandpa Wininger and uncles kept bees on the homestead near Glasgow, Kentucky. But I was never up close and personal with the bees. Naively, I said, "No, I'm not afraid of bees."

"Good. Then will you fly me to Watertown in your Cherokee, and I'll get three packages of bees and put them at your cabin for you."

In my Piper Cherokee, the trip from the Houghton County Airport in the Upper Peninsula of Michigan to Watertown, Wisconsin is about a two hour flight. But, that week, back in 1999, I was finishing my Instrument Flight Rules rating in Eagle River, Wisconsin, and Watertown was only about an hour flight from Eagle River.

"It's the perfect hobby for a pilot," he continued. "You will love watching the bees land and take off. Each hive is like its own little control tower." He soon busied himself setting fence posts in my corral and stringing an electric fence from my stable. I watched with interest, fascinated at the way John, my new boyfriend, was expressing his affection for me. In the past, other suitors had given me lingerie, chocolate, jewelry, perfume . . . but this was the first time a boyfriend had ever expressed his fondness with livestock.

The next day, we rendezvoused in Eagle River on the Upper Peninsula Wisconsin border. Although he is also a pilot and owns planes, he drove a car; and I flew my airplane for a last brush up instructional flight before my FAA flight test scheduled the next day.

He looked in the window at the pristine, white leather interior of my airplane. "I brought some plastic to cover the back seat of your plane. Sometimes the syrup cans leak, and they are very sticky." He climbed in over the wing, and off we flew to the Dadant branch in Watertown. At the Watertown airport, I borrowed the pilot courtesy car, and John directed me to the outlet.

Watertown Dadant is housed in a majestic, picturesque stone and lumber barn. Inside, in the cool darkness, there were stacks and stacks and rows and rows of singing, humming bees. The fragrance of bee pheromones was intoxicating. However, I was puzzled by the handsaw that John had with him.

I foolishly had assumed that a two-pound package of honey bees would be, 'a neat little package.' John purchased seven packages of Carnolians; three for my cabin and four for his farm where he had been keeping bees on and off for over 20 years. At one time, as a commercial beekeeper, (before he went off to law school) he had five-hundred hives scattered over the Upper Peninsula and Northern Wisconsin. The handsaw, he explained, was to saw the packages apart so they would fit easier into my airplane. My skepticism started to blossom as he sawed at the boards nailed to the wooden tops of the packages, separated the little wooden screened boxes, and set them in the trunk of the borrowed airport car. Gooey syrup seeped and oozed onto the plastic. The bees did not like the disruption. Their singing and humming had turned to a cacophonous roar of ticked off bees. And now, not only the syrup was leaking from the shoebox-size cages, but unruly bees also were leaking out, hanging on to the screen for dear life to stay near their respective queen.

"Hurry!" he urged. "I have to pour the bees into the hives as soon as possible!"

"Hurry?!! POUR the bees?!!" I tried to comply. He lifted the bees over the wing into my plane and carefully set the packages on the plastic protecting the white leather upholstery. He had warned me about the leaking syrup cans, but had not mentioned the fluorescent orange bee poop that was appearing as waxy droplets on the ceiling, windows, walls, and FRONT seat of my airplane. Forty or 50 bees were flying a holding pattern around my head. Another bee was helicoptering over my hand on the airplane's throttle.

I made my departure call on the Common Traffic Advisory Frequency. "November8872Juliet, departing Runway Two Three, northbound."

The friendly lady in the terminal, amused at the two pilots with the honey bees, responded, "Come back and see us real soon!"

John picked up the microphone and replied, "We and our 14,000 passengers enjoyed our visit."

At the cruising altitude of 3,500 feet Mean Sea Level, the bees seemed to accept their fate and were no longer frantically throwing themselves at the windows. With my headsets on, I couldn't hear the din of their protests. But the now not so "intoxicating fragrance" of bee pheromones was making me a little dizzy. The romance of flying my new boyfriend to pick up the bees had worn off. Now my thoughts wandered to, "How do I get orange bee poop off white leather? How do I get bee poop out of my curly hair? Why is that bee sitting on the top of the instrument panel staring at me and rubbing her front feet together like Lady MacBeth?"

We pilots often talk about our most memorable flights. However, we try to save our 'adventure flight' stories for sharing only with other aviators. If non-pilots knew about all our 'adventures' they would never get into our planes with us – and we want people to ride with us.

Nevertheless, this was definitely an 'adventure flight'. There I was on final approach for Runway Zero Four in Eagle River. It was my second opportunity of the day to impress my pilot boyfriend with another amazingly flawless, smooth, soft landing. Lady MacBee was rubbing her little legs together. She had stared at me the entire flight from her perch right in front of me on the instrument panel above the airspeed indicator. She continued rubbing her front legs together as my plane settled gently

on the runway. It took all my self-discipline to ignore the very excited bees as I taxied to the terminal.

I was relieved to have boyfriend and bees deplane and drive off. My crusty, old flight instructor stared into the open door of my airplane and growled, "Oh my gawd Marcelaine! Your plane is full of dead BEES! What is that stench?! Oh my GAWD there are LIVE bees in there! You have got to get those bees out of your plane! The FAA is never going to fly a check ride with you in a plane full of bees!"

I spent the rest of the evening vacuuming up bees. The next day, I passed my FAA Instrument Flight test on the first attempt. It didn't take nearly as much focus to fly approaches and landings without Lady MacBee staring at me.

Back home in my little UP cabin, I was greeted by the three hives. In the following weeks and years, John taught me about feeders and queen cages and extracting and wax and other bee facts. I have kept every queen cage as a souvenir. I thought it was so sweet and so touching that he would give me "queens." He made me feel like royalty.

Eventually, the original gift of the three beehives was followed by a three diamond engagement ring. We married in 2004.

These days, I have more hives, and I have quite a surplus of raw honey that I sell locally.

My cousin Ken says that Great Grandpa Wininger was always very successful selling his honey in town even when other beekeepers couldn't sell theirs. I can't use Grandpa Wininger's honey marketing technique. He sold his honey by giving away a pint of moonshine with each jar of honey.

Anyway – that's how I got started in beekeeping. BC

Marcelaine Lewis holds Commercial, Instrument, Flight and Ground Instructor Instrument Land and Sea Licenses. Home base is the Upper Peninsula of Michigan.

. . . by LAND

Miles McGaughey

After mounting losses among managed hives, and huge declines of feral bees the standard method of starting hives or replacing dead-outs with swarms has become more and more difficult. This coupled with the ground swell of new beekeepers emerging from our association's always full classes, forced myself and our association's founder, Tom Theobald, to begin to seek alternatives. We had both purchased many packages and queens from all over the United States and were not satisfied with the condition of the bees when we received them. Either through the mail or dropped shipped for bigger orders, these bees survived but were not always in the condition we had hoped for. We came to the conclusion we would make the run ourselves in the belief that surely the bees would be better cared for by beekeepers than anybody else.

The mountain states, with their unpredictable weather, preclude any early package or queen production so to get a jump on the Spring wildflower bloom we would have to go south or west. We chose west for many reasons not the least of which were Tom's previous dealings with the Koehnen's and their Carniolian strain of bees which are well adapted to mountainous conditions.

As you can see in the picture, the day we left there was 18 inches of snow on the trailer and all though clear weather, the highway conditions were some of the worst we had seen. They closed two highways behind us as we made our way west. No new snow falling, just old snow blowing 40 mph all across Wyoming! Every year is unique and every year brings its own set of challenges, and this year those challenges started early. In January we placed the order for the packages and stayed in contact with the gals at the office in Glenn, California. Beekeeping, like all agriculture, is dependent on the weather and you have to be adaptable to nature's time table and stay in touch with the producers. We time our return to have the packages here, in Colorado, at the same time the dandelions are blooming for quick buildup of then new hives.

Some years cold temperatures threaten the load of bees. Other year's heat is the enemy, and you must be prepared for both. Cargo insurance, when you can find it, is expensive. Without the guidance of Tom and all his years of beekeeping I'm sure I would have suffered greatly, as the learning curve is steep with living insects in transit. Tom said many times "Miles, hauling bees is like shipping ice cream; you can't stop or relax until every ice cream cone is spoken for. Simple things become very critical, very quickly so bring extras of everything you think you might need!" These things include but are not limited to: extra bee cargo nets, extra tarps, extra tie downs and bungees, a couple of staple guns for emergency repairs, cans of fix a flat, thermometers with remotes for the load, and extra cellphones with chargers etc. for real emergencies. Of all of this gear, the most important items we bring every year are the blue ribbon pies my wife and daughters make for us (to eat along the way) and if any make it, to give some to Yvonne and Jennifer in mission control at Koehnen's.

The payoff to all of this hard work is incredible packages that are in pristine condition, and are noticeably high in morale and ready to go! After all of the years and all of the tribulations I wouldn't change a moment of it when we open the trailer and see all the potential that Spring has to offer. BC

Miles McGaughey keeps bees in Longmont, CO and can be reached at ***mmcgaughey1@live.com*** *and would like to thank his daughter for her assistance in preparing this for your consideration.*

It's Mite Treatment Time

The whole regulatory process with its scientific façade for approving pesticides is a farce and a sham.

Ross **Conrad**

Late August and early September is the time when many beekeepers in the Northeast treat for *Varroa* mites in order to get hives in healthy shape for the long winter to come. This year there is a new *Varroa* treatment option available: Apivar. This miticide comes in the form of a plastic strip that contains the active ingredient Amitraz. While this toxic chemical can leave residues in wax and honey, the residues are not expected to reach what is considered by the U.S. Environmental Protection Agency (EPA) to be dangerous threshold level as long as the strips are used according to directions. It is an unfortunate fact however, that all too often treatments are not used according to label instructions despite the label being the law. Now beekeepers who illegally use Taktic (active ingredient Amitraz but only approved for cattle, sheep and pigs) will have a cover story and can blame Apivar when Amitraz, or its breakdown products, are found contaminating their honey, beeswax, and other hive products. Given the history of *Varroa* resistance to the chemical treatments we have formulated so far, and the fact that Amitraz resistance is believed to have occurred in the past, it is reasonable to expect reports of *Varroa* resistance to Apivar strips sometime within the next four or five years, if not sooner.

So why our consistent reliance on toxic chemicals with short-term effectiveness and contamination issues that can have sub-lethal effects on honey bee health especially when combined with other chemicals? I suspect it is the same reason that the EPA approved the new systemic neonicotinoid pesticide, sulfoxaflor, which by the EPA's own admission is "highly toxic to honey bees," right on the heals of the European Union moratorium on the use of certain neonics in EU countries. Our EPA consistently places industry interests and profits above our already dire pollinator crisis, and I am not referring to the beekeeping industry here.

Seemingly thoughtful, reasonable, and rational minds will point out that by allowing our regulatory process to work based upon proper testing and sound research, adequate chemical safety can be assured while providing additional tools for producers. All this sounds well and good until you realize the reality and impossibility of what is being suggested.

Here is a recap of the basic premise that I laid out in a Bee Culture article about five years ago: When chemicals are evaluated for toxicity, they tend to be studied in isolation. Little thought is given to the chemical's breakdown products, which can prove to be more toxic and longer-lasting than the original chemical itself, such as in the case of Imidacloprid Olefin, which is produced as the systemic neonicotinoid, Imidacloprid degrades. Once in use and released into the environment, chemicals and their breakdown products will combine with other chemicals already in the environment to form new compounds. The synergistic effects of some of these combinations have proven themselves to be hundreds of times more toxic than either compound on its own.

In addition, recent research into endocrine-disrupting chemicals (the kind often used as pesticides), reveals that the timing of exposure combines with the amount of exposure to produce a chemical's effect. A certain dose of a chemical might be very toxic to an organism in its developmental stage, while not having any detrimental effects on the organism once it has matured, or vice versa. To make matters worse, sometimes a lower dose of a chemical proves to be more damaging than higher doses. While totally counterintuitive, such new understandings of chemical toxicity have proven wrong Paracelsus's 450-year-old maxim, "The dose makes the poison." Today we know that often the timing is what really makes the poison and that sometimes less is actually worse.

Add to this the studies that now show that a cocktail of "insignificant" doses of several chemicals, each acting on its own, can combine to have significant results. In other words, exposure to very low, supposedly safe concentrations of several chemicals at the same time can cause biological effects that none of the chemicals would have on their own. Thus, when a living organism is exposed to a mixture of chemicals, every component contributes to the overall effect, no matter how minute their concentration.

Agricultural pesticides are indiscriminant and kill the good bugs as well as the bad. In the U.S., a drive through the country rarely results in a license plate or windshield that looks like this any more since chemicals, development, and pollution have killed off much of the insect population. This photo was taken after traveling through an uninhabited and undeveloped region of the Canadian Maritimes.

Vote with your pocketbook and wallet and don't spend money on toxic products if you want to live in a world that is safe, clean and healthy.

All of this makes the task of toxicity testing so complicated that, realistically, no chemical is going to ever be thoroughly tested for safety, either for humans or bees, before being manufactured and marketed. To do so we first would need to know which biological tissues or functions the chemical affects, in what ways, at what potencies, and whether vulnerable populations will be exposed to other chemicals that affect the same tissues or biological functions. Then we would have to test groups of chemicals in combinations at low and high doses, and several doses in between. We would then have to determine whether the creature being studied (mouse, human, honey bee, or whatever) is impacted by this combination of chemicals at one particular stage of life or another. In humans we know for example that during gestation in the womb, exposure to certain drugs during one particular week can produce effects not seen when exposure occurs during a different week.

However, none of this testing takes into account the potential synergistic effects of the multiple compounds that already exist in the environment. For example, suppose we wanted to test the synergistic actions of just 500 toxic chemicals in unique combinations of five chemicals each. A little mathematics indicates that we would have to test over four trillion groups of chemicals. Even if we could test the highly optimistic number of a million combinations each year, it would take us over 4,000 years to finish the task. When we consider that we are presently introducing dozens of new chemicals into commercial channels each year, and we (and our bees) have the potential to come into contact with thousands of man-made chemicals daily, we begin to understand the enormity of trying to regulate these toxins.

Even if we stopped producing and releasing synthetic chemicals into the environment today, there are tens of thousands of toxic chemicals currently in use, and a clear understanding of the complexities and expense involved in proper and thorough toxicity testing is never going to happen. The whole regulatory process with its scientific façade for approving pesticides is a farce and a sham. Its only benefit are the jobs it provides beaureacrats and the chemical industries that can use the process as legal cover as they continue to produce and peddle their toxic wares while birds, bats, moths, bees, and numerous other pollinator populations continue their precipitous decline. This year for example, the monarch butterfly population that completed its annual migration to Mexico sank from over seven acres last year to below three acres this year. The area occupied by the butterflies completing their migration was once as high as 50 acres. As with honey bee die offs, there are other factors that have an impact on the butterfly population, but pesticides and pollution ranks high among them. And if you think that chemicals are only an issue for creepy, crawly critters, talk to the growing population of people who have developed chemical hypersensitivity and allergies, likely a result of our lackadaisical and liberal use and abuse of manufactured toxic compounds.

I am not one to think this is some sort of sinister plot or conspiracy. It is simply the capitalist system in action. If we want to live in a world where we have increasing numbers of pollinators rather than fewer on the planet every year, then one thing we have to start doing is to stop making an using these toxic synthetic pesticides. This means consumers have to stop buying these chemicals, as well as products produced with these chemicals (think organically certified fruits, veggies and meats, rather than those conventionally farmed with chemicals and synthetic fertilizers). In a capitalistic system, what we spend money on we tend to get more of, and what we don't purchase tends to fade away as the companies go out of business...unless the industry is bailed out, but that's another issue.

People who are considered some of the more reasonable folks among us will point out however, that the wonders of modern chemistry are necessary if we are going to be able to produce food efficiently and feed the world. There are many problems with this perspective in addition to the fact that the hunger problem is a political and economic issue and not a production issue. Contrary to the numerous government and business reports that all praise the efficiency of our modern agricultural system, the transition from internal input farming (where everything needed on the farm is produced on the farm), to high external input agriculture (where hardly anything needed to run the farm is produced on the farm) has resulted in not an increase, but a decrease in productivity of over 60-fold in the last 50 years. These facts are clearly spelled out in the Research Foundation for Science, Technology and Ecology publication, *Yoked to Death: Globalism and Corporate Control of Agriculture*, by Vandana Shiva. Part of the reason the majority of us are not aware of this is because most studies and reports that are released on the subject focus narrowly on the amount of human labor required to produce our crops. Little, if any attention is paid to the costs we pay collectively for these gains in labor efficiency through chemical short-cuts that ultimately benefit only the few. However, more and more reports are being published that take into account a complete picture of our modern industrial agriculture system. They include: *Toward the Future We Want: End Hunger and Make the Transition to Sustainable Agriculture and Food Systems* by the Food and Agriculture Organization of the United Nations; *Solutions for a Cultivated Planet* published in the journal *Nature* by Johathan Foley; and *Toward Sustainable Agricultural Systems in the 21st Century* by the Natural Research Council. These and other

reports clearly indicate that the only way we are going to be able to feed our growing human population is not by relying on more industrial agriculture and pesticides, but through smaller, human-scale, sustainable agricultural efforts that embrace practices like those performed by many organic, biodynamic, permaculture, and subsistence farmers throughout the world.

Our current agricultural system is so broken and bankrupt that, without the subsidies it receives from the world's governments, it would collapse astonishingly fast. These subsidies are both direct agricultural subsidies and indirect subsidies that artificially deflate the cost of diesel fuel, farm chemicals, and artificial fertilizers among other things. Thankfully in the world of beekeeping numerous alternatives to the toxic pesticides Apivar, Apistan, and Checkmite are readily available and affordable. This year, rather than use a toxic miticide strip in your hives, I invite you to consider using one of the highly effective essential oil-based products: Api Life VAR or ApiGuard; or the formic acid based Mite Away Quick Strip (MAQS), and give our pollinators, our great grand children, and your bees a break! BC

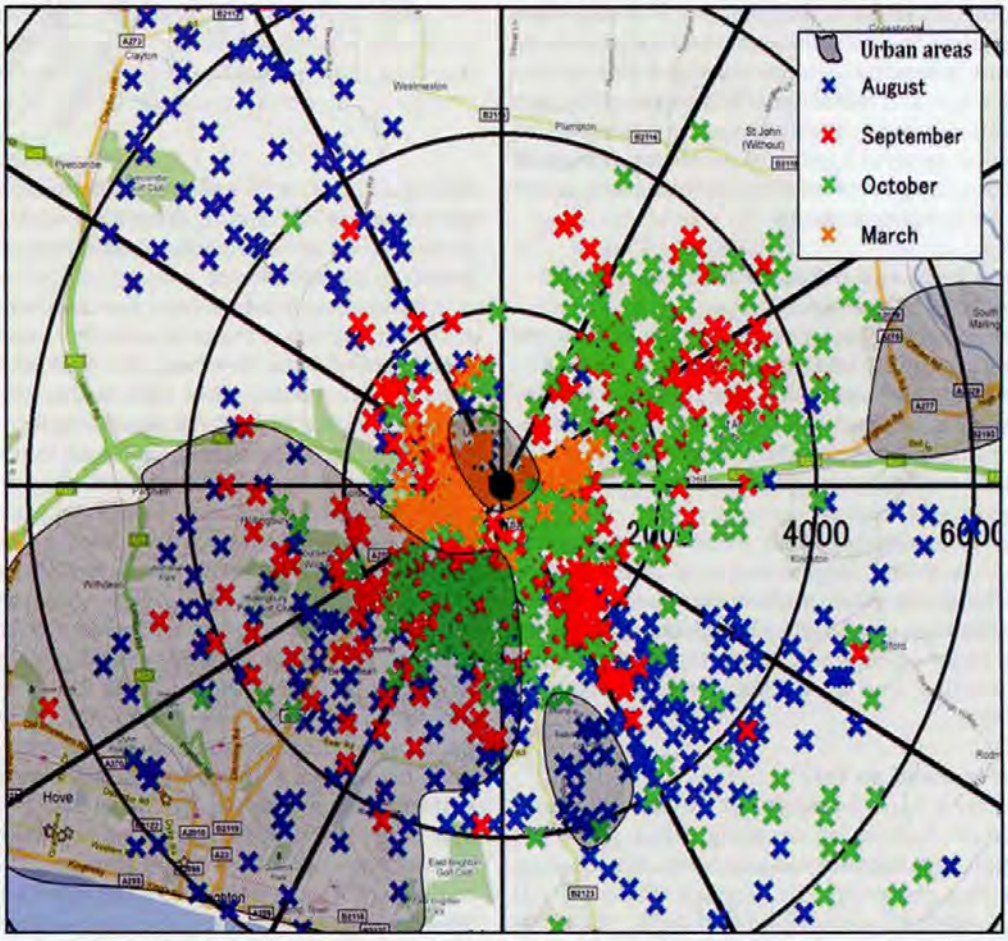
The only way we are going to be able to feed our growing human population is not by relying on more industrial agriculture and pesticides, but through smaller, human-scale, sustainable agricultural efforts that embrace practices like those performed by many organic, biodynamic, permaculture, and subsistence farmers throughout the world.

Ross Conrad is author of the Natural Beekeeping: Revised and Expanded 2nd Edition, ***www.dancingbeegardens.com.***

Where Do Bees Forage? And – How Do We Know?

Margaret **Couvillon**

The honey bee is the single most important animal pollinator. Meanwhile, the proportion of animal-pollinated crops has risen rapidly (>300% in recent years). In the U.S., demand has resulted in the long-distance movement of hives to pollinate valuable crops like almonds. However, some parts of the world including the U.S. are experiencing a decline in wild and managed bee populations: the American population of honey bee hives has decreased yearly since 1961. This results in agricultural need outstripping the availability of honey bees, especially in recent decades.



Reasons responsible for the decline in the honey bees are complex and multi-faceted and involve numerous diseases and pests including viruses, Noseama, and *Varroa* mites. Additionally, *Varroa* mites are now resistant to many acaricides treatments. The mites can kill colonies when they reach high levels but they also vector virus diseases, which in combination with lower levels of *Varroa* can kill colonies. Lastly, loss of forage is most definitely an important issue. Healthy or sick, our bees need to eat. Less available forage translates into unsufficient honey stores to see the bees through those long Winter months.

Why might there be fewer flowers for bees? Less available forage reflects changes in land use. Hay meadows are increasingly rare, and in the UK heather moorland is in decline. Traditionally, clover pastures were a common source of nitrogen for farms, but commercial fertilizers have largely replaced these. Agricultural land has fewer weeds and wild flowers. Therefore, the typical bucolic image of the countryside that we see from the road actually offers very few flowers. All of this results in less nectar and pollen for bees and other pollinators.

Recommendations made on land-use policy to reverse this decline in honey bee populations will be more effective with a better understanding of how forager bees are using the existing landscape. There are many important questions: during which months of the year is there less forage for bees? How do the bees respond to lack of food when it comes to organizing their work force? What is the relative contribution of urban and rural landscapes? Which parts of the landscape are most attractive to bees?

Here at the Laboratory of Apiculture and Social Insects (LASI) in Brighton, UK, we are working hard to investigate these issues in Project 2 of the Sussex Plan "How good is the British countryside for bees? Decoding waggle dances to determine where honey bees forage."

How do we know where honey bees forage?

The honey bee is unique in that it is the only animal that tells you where it has been foraging. This is communicated by the waggle dance, which was discovered by Karl von Frisch in work that earned him a Nobel Prize in 1973. In the waggle dance, a successful honey bee forager

returns to the hive and tells her nestmates where she has been collecting nectar and pollen by waggling her body in successive figure-eights. The direction in which she waggles her body relative to vertical on the wax comb is the direction of the food source relative to the sun. The duration of her waggle denotes distance, with one second of waggling being approximately 1km of flight. The bee will repeat the waggle run any number of times, from one to approximately 100 times.

Only foragers who have found relatively profitable patches are likely to dance. In this way, the colony is able to direct its efforts to the most fruitful areas. This recruitment strategy allows for both positive and negative feedback: a bee that has followed a dance and been recruited to a really good patch will then, after foraging, dance herself and recruit more bees. Alternatively, if a patch becomes depleted, its visitors are unlikely to dance, so the workforce will be redirected elsewhere.

By housing colonies in observation hives, we are able to eavesdrop on these conversations. We use video cameras, computers, video software, and a protractor to decode by hand individual waggle dances by precisely measuring the angle and duration of the dance. Although this does not tell us precisely which flowers a bee visited, it does show what general areas are providing forage. In this way, decoding dances is an effective means to investigate honey bee foraging ecology.

How will honey bees and other pollinators benefit from the results of the project?

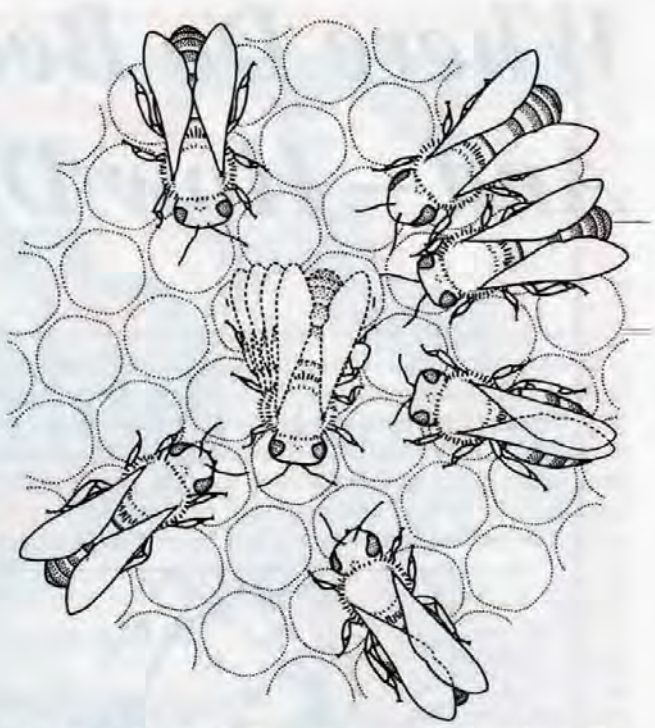
This information will be of value to people who are responsible for growing plants and who want to make our world more bee and insect friendly, including farmers, land managers, parks departments, and gardeners. The research will generate specific information that will feed into recommendations to those in a position to help the honey bee.

Additionally, honey bees are generalist foragers, which means they visit a large number of plant species that are also visited by other pollinating insects. Therefore, locations that are good for the honey bee will also be good for many other pollinators, including bumble bees, wild bees, butterflies, and hoverflies, thereby benefiting wildlife in general.

What have we learned so far?

We've gathered data for August-October 2009 and March-July 2010. Almost no foraging takes place between November and February. Already we can observe several interesting patterns. The average distance that an individual forager flies varies with month. For hives located in rural East Sussex (a county in SE England) at The University of Sussex, bees fly the furthest in the Summer, averaging over 4km in July and August.

Flight is costly both in terms of energy (a bee must consume valuable honey to power flight) and time, and of course the longer a bee is in flight, the more it is exposed to predation and the risk of getting lost. All of this means that a bee will not fly far if forage is available close by. Therefore, our results indicate that the Summer months are actually a challenging time for our bees. This is surprising and goes against commonly held perceptions. Most people probably think that the Summer, with its warmer weather, is the best time for bees; but it is the



Spring time in which flowers are most abundant. One recommendation arising from this work could therefore be to encourage the planting of nectar-rich plants that bloom in high Summer.

Distances decrease into Autumn, and in September and October the average is only 2km. It is likely this decrease reflects the flowering of ivy (*Hedera helix*), which is a common native plant here in the UK. Ivy is typically the last nectar flow of the season before the bees begin overwintering and is a magnet for all kinds of insects. The creeping ivy with its hand-shaped leaves is the immature plant and does not flower. When ivy finds a sunny location, it matures, making oval leaves, woody stems and many flowers. Ivy also produces berries that are a Winter food supply for many birds. Ivy is surprisingly common. Wherever you look, whether in town or countryside, you will see it on walls, buildings, and trees.

In March, the majority of foraging was at short distances (<1km). The University of Sussex campus contained many patches of Spring bulbs like crocuses and snowdrops. Although these species are not native to Britain, they are both popular garden plants. Therefore, at a time of year when bees need pollen to feed their new brood, urban gardens and parks may be an important repository of food, at least until the wild flowers like dandelions start to bloom.

We saw a great deal of foraging in the surrounding urban and suburban areas of Brighton and other small towns. Interestingly, a higher proportion of urban visits happened in Summer compared to Spring. Therefore, at a time of year when forage is less available, the bees are able to find nectar and pollen in urban environments. It is likely that parks, gardens and cemeteries provide a wide variety of plants. Having many different species of plants ensures a more constant supply of nectar and pollen, as each plant will bloom at different times. In this way, urban environments might show less fluctuation in forage availability than a more rural landscape dominated by monocrops.

A large number of dances were decoded to nature reserves NW and SE of campus. Upon investigation, we found a local park and the neighbouring farms to be covered with pastures of white clover. We found the bees will fly many kilometres to visit these 'clover leys.' Additionally, the Castle Hill National Nature Reserve, a few km SE of campus, has several fields abundant with wild flowers. By graphing individual dances with colour-coded dots for each month, we are able to pinpoint which areas are visited during different seasons.

This method of visualization provides a powerful tool. We can identify at a glance what areas are key foraging locations. Additionally, we see which sections of the landscape are relatively untouched. For example, there were no dances to the area north-east of campus for August 2009. This land is mostly farmland. It will be interesting to monitor over the next year if this specific pattern remains and to determine what is growing there. In contrast, during that same month, bees were heavily visiting north-west of campus. The foraging range includes part of the South Downs, which is an area of chalk downland in southern England and the country's newest national park, the city of Brighton, and several smaller villages.

Who funds our research?

LASI Research on The Sussex Plan for Honey Bee Health and Well-being is entirely funded by philanthropic donations. These donations have come from a wide variety of sources including companies, trusts and foundations, beekeeper associations and individuals. The commitment shown by LASI donors to this vital research is crucial to finding evidence-based solutions to the problems facing the honey bee, solutions that will also impact positively on all pollinators. It is essential that the Laboratory continues to attract generous funding to ensure that the research continues to help the honey bee.

Project 2 is supported by three major donors: Burt's Bees, a company whose ethos supports sustainability and ecological responsibility and which has strong links to bees in its name, in its products and in its founder, U.S. beekeeper Burt Kravitz, Waitrose, a leading supermarket with a strong commitment to social responsibility, and Nineveh Charitable Trust, which is an agricultural charity promoting the preservation of the countryside. These independent support schemes are complimentary in that Nineveh and Waitrose predominantly have hired the project's personnel and Burt's Bees has funded equipment. The project is critically dependent on all three.

Where do we go from here?

We've completed one year of data collection. However, we are nowhere near finished. For scientific research to be published in peer-reviewed journals, it is important to demonstrate replication. Therefore, we must monitor dances for a minimum of two years to allow for pattern comparison between at least two seasons.

Additionally, this next year will include some 'ground work' in which we visit decoded locations to determine what specific plants are present. These new areas will require microscopy and keys to identify what species' pollen is being collected. If possible, we plan to integrate the use of Global Positioning Systems (GPS) and to collaborate with geographers who already are versed in land-use databases.

Finally, it is also important to calibrate the dances. The equation that we use to convert seconds of waggle to metres of flight is based on Karl von Frisch's data. However, we know that different subspecies of honey bees have a slightly different seconds-to-metres translation. It is important we figure out just what our bees are telling us with each second of waggle.

Calibration is an essential step, but it is one that may be done at any time in the project. We plan to undertake this important task in the upcoming year. It will involve decoding dances of individual bees that have foraged at a known location. Here we have enlisted the help of Plumpton Agricultural College. Located an ideal two to seven km from LASI, Plumpton College will plant for us large patches of borage that should be very attractive to bees. These patches will be located in two to three known distances from LASI. To calibrate for shorter distances, we will train bees to nearby feeders. When bees visiting either the borage or the feeders return to the hive and dance, we will then obtain the necessary information to tweak our mathematical function to reflect our very own bees.

In this way, we continue our work to help the honey bee, one dance at a time. BC

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For more information on LASI and Project 2 of The Sussex Plan: ***http://www.sussex.ac.uk/lasi/sussexplan/dances***

Celebrate The New Year With Your Bees

Ann **Harman**

Yes, It's Time To Start Thinking About Winter

Winter is coming! No, this is not a message from Chicken Little. It's a message from your bees. Remember those nice packages of bees that you picked up one lovely day in April? Today it is August. Well, the bees are still alive and seem to be doing just fine. At least some bees are flying in and out the entrance.

You looked at your *Bee Culture* calendar and saw that August first was Bee New Year Day. Time to celebrate by taking a look inside that hive. You might like to make a list of what you are looking for. The information you find out today will guide you into preparing your bees for the Winter to come and a successful Spring next year.

Your plans will, of course, depend on the area of the country you and your bees live in. Bee life and yours, too, are quite different in the various climates within the U.S. In the warm south you will have a bit more time to fix a colony problem than if you live in the far north. However, the bees' needs are really the same no matter where you live.

The bees need a good efficient queen. One that is doing her job of laying eggs. The bees need a good 'home' for spending the quiet days of Winter. The bees need plenty of food not only to keep them alive during Winter dearth but also enough to start building up colony numbers when Spring arrives. The bees need bees. More about all these points as we go along.

Before you go out to the beeyard with your list, sit down and think about the weather. To be a good beekeeper you need to be a Weather Watcher throughout the year. Weather is never 'normal.' Too much rain, drought, too cold, too warm – all these affect bee plants and therefore your bees.

In addition to being a Weather Watcher you need to be a Plant Watcher. Do you know what pollen and nectar plants will be available for your bees for the Autumn months ahead? If not, get busy and find out. If you belong to a local bee association the experienced beekeepers can give you some information. No local association? Try the state association. Just remember that some large states can have quite different climates and therefore quite different plants. If you are not familiar with the trees and wildflowers in your area and their blooming times, you need some field guides. These will not tell you if it is a bee plant but you will be able to identify the wild plants you see blooming. Is Wacky Weather affecting those plants? You need to put your Weather Watching together with your Plant Watching. You will be a better beekeeper when you do that.

You need to start your list somewhere, so let's start with the queens. Do you know whether these are the same queens that arrived with your packages? Actually it may not make any difference. What you are interested in right now is what each queen is doing. You have seen pictures of a "good brood pattern," with a comb having well-organized cells filled with larvae and pupae in various stages and a smooth uninterrupted pattern. Today the "perfect" brood pattern many not resemble the one in your beekeeping book if you have hygienic stock. Industrious hygienic workers can produce a "shotgun-type" pattern that older bee books say indicates problems. Now what.

Look at the population within each hive. As an inexperienced beekeeper it may be difficult for you to judge. With two (or more) colonies you can easily compare the queens' efforts. Were you fortunate to have a mentor who helped you get started? If so, now is a good time for asking the mentor to come and have a good look at the colony size. Your idea of zillions of bees may not be reality.

Some stocks of bees, such as the Russians, will reduce raising bees when forage declines. (You now see that being a Plant Watcher is important.) Other stock, such as Italians,

will just carry on as if they lived in a world of plenty. You will learn the bees' behaviors during the next couple of years.

If all is well you can go to the next item on your list. However, what if you have a Wimpy Colony, one with a small population and brood pattern that indicates a Wimpy Queen? Our New Year month of August is a perfect time to make the decision about that Wimpy Colony. All too often we fall into the feeling that we must help the runt of the litter. Bees really do not respond very well to nursing along. A Wimpy Queen is a Wimpy Queen. You can just blame her for the problem. (See – it's not your fault. Feel better?) A Wimpy Colony in August will be a Wimpier Colony in January and a dead one in March. No honey crop from that one.

Your decision with the Wimpy Colony will somewhat depend on your climate. If you wish to requeen at this time, are good queens available? If so, perhaps immediate purchase of a mated queen is a good idea. Since drone population is in decline now, asking your bees to raise another queen is not a good idea. The population of Winter bees needs to get started now, no matter where you live. Or you could choose to unite Wimpy with Strong, provided you are not introducing disease and lots of *Varroa* and small hive beetle into Strong. By the way, a nice thing to do with Wimpy Queen is to kill her without squishing, put her into a container and show her to children. They think seeing a queen bee is very exciting.

A few words about winter bees. Although they look the same, they are physiologically different from Spring/Summer bees. Do you remember them from your bee classes? Look them up in your beekeeping book. Going into the Winter with a good population of Winter bees, laid in late Summer and Autumn, means you will have a good start on the Spring bee population. While you are thinking about how many bees in each hive, remember that normally 50 to 100 bees die each day. They just do. So your bee population is going to start decreasing as the queen normally slows down and then stops egg laying. A Winter cluster of plenty of bees is efficient in generating and preserving heat and in using stores of honey.

Next on your list is the "home" of your bees. The hive parts, inside and outside, including a hive stand all constitute the bees' home. We'll start inside with the amount and quality of your comb. If your bees were able to draw good comb on all your frames your hive is in good shape. If you have frames with just foundation (no comb) or frames with only a small circle of comb, these need to be against the wall of the hive body (positions one and 10 or one and eight, depending on the size of your hive). Perhaps the bees can be persuaded to finish them next Spring. Remember that bees need a good reason to draw comb – a nectar flow. If August is a flower dearth in your area, why draw comb? If you have damaged comb (dropped it, stepped on it) mark it for exchange next Spring. Keep the brood sphere intact and any frames with honey and pollen next to the brood.

Since you just started with bees this year and bought new equipment, you do not have to think about holes or broken parts. However, how do you like the hive stand you chose? Is it the right height for you to inspect the hive easily? If not, you can change it now. Unless you happen to have a nectar flow now, or in September, make certain that **no** queen excluders are on your hives!

Many beekeepers are using a screen bottom board with *Varroa*-sampling insert. Half the people you talk to will leave it open all winter. Half the people you talk to will close it for the Winter. And half the people you talk to leave it half open for the Winter. You will have to decide which half you will follow.

No matter what you do with that bottom board your hive must have both upward and downward ventilation. Otherwise you run the risk of condensation freezing on the bottom side of the inner cover then melting and raining down on the bees. During the Winter the bees eat. They produce water vapor and carbon

dioxide (just like we do). The water vapor goes upward and must leave the hive. The carbon dioxide goes downward and must leave the hive. With a screen bottom board open or partially open through the Winter downward ventilation is provided. The inner cover can be propped up in front allowing an upper entrance as well as ventilation.

Since the bees are actively eating honey all Winter the ideal colony should have sufficient food to last until something starts blooming in late Winter. The amount, of course, varies with your location; sufficient could mean 30 pounds of honey in the south, 60 pounds in the middle temperate area, 90 pounds in the north. So this brings us back to what is available for your bees from now, August Bee New Year Day, until frost. In a very few areas of the U.S. your bees may have almost year around forage.

Feeding bees in midwinter is a most difficult problem. The time to feed syrup is before Winter starts. The best food, if you have to feed, is 2:1 sugar syrup (two parts white granulated sugar to one part water). This is a digestible, no-residue food for bees.

Beekeepers have all sorts of ways to estimate, or measure, the amount and placement of Winter stores – weighing each colony, hefting it from the back, putting it on a scale – but at some point you really should look inside to see how much is stored and where. Bees store food above the brood area and, for Winter stores, they will also store to the sides. If the late Summer, early Autumn months mean a harvestable honey crop for you then either plan on leaving the appropriate amount for the bees or take your honey crop and immediately feed, feed, feed. Your goal is not to be forced to try to feed during the Winter.

Now it is time to give a thought to the bees' health. You should have had a *Varroa* control program of your choice ever since you got your bees. How do you think your program is working? You might want to do a mite drop now just to make sure the *Varroa* is under control. Brood is still being raised so the *Varroa* are quite happy. Don't let them get ahead of you. Our other problem is *Nosema ceranae*. The best guess right now is not to feed Fumagilin-B® but you need to keep up with nosema research in the bee journals and at association meetings. Are you in a high population area of small hive beetle? You can keep them under some control using beetle traps and limiting hive inspections.

OK! You've made your list. Perhaps you have asked your mentor to come over. You are ready to inspect and take action.

Now flip a few pages in your bee calendar. And so the weeks since Bee New Year Day have passed. The queens have been praised for their good work. All equipment is in order and the beeyard cleaned up (there's that missing hive tool!). The bees' pantry is full and everyone is healthy. Now all you have to do is wash your bee clothes – yes you do, to get rid of dried venom – clean up hive tool, smoker and bee bucket. Now you have time to sit back and read your bee books and magazines and wait for Spring. BC

Ann Harman keeps her bees alive at her home in Flint Hill, Virginia.

Surprise!

Peter **Sieling**

This past Summer I was rooting around an old house foundation trying to find where a colony of bees was hiding. They flew in right at the ground level and I was scraping away dirt to see if they were going up into the wall or down into the foundation. Several red cylinders labeled "explosive" emerged from the soil. I decided to work from inside rather than risk irritating the bees by blowing myself up.

The government classifies farming and logging as the most dangerous occupations. That's only because the people who collect the data don't know about removing honey bee colonies from buildings. The obvious dangers – falling off ladders, falling through rotten floors and ceilings, falling off scaffolding, collapsing ceilings and roofs, inhaling plaster dust and asbestos – are easy to avoid if you are careful. The real dangers are the unexpected ones – stuff no fiction writer could ever think of. It's the bewildering variety of unknown and unexpected dangers that make bee removals interesting. Take dummies, for example.

Shortly after the dynamite house, I agreed to remove two colonies from another old farm house. Unoccupied for 20 years, the roof had leaked and the ceiling rotted. The house should have been bulldozed, but the elderly farmer had been born in it and he hoped to restore it before he died. The contractors had started to remove a collapsing porch, but the bees chased them away.

The owner forced open the door and led me through the kitchen. The floor sagged as we stepped on it. He assured me there was no basement so if the floor gave way I'd only fall into the crawl space. The previous renters left heaps of debris on the floors and canned goods in the cupboards. It felt like stepping through a time warp into the 1980s. A department store mannequin lay among the rotting household furniture, naked and with a couple fingers missing, but otherwise in good shape.

"I have no idea where that came from," the old man nodded toward the dummy.

"My wife shouldn't see that," I said. "She's a seamstress and costume designer and might want it."

"Well, she's yours, then," he said, and that's why "Helen" went home with me that night along with two honey bee colonies. It was, coincidentally, Nancy's birthday and I had forgotten to buy a gift.

My wife has a well-developed startle reflex, and while I wanted to surprise her, I didn't want to overdo it. So while Nancy pinned and sewed upstairs, I hosed and dried Helen in the shop, then dressed her in my bee shirt. I carried her into the house and stood her up in the shower. I went upstairs to explain to Nancy, "I found you a birthday present. I thought it would be useful for your business, but if it isn't, just consider it a gag gift and I'll get rid of it. Oh, and I hid it. You have to find it."

Nancy eyed me suspiciously, and then looked at the time. "How long is this going to take?"

"Not long."

"Is it bigger than a breadbox?"

"Much bigger."

She came downstairs and wandered through the kitchen and living room. Stepping into the bath room, she caught in her peripheral vision a glimpse of a woman standing in the shower and staring at her.

She screamed.

Most power tools measure around 90 decibels, and a jackhammer is 120 decibels. I once stood directly behind a Boeing 767 when it started its engines. This was worse. Hearing loss is progressive and permanent. I always wear ear protectors when running tools. I wonder how much hearing I lost in that half second blast of high frequency shriek.

Helen now lives in the honey house and startles honey customers. Between modeling jobs she helps me by holding towels and dish rags.

Of all the dangers associated with colony removals, the most dangerous are the most unexpected. If you see something like a dummy lying in a dark corner, leave it alone. Or, at least, don't forget your earplugs. BC

Peter's book, Hive-Making Manual, *and* A Bee's Guide to Managing Beekeepers, *is available at* ***www.makingbeehives.com.***

Bumble Bee Massacre

Cosmetic spray in parking lot kills thousands.

Dewey **Caron**

In a suburban shopping mall in Wilsonville, OR, south of Portland, a massive loss of bumble bees has been attributed to use of the neonictinoid pesticide Safari. It is an unusual pesticide poisoning incident highlighting that suburban locations, not merely agricultural fields, can sometimes be hazardous to foraging bees.

Early Saturday morning shoppers to the Argyle Square Target store June 15th in Wilsonville where concerned when they saw "tens of thousands" of dead and apparently dying bees. Bodies littered the ground and sidewalk beneath flowering trees at the store entrance and in the parking lot. Still living bees were acting like they were drugged, spinning on the asphalt while others clung and buzzed crazily among the flowers and foliage on the same trees. Ironically this gruesome discovery marked the beginning of the week designated as Pollinator Week in the U.S.

Rich Hatfield of Xerces Society was called to come investigate the kill. Xerces Society is a world-renowned, non-profit invertebrate and habitat conservation organization based in Portland. Rich, a bumble bee specialist, found large numbers of dead and dying yellow-faced bumble bees *Bombus vosnesenskii*, is a distinctive and common Oregon bumble bee, easily recognized by it's bright yellow markings on head and top of the first thoracic segment and a single yellow stripe on the lower abdomen. It is otherwise densely black and hairy with blackish wings. It is a small, round-shaped, slow flyer. He estimated over 25,000 bumble bees were involved likely representing more than 300 colonies.

Rich also noted a smaller number of *B. mixtus* and *B. melanopygus* bumble bees among the bodies. He found a smaller number of dead honey bees and lady beetles as well. *NOTE: Bombus vosenesenskii*, represented with over 95% of the observable kill, should not be confused with the yellow-banded bumble bee *Bombus terricola*, a bumble bee species of great concern and considered threatened in the eastern U.S.

Surveying the extreme losses "We immediately contacted the Oregon Department of Agriculture (ODA) and asked them to test the bees for pesticide poisoning," said Mace Vaughan, the Xerces Society's Pollinator Conservation Director and colleague of Rich Hatfield. "They were literally falling out of the trees." ODA investigators from pesticide safety, contacted the landscaping firm responsible for maintenance of the parking area and learned that the pesticide Dinotefuran (Safari) had been applied to the trees of the parking lot that very morning.

Safari is a neonicotinoid sold by Valent, a division of Syngenta. It is readily available to homeowners. and can be applied without a pesticide license. In fact the very same Target store sells it to homeowners for insect control on roses. As listed in our soon to be released update of PNW Extension Publication **How to Reduce Bee Poisoning from Pesticides** (PNW Publication No 591), Safari is classified as "highly toxic" to bees and buried in the product label is the caution to avoid application "if bees are visiting the area." How long the material remains toxic following application is unknown.

Suspecting the bee deaths were directly related to application of Safari, ODA took samples from the dead and dying bees and from flowers and foliage of the trees. By Friday, analysis confirmed residues of the chemical in bees and on the trees. With the early Saturday spraying and residue analysis it was concluded that pesticides, specifically Safari, was the culprit and responsible for the massive bumble bee losses, since revised upward to over 59,000 individuals.

Safari had been applied to the trees to control aphids, which secrete a dark sooty honeydew. Aphids are indicted as about the only insect pest of Little Leaf Lindens. Lindens (*Tilia cordata*), including this species, are known for heavy honeydew secretion and are viewed by some as a "problem" when the honeydew falls on car windshields creating a sticky nuisance. Apparently the mall management firm had authorized the application of the pesticide simply to avoid customer complaints. A "cosmetic" application situation. Unfortunately at application, the lindens, 55 trees in all, were in full bloom.

Could there be syngerism?

But the story gets complicated. The dead and dying bumble bees were beneath Little Leafed Linden trees. (See Univ Florida extension site http://edis.ifas.ufl.edu/st642 for species details). This non-native, heavily fragrant tree is described as ideal for shade and its attractive form and fragment bloom in large parking lot islands, as found in the Target shopping mall. Lindens are also known as lime

trees (in Europe) or basswood to honey connoisseurs. Basswood honey is a distinctive, water-white honey, often with slight greenish tint. Some consider it one of the finest honeys for direct consumption. Basswood timber was also once used extensively for comb honey section boxes.

Little Leaf Linden trees, *Tilia cordata*, a non-native, is widely planted especially as a hearty street tree, like the native American Linden, *Tilia americana*. Rarer is the White Basswood tree, *Tilia heterophyllia*, also known as "bee tree linden."

The unusual twist to this story is that linden is one of a small number of plants known to be toxic to bees. Among lindens, the Little Leaf Linden tree has been shown to secrete a toxic nectar, perhaps due to the sugar mannose, that is apparently particularly toxic to bumble bees. The abstract of a 2007 study in Germany noted "dying of bumblebees under the late flowering lime tree *Tilia tomentosa* has been described by several authors" and that "numerous dead bumble bees are found under silver linden trees." The study found that "Honey bees foraged on *T. tomentosa* only at times of high nectar availability . . . Bumblebees . . . visited the trees throughout the flowering season." The different foraging strategies of the two bees was surmised by the authors Ingrid Illies and Werner Mühlen as the reason why bumble bees, more so than honey bees, fall prey to the toxic nectar. (published in Entomologia Generalis Volume 30 Number 2 (2007), p. 155 – 165)

The website states "Linden tree flower nectar is safe for honey bees in low amounts, but poisonous in excess amounts. Honey bees are most likely to become poisoned under certain environmental stressors, such as abnormally low soil moisture in the bee's foraging area, which will force the bee to take in too much nectar from the linden tree's flowers." http://www.ehow.com/facts_8035645_linden-tree-toxic-honeybees.html#ixzz2WuyNENNh

Why so many bumble bees?

This shopping square is in a suburban area with some remnant farms. Directly behind the store is a 32 acre field now of mixed flowers. Last year it was a crimson clover seed field. The large numbers of bumble bee nests might be attributed to the rich foraging opportunity in this field. Honey bee colonies, rented the previous season for seed pollination, were not on site this year as the property is being sold and no longer actively farmed as in previous years. There was no indication of dead bees in this field nor reports of massive bee kills in previous seasons. Bee colonies located in the area are being checked for evidence of pesticide damage.

Whether the massive bumble bee kill is a highly unusual case of an erroneous application of pesticide leading to the poisoning of native bumble bees or a still rarer instance of massive toxic nectar poisoning, or a synergistic effect of the two, may never be determined. Further analysis will be needed. It is possible, as we are finding with CCD in honey bees, that multiple factors may have been at play creating another instance of unfortunate and inadvertent heavy losses to our pollinators in this suburban mall. The bumble bees are the clear losers.

Finding a temporary solution

With the large kill it was obvious a solution was needed. In an effort to mitigate further damage to foraging bees, several options were considered. One option discussed was to immediately strip off flowers and leaves from the trees. Another was to apply a non-toxic repellent to keep bees and insects from visiting the blossoms. Both were rejected in favor of covering the linden trees with large nets to prevent bumble bees and other pollinators from reaching the flowers. Plastic shade netting was used to cover the 55 trees. Netting of the trees was completed finally on Friday, nearly a week after the first kills were reported.

And in yet another twist, a well-known phenomena, a "copycat" story, appeared in the local media. In another Portland suburb, Hillsboro, about a 100 dead bees were discovered under a tree maintained by the city. These trees too had been sprayed with Safari, but legally as a systemic application, several months earlier. The city was planning to cover the tree with a net as was done in Wilsonville as a preventive measure.

In the meantime specialists were trying to inform the public of the nature of the event. The Xerces facebook and website (www.xerces.org) has been keeping the public well informed as well as trying to respond to the numerous phone and media inquiries. Mace Vaughan, the Xerces Society's Pollinator Conservation Director stated "To our knowledge, this incident is the largest mass poisoning of bumble bees ever documented. "

Could some good come from this unfortunate pesticide kill of bumble bees? Scott Hoffman Black, Executive Director at the Xerces Society put the loss in perspective as quoted in the The Oregonian newspaper lead story "If the trees are indeed toxic they should be cut down and replaced by something that will provide non-toxic pollen and nectar for bees . . . On the other hand, if pesticides are the cause, we need to spotlight this as a real-world lesson in the harm – toxic chemicals are causing to beneficial insects."

Mace Vaughn of Xerces and others hope this story, before it is replaced by something else in the news, will spur an effort to limit pesticide sprays for "cosmetic" (i.e non-essential) use, especially since this case highlights the unintended consequence such spraying may have. The ODA is considering the possible fining of the applicator but the fine would only be in the $1000 to $10,000 range. Someone has to speak for the bumble bees. Could this bumble bee massacre spur Oregon, perhaps like Ontario, to enact legislation to speak for them and against careless and inconsiderate (and unnecessary) use of pesticides?

Meanwhile, the ODA has banned pesticides for ornamental uses that contain dinotefuran for a 180-day period. BC

Happy New Year!

Time To Get Ready For Winter

Larry **Connor**

Is the flow over?

After a frantic year of waiting for Spring, pushing to build up colony strength (and being rewarded with way too many swarm cells), piling on extra honey supers, and making increase colonies, most beekeepers look at the month of August as a chance to catch their breath or switch to honey harvest. For many parts of North America, certainly in the northern United States and Canada, the major nectar flow is usually over in August unless, of course, there is a second nectar and pollen flow from goldenrod and aster (often called a Fall flow but technically a late-Summer flow). The geography and plant community of a region is especially important in August. In Alaska and northern regions of the continent, fireweed is about done and going to seed. Yet at this time of year, some mainland migratory beekeepers are busy herding their bees to Florida and other southern locations for flows from plants like Brazilian pepper (*Schinus terebinthifolius*, also called rose pepper and Christmasberry) and melaleuca (paperbark). Many of these colonies, coming out of northern pollination and nectar production duties from Maine to the Dakotas, need a rest. This is an ideal time to reconstitute these road-weary colonies and produce new colonies with fresh, newly produced queens, natural forage, high protein feeding, and supply them with all the conditions they need for their next assignment, which is most likely the almond bloom next February in California.

Based on their prior experiences, non-migratory small-scale and sideline beekeepers should know if they are likely have a goldenrod-aster flow. Experience should also inform them that there is not a flow from these plants every year, depending upon summer rain and the development of fully functional flowers.

Where purple loosestrife (*Lythrum salicaria*) has not been decimated by bio control methods, beekeepers may have an August flow from this invasive wetlands species. Not everyone likes loosestrife honey, but its blooming period is somewhat unique in that it provides many bee colonies with food at the time they will benefit most from this rich nectar and pollen producer.

Many major honey bee nectar sources are considered invasive species and there are many who are willing to spend a great deal of time and money to stop their spread or reduce their reproduction. The classification of a plant as illegal, pest or invasive is always a mystery to me – I have seen signs in Alaska for weekend work parties to go out and pull sweet clover plants from the local fields, yet this same species is the major nectar source for beekeepers throughout the northern plain states and provinces. It is an interesting conflict. I recently had the opportunity to talk with pro-environment sustainability advocates who have just started beekeeping and had the duty of informing them that the plants they have been helping destroy are the very plants the bees depend upon for the nectar crop and colony sustainability! It is not always an easy discussion, but it is one we need to engage in more and more.

For my bee colonies in Michigan, the last mid Summer nectar comes from spotted knapweed (invasive of course) that ends anytime from mid July to early August, depending on rainfall and mowing practices. When the flow tapers off, the colonies change their behavior in multiple ways. First, colonies in the mid-Summer and Fall produce fewer eggs per day (the queen does not determine this alone as the entire colony influences this decision). There is a lower rate of success of these eggs, dropping to 75 to 80% in otherwise healthy colonies as compared to 90 or 95% success (as measured by adult worker bee emergence) during the Spring and early Summer. Why does this happen? It is probably due to the fine tuning or trimming of brood that colonies always perform. As the season matures, day-length declines and forage becomes more precious, the percent of successful worker bee emergence is reduced. I have observed that this lower success rate, as expressed as empty cells or spotty brood, is also more prevalent in the early season, during the first few cycles of brood. The fine trimming mechanism is always at work in the hive but this period is accented by the relatively steep decline in available forage.

Second, in the middle or end of Summer we should notice the disappearance of drones from all

A well-fed drone larva floating on a bed of royal jelly or drone brood food.

colonies but those undergoing queen replacement. This is of importance to beekeepers making mid Summer increase colonies and naturally mating locally reared queens. Without a large, young supply of drones, August queen mating will often fail to produce fertile queens, or result in queens that run out of sperm early in their lives. Stored honey will prolong the reproductive efforts of bee colonies, but those where honey is removed for harvest are likely to eject drones and prevent them from reentering the hive after a mating attempt. Workers may be seen at the hive entrance, tugging at tired drones that return from the sexually charged drone congregation areas, even dragging them away from the hive as they would with an invading wasp. This hostility toward brother drones apparently benefits the colony by reducing consumption of honey by the bees.

There may be a temporary reversal of this condition when the goldenrod and asters bloom. Drone production may start again, but rarely at the level seen in May and June. There is also a second swarm season in which bees launch swarms, as their population grows a bit, but nowhere near the Spring levels. The success of these late Summer and early Fall swarms must be very low during most years, but, in an exceptional season, the Fall swarm may collect just enough food to survive the upcoming Winter. One reason for the success of some swarms is the production of new bees that are well fed, to be discussed next.

Happy New Year

More and more bee biologists consider mid to late August to be the start of the colony's New Year, for it is the point when bees that will develop the colony the next calendar year are being produced. Late Summer and Fall swarms utilize the bee species' natural instinct to produce new bees in large numbers and feed them well. The process is a bit complicated, but is based on the concept that the bees feed the bee larvae that become the Winter cluster must themselves be well fed. The nurse bees produced in late August and September in my region must have abundant food supplies so the last bees they raise, the so-called Winter or fat bees, are crammed with proper nutrition that will help them feed the new bees during the Winter months before the first food of Spring is available.

When the Summer flow tapers off colony behavior changes – fewer eggs are laid, and fewer eggs emerge.

Beekeepers in my area question my recommendation that they should make increase colonies during June and early July because they fear that these colonies will be unable to build enough to survive the Winter due to lack of food. Ironically, these are often the same beekeepers who harvest every frame of honey from a colony during the late Summer (with the promise of heavy Fall feeding with sugar or HFCS), or chase after late-Summer and Fall swarms with the hope of getting them to survive the Winter.

Is there so much difference between a beekeeper-made increase colony and the fully-harvested or late swarm colonies? I think they are more alike than different. The fundamental equation for colony survival boils down to young queens, young, well-fed nurse bees, and adequate food stores, regardless of how a healthy colony enters the Winter season. Strong colonies that have lost their stored honey may have an old queen and not enough vigorous nurse bees to survive the Winter. More and more, beekeepers report that the colonies that do the best over the Winter are the new colonies: the splits and increases of the Spring and early Summer months. Why? First, they have had a break in the brood cycle that generates a generation of bees with less *Varroa* mite pressure. Second, they have had a tremendous buildup rate to produce adequate bee populations of young, well fed bees to ensure better wintering success. Late season swarms may have an advantage if they are blessed with a delay in the first killing frost, enabling a September swarm to potentially build adequate comb in which to store (or rob) enough food for Winter. The entire role of Fall swarms is poorly researched and requires further investigation.

Drones disappear and the *Varroa* populations explode

During the main beekeeping season, while there are drones in production in a colony, *Varroa* parasitism is primarily on the developing drone late larvae and pupae. At this time, the drone's 24 day developmental time is preferred by the mites over the worker bee's 21 day development cycle. The female mites smell the drone brood and are attracted to it. The precious extra three days in the drone cell allow the female mites time to produce three or four additional daughters beyond what can be produced by mites in worker brood. The reproduction rate in worker brood is pretty tight, generating a slight increase in mite populations while each cycle of worker larvae pupate, but the development rate in drone brood allows for a rapid increase in mite populations. Since mite-spread virus-deformed wings is less of a concern to honey production (but not queen propagation) when it occurs in drones rather than workers, beekeepers who emphasize honey production may choose to mechanically remove drone brood from colonies and destroy it, or to allow the mite numbers to slowly grow and then use a miticide after the honey crop is removed from the hive.

When the nectar flow ends in July or August and the production of new drones is suppressed, there is active removal of adult drones by the

Under the protection of the capped pupal cell varroa mites are able to reproduce and generate several daughters on the drone pupa. They have three fewer days to do this in the worker cells. Once the drones are out of production in a hive, the mites move to the worker brood and cause feeding damage and expose the bees to additional viruses (or create conditions that favor viral development).

worker bees. Now, the mites feeding on adult worker bees (phoretic mites) are forced to enter worker cells for reproduction rather than drone cells and the impact on the new bees is dramatic. Within a few brood cycles, the combination of a growing population of worker, larvae, and pupae-feeding mites, along side the development of various detrimental viruses, results in a serious impact on the new bees. Surviving, un-deformed bees must carry on hive activities while suffering from a reduced nutritional physiology. These are often the bees that feed the bees that go into Winter, so their impaired feeding will have a compounded impact on the bees entering Winter, so much so that these bees are often dead by the first of the new year and the colony dies before the depths of Winter are reached.

Taking a share

New beekeepers with new colonies from packages and nuclei are advised to leave most of the honey the bees produce during their first season on the hives. Exceptions abound, but honey is the ideal food for wintering colonies and, if the bees still have surplus honey in the Spring, you might be right to harvest it then. Why do I make this statement? I have formed the opinion that the best colonies are the ones with money in the bank. Or, more precisely, honey in the colony. This honey is best located in and around the brood nest of the colony where it will be available to the bees during the Winter months. More and more, I see bees moving straight up into the second honey-filled hive body as Winter progresses. If the top of the colony has insulation and ventilation, the bees will move over the tops of the combs and access the honey in these top frames. This success of having heat from honey consumption, and the eventual Winter survival goes back to the conditions within the hive that started sometime in August or early September. If there is not a Fall pollen and nectar flow the bees will not be well-fed fat bees, and the entire colony may be at risk.

Finally, Winter survival must incorporate a comprehensive mite control program. I am a strong advocate of using only mite-tolerant bee stocks, not chemical treatments. While chemical-free beekeepers often lose a large percentage of their colonies in their efforts to develop a local survivor stock with mite resistance, the long term benefits are enormous. Avoidance of mite-susceptible package bees and nucleus colonies, and absence of chemical treatments, will ultimately lead the larger honey crops from increased numbers of colonies. There are beekeepers who have been chemical free for a decade or longer; consider them as a starting place for nuclei and queens for next season. BC

When the drones disappear, *Varroa* populations feed on worker pupae!

Check out the new revised Honey Bee Biology and Beekeeping *by Dewey M. Caron with Lawrence J. Connor at your local bee book vendor or at* ***www.wicwas.com.***

DOWNTOWN

Make Sure You Get Sweaty and Dirty and Stung and Overjoyed.

An Open Appeal To The Urban Hipster

Few things make me cringe as painfully as urban homesteading books that squeeze in a chapter on beekeeping between the ones on chickens and pickling, or the stylish cooking catalogs with the unlikely turnkey hive kits, or the appeals to "Save the Honey bees!" that end with the suggestion that you just pop a hive into your back yard.

With such an opening, you've clearly been warned that this article has more than a little bit of ranting and overgeneralization to it. I ask for your patience with me as I acknowledge that we are all in this together, more than one approach is required, and we are all trying to be on the side of the bees. I also know that, since you are reading this magazine, you are probably not the audience that needs one word of it. But hey! Let's dish!

Yes, it is the tired part of the year for me – the days of catching my breath after the months spent trying to teach the willing and to calm the outraged about why that spendy new hive died ("nope, the one deep they sold you with the $300 bees was not enough for local winters"); between stints climbing trees, buildings, and fences to capture the swarms from the lucky strong colonies that flourished-- before someone squirts them with Raid or declares war on urban beekeeping. All while worrying over my own losses and mistakes, wondering what last year's deadouts and this year's survivors can tell me about living downtown. Trying to live up to what I preach.

There are so many wonderful, willing hipsters out there, folks just yearning to get on the right side of things green. But my observation, city folks, is that many of us need an education about what constitutes an education, and it may be one of the most wonderful gifts that the bees have to share with us. And it never ends: if you are looking for your green-ness in a nice, defined package, beekeeping may not be the way to go.

City dwellers, most of you are pretty smart operators. There is very real truth to the saying, "If you can make it here, you'll make it anywhere!" because you need to be really smart and to know a lot and to figure out how to adapt very quickly to keep your head (and those of your loved ones) above water in the competitive urban enclaves of today. Most of us, however, got our smarts out of superior classroom performance and a real affinity for book learning. If the lesson is offered inside a building or at a keyboard, we shoot and we SCORE! When beekeeping first crosses our mind, it seems natural that what we have been good at will continue to serve us: after all, look at all the brainiacs who have made the art and science of beekeeping possible!

And then there is the Internet, where anyone with a connection and an opinion can look as important and persuasive as someone with decades in the apiary behind them (probably MORE persuasive, as a matter of fact, since experienced beekeepers are rarely in the IT vanguard).

Study after study shows that people in isolation migrate to stuff that is like the stuff they have experienced and learned before: if you were looking to expand or revolutionize or surprise your point of view into something you never considered, a computer screen is an imperfect place to do it. If the bees were going to say something to you that you never heard (or saw, or smelled) before, you are probably not tuned in to the strongest signal via WiFi.

Yes, I am begging you to go outside. Preferably with other people. Lots of them.

Over the 8,000-year relationship

Toni Burnham, Meghan Olivier, and Hazel Schenk put their heads together at an urban roof apiary. photo by Matthew Rakola

between people and bees, almost all of the beekeeping education happened when one person stood at the elbow of another, and exclaimed over what they saw inside a living, breathing hive. And the more different elbows, the more the beekeeper learned. And not in just a couple of afternoons. I divide my own best beekeeping education almost evenly between the short course I took, the mentors with which it connected me, and all the coffee I drank while watching my bees come and go out the hive entrances. And even more importantly, all my beekeeping friends: the grounded longtimers who help me see a pattern emerge for the first time, the shiny new beeks who help me see the same thing through a completely original perspective. I need them all.

I've always suspected that what originally sucked me into beekeeping was the affinity between the social world of the bees and the comings and goings of an urban hive. I want to live in a city where we work together, can count on each other, and form a community that really wants to be there for all of its members. Of course, I did not kill my mother when she stopped having offspring, and I allow my husband to continue to reside in the house between November and February, but you get the picture.

Because so many of us really care about the green world, I think there is a good reason to look for that kind of community in urban beekeeping. In the age of cell phones, this has an added benefit: if you know a lot of other beekeepers personally, and have visited lots of apiaries, and you find yourself in a jam, you can call in help from all quarters – if you have been exploring all quarters in real time with actual people. Not just the one who sold you your stuff. When I really want to suck someone into the magic of beekeeping (say, a City Council person, or a member of the media) I invite them to a situation where we beekeepers are helping each other out: catching swarms, harvesting honey, or diagnosing a hive issue. It speaks to where we really want to live.

Beekeeping also has a tendency to reward the amount of heart you put into it, in spades. Not everyone is in need of a deep and meaningful relationship with insects, it is true. I would argue, however, that they at least deserve your respect, and when you show that by spending time and getting exposure to the miracle that they are, you will be rewarded with joy. And friends! And (at least in my case) access to all sorts of rooftops and secret green spaces and cool apiary ideas I never could have thought up myself.

So make some time to go to meetings, especially (in my opinion) less programmed meetups where encountering new folks is more important than listening to a PowerPoint presentation. Raise your hand and share something that is confusing or vexing you. Invite someone to come see your bees, or ask if someone interesting would welcome a hand with theirs. Go to meetings of beekeepers whose approach is radically different from yours – get a look inside a TBH if you only do Langs (and vice versa), attend an IPM conference even if you use Checkmite. Use local discussion boards to locate nearby folks with similar confusions or problems, and put your heads together over a real live hive to see if you can figure it out. If you want experiences like catching a swarm or opening up a bee tree, seek out a person who has been crowing about that, and put yourself on their call list.

Don't just stay inside, or only look up how to do a new task. Every one of us needs a beekeeping library, and should keep an eye out for new publications on the queen rearing wrinkle or site selection study that applies to us. But please make sure that you get sweaty and dirty and stung and overjoyed from time to time. Call me if you're gonna. BC

Toni Burnham keeps bees on rooftops in the Washington, DC area where she lives.

GLEANINGS

AUGUST, 2013 • ALL THE NEWS THAT FITS

OBITUARY

Elmer Lynn

Elmer Lynn of Pleasant Hill, IA passed away June 17 at the VA Medical Center in Des Moines, IA at the age of 91. Funeral services were held June 22 at Merle Hay Funeral Home in Des Moines with burial and military honors at Chapel Hill Garden.

Elmer was a WWII Army Air Force veteran and was a former president of the Iowa Dairy Supplyman's Association. He also started Sho-Me Containers and BL Plastic Containers and operated them for many years before selling the companies and enjoying retirement. He was well known in the beekeeping industry as a supplier of quality honey containers. He will be remembered as a loving husband, father and grandfather.

TARIFF TO INCREASE ON CHINESE HONEY?

The United States has proposed $2.63 a kilogram ($1.19/lb.) as its preliminary rate for renewed antidumping duties against Chinese-made honey.

It is the second renewal of the tariffs on all Chinese honey exporters first imposed in 2001.

In 2008, the Commerce Department's International Trade Administration set the rate at $2.06 a kg (93.4c/lb.).

The dumping duties were first imposed in 2001 when it was found Chinese exporters were shipping honey to the U.S. at prices below the cost of production.

The tariff extension comes after the International Trade Commission ruled in November that U.S. beekeepers and packers would likely suffer material injury if the U.S. lifted duties on Chinese honey.

The International Trade Administration says the products covered by the order are natural honey, artificial honey containing more than 50% natural honey by weight, preparations of natural honey containing more than 50% natural honey by weight and flavored honey.

The Department of Commerce says its preliminarily determination is that none of the Chinese exporters have demonstrated their eligibility for a separate tariff rate.

"If we adopt these preliminary results in the final results of review, the Department will instruct U.S. Customs and Border Protection to assess antidumping duties on entries of subject merchandise," it says.

The preliminary findings are open for public comment for 30 days and the Department of Commerce says it intends to issue the final results of its review, including the results of its analysis of the issues raised in any written briefs, in no later than 120 days.

BRUSHY MOUNTAIN BEE FARM OWNERS ACKNOWLEDGE HELP OF OTHERS

Left to right – Steve Forrest, NC Senator Kay Hagan, Sandy Forrest and Shane Gebauer.

NC Secretary of Labor Cherie Berry was at the Brushy Mountain Bee Farm's new manufacturing facility in Wilkesboro in June to help recognize co-owners Steve and Sandra Forrest and Shane Gebauer as NC Small Business People of the Year for 2013.

Berry attended a ribbon cutting for the new 21,000-square-foot facility for the beekeeping equipment company, organized by the Wilkes Chamber of Commerce.

In her comments at the event, she noted that the Brushy Mountain Bee Farm was one of 26 companies in NC that have received the NC Department of Labor's (Safety and Health Achievement Recognition Program (SHARP) designation.

Berry said the Brushy Mountain Bee Farm's "basic premise is that they care so much about their employees because they care so much about their community and state."

Forrest spoke about how he and wife, Sandra, started the company in the basement of their home after moving to the Brushy Mountain community over 30 years ago. They were teachers in Iredell County.

Moving most of the company's manufacturing operations to the pre-existing building on Industrial Park Road will take much of this truck traffic off Brushy Mountain Road.

Forrest also told how the NC State Univ Industrial Extension Service and the NC. Small Business & Technology Development Center (SBTDC) at Appalachian State Univ have contributed to the company's success by helping it become more efficient and improve sales.

Gebauer emphasized that while striving for success, the overall goal is to produce and maintain value.

He described how officials from state, Wilkes County and Wilkesboro governments, the Wilkes Economic Development Corp., Municipal Engineering and others worked with the company to help secure a Small Business Entrepreneurial Assistance grant of $250,000 from the NC Dept of Commerce and an NC Rural Economic Development Center Building Reuse and Restoration grant of $150,000 to help the company with the move and expansion.

Gebauer said the grants funded nearly half of the company's cost of acquiring and renovating the building, and noted how it provided work for employees of various companies involved in renovating the facility.

The Brushy Mountain Bee Farm nearly tripled its manufacturing space with the move, acquired additional manufacturing equipment and added 12 jobs. It now has 62 employees in Wilkes and eight at a retail facility in Pennsylvania.

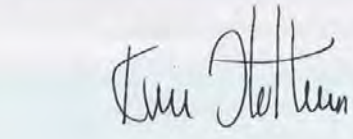
INNER ... Cont. From Page 19

as he calls them, and she was open mated with drones from around his home. She looks and acts more Carniolan than not, but she's not pure, but she's been doing just fine. They overwintered in four medium 8 frame supers with lots of food, and came out strong with a good population at just the right time for the early DC flows. So far Charlie's harvested four full supers, and it's only June. Timely management kept their minds off swarming and they are building even faster now. And they're always keeping an eye on the mites.

Charlie also has two colonies on a 12 story building downtown that I was curious about. They had to be moved early this spring. One was doing great...140 pounds so far, but the other was just sort of holding its own. Construction moved them both out for a bit, but just recently he brought back another 8 frame hive two weeks later. It's in a good place on the roof, and winds don't seem to be an issue, but the building isn't in a skyscraper canyon, so that's still a test.

Last year was tough on bees in that area. Generally, heat stress, drought, not enough available forage and Varroa buildup were issues everywhere. Lots of colonies didn't make it through winter...Charlie lost a bunch. So this spring was build back, and build up time and he got 35 packages from Georgia. 25 came in April, 10 in mid-March. Then 30 queens from California for the rest of his colonies in late May. He also produced more than 30 queens himself from splits. The colonies that survived are going strong, and most of the packages are respectable...some queen issues but for the most part building up as expected. The lesson learned is that Varroa wins. Take care of that problem, make sure there's enough good food, and a clean home and bees do OK. Ignore those lessons...and you have some clean up duties to perform.

Thanks for the Update Charlie. Good to know the status of the bees in the best beeyard there is.



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Honey bee covered with pollen on a sunflower. photo by Brad Clawson

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I dreamed about the upcoming Colorado state bee meeting at Paul's place in Silt. We have it there every Summer. In the dream, I stayed for the bee talks and the camaraderie and of course the barbecue lunch, but I went home a little early and spaced out the official meeting at the end of the day. This was reminiscent of the school dream I used to have, in which it's time for exams, and I suddenly realize there are a couple of classes that I completely forgot to attend during the semester.

There's one difference this time: I really did skip the business meeting a couple of years ago, and it happened the same way. It had been a long dusty day, folks were leaving, and I thought, "This is over. Why stick around?" and forgot all about the meeting.

We ought to have the meeting before lunch, not at day's end. That way we'd all be fresh, attendance would be pretty good, and as soon as the burgers hit the grill, we could adjourn. With a lunch deadline looming, the big talkers would just have to be a little more concise.

At Christmas Marilyn's big family draws names for presents, and this year her brother-in-law Tom gave me a smoker. It's made by a company that I don't ordinarily do business with. They're a little cheaper than the competition, and it's reflected in the products they sell. But I thought, "I can always use another smoker. They wear out. They fall apart. They get left behind. You can't have too many."

The defect of this particular cheapo product is that the bellows are kind of flimsy. You squeeze them, and they give practically no resistance. "Fine," I thought. "This'll still make a great spare."

Did I tell you about my skiing accident on the patrol last Winter? I was skiing an extra steep little shot through the woods, and feeling somewhat proud of myself for doing what I thought was an OK job of it. I'm not sure what happened next – maybe I hooked my ski on a tree root – but I did a flying Wallenda, and when I finally landed, it was on my right thumb.

That thumb's been giving me hell ever since. In the best of times, it aches. In the worst, I can't button my shirt. My thumb stiffens up, makes me drop things and sometimes even makes me say bad words.

Operating a smoker aggravates this injury, but guess what! Squeezing the bellows on the cheap smoker Tom gave me is a breeze. It's become my favorite, and now I wish I had a half dozen more just like it.

I'm a big advocate of keeping your *Varroa* mite numbers down. Lack of attention to mites will sooner or later give you a multitude of problems, including colony collapse. But when it comes to Nosema, I just put my head in the sand. Some of my hives thrive, and some dwindle. I often have no idea why. I don't own a microscope to check for Nosema. I don't treat for it with fumagillin. I do feed pollen supplement spring and fall, partly to improve my bees' resistance to Nosema. But basically I feel that bees have to learn to live with this stuff, or perish. I'm not convinced that antibiotics are the answer. Maybe that's naïve, but that's how I see it.

I do try to keep an open mind. I reserve the right to backtrack 180 degrees on anything I say about bees. I'm always interested in the opinions and methods of successful commercial beekeepers, because these guys manage to thrive in a business that is supposedly going under. In case you think all commercial beekeepers are being decimated by Colony Collapse Disorder, look again. Some of them are doing very well, thank you. One Big Operator told me, "My bees have never been better!" Wow! What can we learn from these guys?

It's early June here in western Colorado, and my bees are doing reasonably well. I still have a couple of loads to haul to the high country. The dwarf waterleaf and the dandelions are showing on the Flat Tops. I wish I had the little darlings up there already, but where's the time for it all?

We have a star-studded lineup for the bee meeting on Saturday, including Roger Morse protégé and Africanized beekeeping promoter Dr. Dewey Caron, and Dr. Ron Fessenden, author of "The Honey Revolution." Our get-together will be a chance to meet up with old friends and yes, maybe learn something when we bump into a successful commercial beekeeper. Not all the learning goes on in the classroom.

Paul's place is just down the road. I'll be there, and this year I'm not going to space out the business meeting.

Ed **Colby**

A Cheap Smoker