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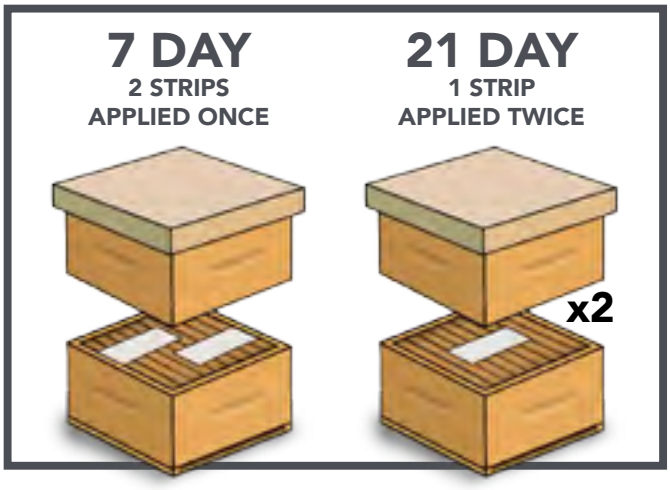

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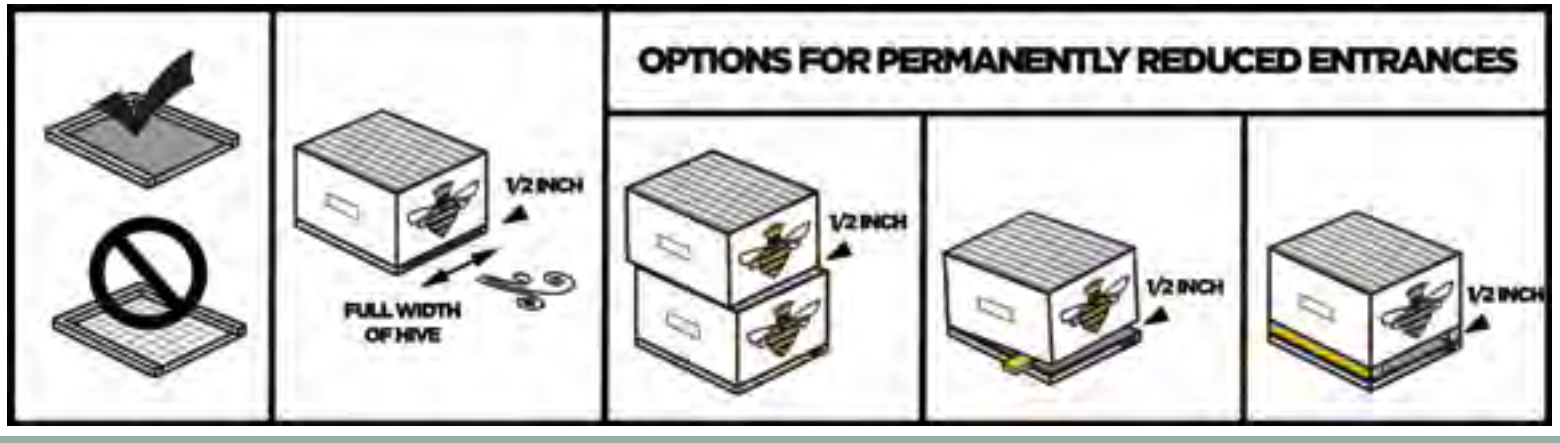

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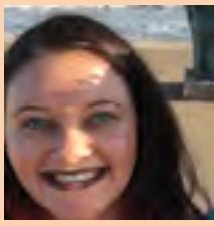




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Bee Culture

June Features . . .

Page 23

Page 41

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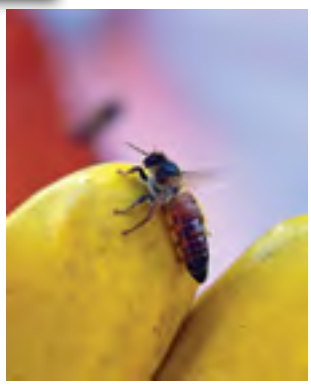

An African queen photo by Bill Mondjack, PA. Bill has been in photography since his days in Vietnam, 1966-67 and has photo galleries on: ***www.pbase.com/billzbeez***

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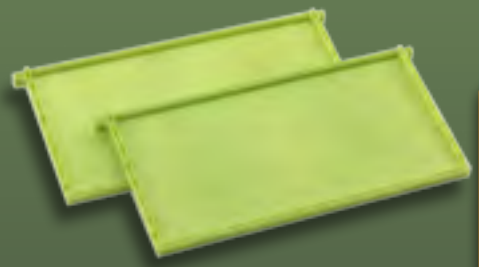

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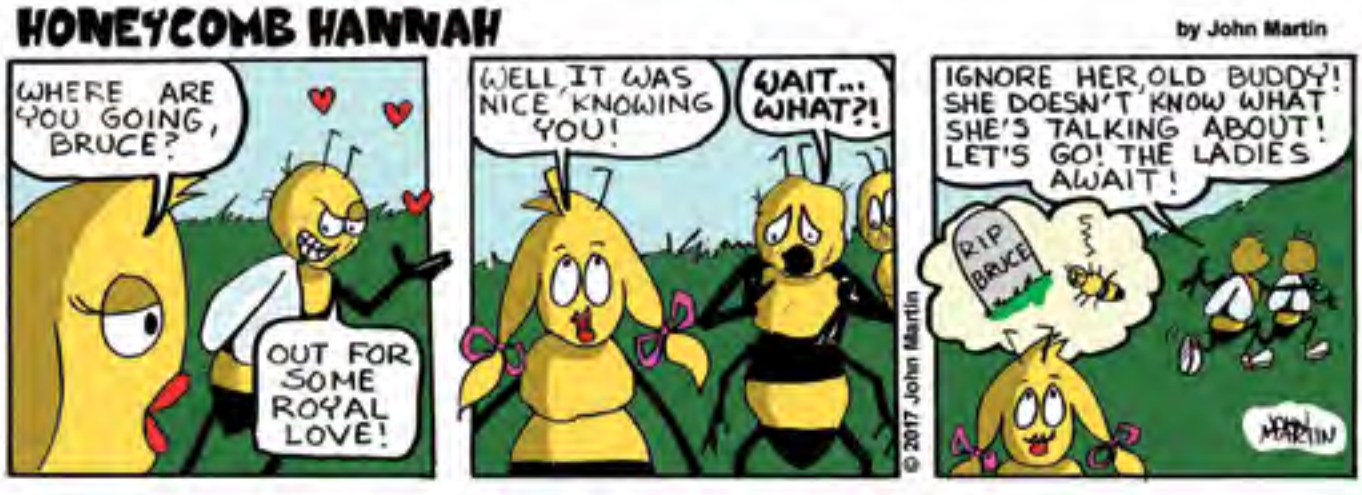
Corrections

In the May issue of *Bee Culture* we made a couple of errors and we apologize for that.

The article by Vaughn Bryant should have been titled **CAVEAT EMPTOR: LET THE BUYER BEWARE.**

The ABRC Summary article should have included Michael Simone-Finstrom as an additional author.

In Every Month –



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Racoons?

I was glad to read your recent article about the benefits of insulating colonies.

I have been using rigid insulation foam for many years to good effect.

We can have serious cold snaps (March is the killer) but over the last 18 years I've had very few losses.

I am guessing that the insulation keeps the temperature inside relatively stable and may make the temperature outside the cluster in the hive space somewhat less close to freezing.

This morning, for the first time, there was an issue!

The raccoons were probably working from the top of the hive.

Helen Miranda Wilson
Wellfleet, MA

Top-Bar Beekeeping

As a new subscriber I thought I would give you my opinion on one thing: the lack of information on top bar hive beekeeping. Now, I recognize that Langstroth hives are a real money maker, what with the million different parts involved in each individual hive, but I was hoping that a publication that touts itself as "The Magazine of American Beekeeping" would be all inclusive and at least have ONE article in each issue involving the Top-Bar method. As far as sustainable and back yard beekeeping goes, I find the Top-Bar Hive to be much more user friendly, and much more in keeping with a bee's natural form of existence. I also find it much less EXPENSIVE, and so I would think that more people would be inclined to have bees if they were not quite so put off and intimidated by the misleading information, given that most information out there pertains to keeping a Langstroth hive rather than the Top-Bar. Maybe this is something your editorial dept. could work on?

Tammie Shurtleff
Westport, MA

Editor's Response: *You're correct, we don't offer much for Top-Bar Hive users and there are only three books that I know of that offer information. Notice that we do have a TBH article this month, but it is a hybrid with Langstroth equipment.*

The difficulty is two-fold – first there is no standardized equipment, and, second, there are very few successful TBH users to offer advice.

When I started this job years ago the 10-year veteran I replaced (Larry Goltz) shared an observation. "Be careful," he said, "because you will note that often those that know don't have time to write, and those that write don't know."

So we choose our writers with care, and so far have not found a TBH writer that has the time and knows what to say.

Sow What?

Project Apis m.'s primary mission has been to fund and direct research to help honey bees, but as we expand our forage programs, including Seeds for Bees in California and The Bee and Butterfly Fund in the Upper Midwest, there is a whole new body of interests to understand. The recent campaign from General Mills, where Buzz the honey bee disappeared from the Cheerios box, has gotten a lot of attention – both praise and criticism. Not only did they quickly 'sell out' of all the free seed packets that were offered, but there was equally swift backlash criticizing the effort for the seeds chosen. As we engage to replace critical habitat which has been lost for honey bees, below the surface of that good deed are interests that may seem at odds, and may confuse most audiences seeking to help the situation. As I discussed this issue with the Director of Habitat Partnerships from Pheasants Forever, Pete Berthelsen, he provided the following explanation from his years of service building habitat:

The use of "Invasive" or "Introduced" plants in seeding mixtures to benefit pollinators has

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been a hot topic the past month or so. This is an interesting and important discussion and it's exciting to see the enthusiasm around the topic of planting pollinator habitat. But like most complicated issues, there are many aspects to this story that we need to consider carefully.

Just like the 'Flow Hive' generated lots and lots of media attention, dollars raised, Facebook posts, enthusiasm, etc., it was a far more complicated issue than the message on the surface would have the public believe. The issue of introduced plants vs. native plants is just as complicated. Here are a few points that need to be understood and considered about Introduced plants in pollinator plantings:

1. Not all Introduced plants are all bad. If you were to remove all introduced species from a pollinator planting, you would also remove the most important plants for honey bees (sweet clover and many other introduced clovers). Recent research conducted by USGS in the Dakotas has identified introduced clovers as the most important plants on the landscape for honey bees.
2. Not all introduced plants are good for all landscapes. Introduced plants like sweet clover can become invasive in areas with moderate to generous rainfall (about 32" of annual rainfall or more). That's why species like sweet clover are not included in our Bee & Butterfly Habitat Fund or the NextGen Habitat Project seed mixtures for East of the Dakotas and Nebraska. When designing pollinator seed mixtures, you must

take the time to consider where and how each of the species – native or introduced – will function on the landscape, and in the mixture. If they have a tendency to become 'invasive', they are likely to outcompete the other species in the mixture.

3. There is a "Natives First" movement out there. There are states where there is a strong movement to use only native species in their conservation/ pollinator plantings. This effort can usually be traced back to conservation programs that used introduced species in their past program seed mixes, like Fescue, smooth brome, etc., which were generally detrimental to wildlife and pollinators. The backlash solution is often to recommend the use of only native species in conservation programs going forward, assuming all non-natives are similarly detrimental.
4. Introduced and native can live and work well together. When Conservation/pollinator program seed mixtures are designed properly, there is a role for both native and introduced species to perform well in mixtures. This is especially important where pollinator habitat is concerned. If we allow people to repeat the message that "All Introduced species are bad", we will be removing one of the most valuable tools in the toolbox for pollinators – especially honey bees.
5. Introduced plants can fill important roles. The use of the correct combination and rate of introduced species alongside native species can provide important benefits in other areas like: Cost-effective seed mixtures, habitat that establishes quickly and easily, providing significant pollinator benefits within just a few months, and a habitat planting that is better able to compete with weeds.

The bottom line is that this is a complex topic without a simple answer or response. We need to be thoughtful and careful about how this message is relayed to the public that is enthusiastically wanting to help the bees and butterflies! I hope these five points will help inform habitat enthusiasts as they encounter these debates.

Danielle Downey, Apis m
Pete Berthelsen, Habitat Partnerships, Pheasanst Forever

More On Climate Change

I'm writing this in response to Joe Traynors' article on climate change Feb . issue

First let me say I do believe there is a climate change but do not buy the man made theory. I have to look at history. My question is what caused the end of the ice age? I didn't see any pollution from cars or industry then. What about volcano eruptions? They produce more pollutions than a man could do in a lifetime. The methane gas seems to be a problem. How do we fix that? What happened to the ban on refrigerant gas containing HFC? That was going to be the end of pollutants to save the world. My guess if we get rid of carbon dioxide it will be on to something else. The carbon tax is a joke. All it will do is put more money in the pockets of government and fix nothing. I'm no expert but my guess is, this is just a cycle and will turn around in a few years then all the experts will be trying to stop the cool down.

Jerry S.
Mason, OH

Figwort – Bee Plant?

We have a question for you about a bee plant, and some information that will most definitely help other beekeepers.

1. FIGWORT AS A BEE PLANT? In the 2016 Xerces book for bees, *100 Plants for Bees*, they include figwort, *Scropularia marilandica*, as a prolific nectar producer used in Ohio at one time. The cost of reseeding made it not practical for continual planting in Medina, Ohio in the past. Figwort was mentioned by John H. Lovell in his 1926 book, *Honey Plants of North America*, also. Some books classify it as a "weed". I have NOT been able to find a non GMO organic seed source, as we are researching and recommending bee plants for our Northeast Oklahoma Beekeepers Assoc.(NEOBA).

2. WONDERS OF OREGANO One herb has been discovered to be very medicinal, has up to 76% sugar(s) in the nectar, and is a perennial. Yes, Oregano! Beekeepers across America should be aware that Dr. James Duke (who served as a U.S. Govt Botanist for 20 years) wrote *The Green Pharmacy*. His own research revealed Oregano essential oils and active chemicals of oregano proved to be the best overall (synergistic) healing plant of ALL and beneficial to a strong immunity for humans. We find it helpful for our honey bees, also! We always include oregano essential oil (dilute amounts) in our own spring "Bee Booster". To make one cup Concentrate: 1 cup 50% sugar feed, add two drops of each of the following essential oils – oregano, lemon grass, and any mint. Store in the freezer, whip when removed to emulsify oils, and add one teaspoon of this concentrate to each quart of feed. Our proof is enjoying our healthy survivor bees.

3. SUSTAINABLE BEEKEEPING We're strong advocates of sustainable beekeeping and happy to report that we have sustained our line of (chemical treatment free) survivor queens since 2003 successfully (14 hives this Spring). We have used only our own version of Jerry Freeman's Beetle/Mite Trap, using IPM techniques like monitoring *Varroa* drops, (physically removing mites and beetles) by dusting with home-made ground powdered sugar (no additives). We monitor and record, using 24 hour drops or sugar rolls. Bottom line: almost 100% survival over Winter, the acid test for survivor genetics and pest tolerance.

Several friends are also finding their own strains of survivor bees, which we encourage heartily! The point beekeepers should remember is to not panic when they lose weak genetics, especially of bees ordered from other areas, and not raised

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locally. Our original survivor rate in 2002 was one in five, not good at all! From the two surviving colonies monitored and genetic tested at the U of A in Fayetteville, proved to be a mixture of Italian, Carniolan, and Russian!

We have only purchased one queen from the New Mexico Survivor Project (also Zone 7), and she has provided remarkable progeny which is now being shared with others, but not queens raised commercially, since we allow the queen to lay her own eggs, then make splits from hives each Spring.

Our goal is to keep beekeepers, so we share at least one hive free with a beekeeper who has lost all their hives over Winter. Our son has joined us, and sells up to three nucs each year. We also share single frames with those making splits, sending with them a fresh frame of very new eggs to add to their split three days later (doing so only in April and May in Oklahoma). Our goal is to keep beekeepers in beekeeping who can enjoy their own hardy bees without having to expose bees and themselves to chemicals or order bees that may have inferior queens, like ours were!

Our hives are redesigned Langstroths or horizontals, and are ventilated top and bottom for Oklahoma's heat and high humidity. Each region, however, should adapt hives and methods that help both bees and the environment. Note: We give away swarms caught to new beekeeprs, rather than adding unknown genetics and pests to our own apiary, as "nucs" are in great demand!

Our whole family looks forward to *Bee Culture's* arrival. We give thanks to the staff as you promote responsible beekeeping, and hope you will visit NEOBA again.

Mack and Helen Hickey
Okie Survivor Beekeepers

Treatment Free Debate

With regard to the recent treatment free debate, I appreciated seeing the recent articles on "*Varroa* bombs" along with the current commentary from Mitch Valerio, a treatment free beekeeper in OH. I agree, there are many varieties of *Varroa* strategy, and I applaud those like Mr. Valerio who are clearly working hard to reach what is ultimately the goal for many of us.

I think what he may be missing is that the idea of "treatment free" HAS indeed been misconstrued by the uneducated (or worse, those who have "read a book and an internet article") to mean "hands off".

I do attend many community events and markets, and though I am just a lowly fifth year beekeeper, I have encountered those "enlightened" bee-havers that Toni Burnham mentioned in her article. This year already, I have had several phone calls from people I've met who, when they called for my input on "why I lost my bees when they had all that honey?!!?", had never heard the term *Varroa*, let alone IPM. A true no-treat IPM IS more intensive, and requires deep knowledge, yet these individuals had basically allowed their bees to die due to bad information, ego, and a lack of any local education.

Couple extensive and really bad internet information with people who in this electronic age seem to have zero desire to actually network with and learn from real live humans, and you do indeed have a recipe for *Varroa* bombs. The guy that called me last week had invested in equipment for SEVEN colonies, and only one (he THINKS) overwintered, though he did not know/think to even go in the hive and look. THAT is the level of knowledge we are dealing with here.

Please allow one responsible suggestion: for those who are selling bees, have some of you given thought of being more selective to WHOM you sell? Do you at least ask: "Have you had local training"? "Do you have a mentor?" IF the answer to those questions is "no" – will you still sell them your bees?

As I grow my small operation a bit each year, I imagine I will get to the point where I will think of selling nucs. I have already promised myself that I will not sell bees to those who have had no training locally to get their hobby started.

Toni Burnham – I thank you for your article. This was the first year I took losses in my backyard bees, and as the phone started ringing this year, I google mapped these individuals, and was indeed surrounded by at least five "havers" in a two mile radius who didn't even know that treatment/IPM/monitoring is part of keeping bees. I lost half of the bees I keep at my home, my most intensely monitored, "pampered" and "northern" of my bees.

I am grateful now for the bees I keep elsewhere. They are helping me to replenish my losses. I will change up my *Varroa* monitoring, be open to new ideas, but will be also be a bit more wary of those around me when selecting sites.

A further "amen" to the April letter from "Clint" – I agree. I am weary of the politics. I had hoped there would finally be an issue without any, but alas, this month's "rabbit hole" article was more of the same. Perhaps the unrelated pictures of some random children in beesuits that were added to the article were meant to soften the message? (Not sure what they meant…) But once again, we find someone passing some kind of "moral" judgement on anyone who's motives were not "pure" or "kumbaya". . . "evil capitalists", etc . . . Somehow, some way, *ABJ* manages, each month, to pack science and research into each issue without preaching or moralizing. Would that *Bee Culture* would do the same . . . well, at least I can count on Clarence Collison's column . . .

Vicki Kleber
Russellton, PA

Pollen In Honey

As a new beekeeper I have been enjoying your magazine, however the above subjected article by Vaughn Bryant, in the April 2017 issue hit a nerve. The veiled plea within the article for increased government regulation through truth in labeling laws goes against my grain.

Testing laboratories stand to benefit much from such laws while only adding costs to producers and consumers alike, neither group which is clamoring for more regulations that I am aware. For those producers who wish to distinguish their honey by the pollen content they could do so through an Association or Independent laboratory

certification.

Jim McNabb
Virginia

Vaughn Responds:

Dear Mr. McNabb,

First, let me assure you that your comments are in the minority. Most beekeepers do want to have some type of federal laws requiring truth in labeling for honey. Even the American Beekeeping Federation has repeatedly asked Congress to take up this issue and to pass laws similar to the laws in many other countries where strict enforcement of truth in labeling on honey products is practiced. The article that I have written in the May issue of this magazine addresses many of these concerns and hopefully explains why truth in labeling is so important.

Briefly, let we summarize some of the reasons.

•First, I have found that over 70% of the honey sold in large grocery stores nationwide, and even some honey sold at roadside stands are not what is written on the label of the honey jar; in other words, the consumer is buying something that is not what is in the jar.

•Second, consumers are beginning to complain and are often not willing to pay premium prices for honey such as sourwood, tupelo, sage, fireweed, orange blossom, buckwheat, and the list goes on because they can't be certain what is really in the jar.

•Third, many of the honey products being sold as "local honey" are often not local, even when purchased at roadside stands. I have examined hundreds of "local honey" samples sent to me by people in many different states wanting to know if the honey is really local. All too often, it is not local honey but instead is a blend of inexpensive honey from other regions.

•Fourth, beekeepers in many regions, such as North Carolina, Florida, Alaska, Hawaii, California, and other states, where their premium honey can be sold for premium prices are finding that other sellers are trying to capitalize on the premium prices by falsely labeling cheap honey from other sources as being the premium type. This hurts local beekeepers who are trying to make a living and are trying to do the right thing.

•Fifth, with no truth in labeling the consumer has no idea where the honey originated. We know from federal statistics that in 2016 over 91 million pounds of illegal honey was sold in the United States and it was probably much more than that. Some of that illegal honey may have contained harmful pesticides and/or antibiotics which are illegal to use in the U.S., so those harmful products could cause serious health problems among consumers. As for the cost of requiring truth in labeling, this is something that should be the responsibility of the federal government. The Food and Drug Administration is required to certify many different products as being safe for consumers to use. Those costs come out of your tax dollars, not out of some fee assessed to farmers trying to sell their crops.

Finally, I will admit that there are a large number of people who go to stores and purchase the cheapest honey they can find without any concern as to where it might have originated, if it came from legal or illegal sources, or if the contents on the label actually reflect what is in the jar. But, there are many others who are very concerned.

Let me close with one unfortunate comment. Several years ago a beekeeper sent me four samples of what he was selling as "premium types" of honey and wanted them tested to see if his labeling on the jars were correct. After I tested those samples I found all four were "not" what he was calling them on the jars. He was amazed at the results but then said, "well, I am going to keep calling the honey those types because that is what the consumer wants to buy!" Read my article in the May Bee Culture Magazine for more on this issue.

Pollen Atlas

The recent *Bee Culture* article about pollen in honey by Vaughn Bryant was very interesting.

Here is the biggest problem in pollen identification: When I want to identify the pollen my bees are bringing in, I can go to atlases on the internet, but then have to search entry-by-entry to find a photo/diagram that matches the pollen in my hand. This is VERY time consuming.

Now, a Beekeeper's Wife, Linda Lathrop of Laclede County in Missouri**,** a graduate botanist, has compiled an Excell spread sheet of over 250 pollens, which has been installed on our club website. **http://madbees.org/pollen/lathrop-2007.html** and **http://madbees.org/pollen/lathrop-2007-key.html**

The beauty of her work is that the file is sortable by the pollen characteristics, so I only have to look individually at a few entries, instead of all 250.

In addition to the spread sheet, there are individual microscope photos of the pollen, some 450 photos in all, which is too much data for our club website to handle. I have these photos on disk and on thumb drive, and will be happy to share them.

My problem is how to get these photos into the public domain, so everyone can have access to them. Who would like to publish these photos, with the spreadsheet, on their web site? Which university has a department that would do this? What bee research lab is willing to make this material public??

Linda wants to have this data used by all interested parties – she did not do the project just to sit on the results! Maybe someone would like to make it all into an e-book, and sell it?

If anyone has ideas, please get in touch with me, **jeanniealabeannie@yahoo.com** 608.244.5094.

Jeanne Hansen
Madison, WI

Something New . . .

I think beginner beekeepers have much to learn and who better to learn it from than those who have been there and done that for decades? In Ed Colby's article he admits he has no smart phone apps or GPS and that he is from another century – and I get that. Technology can be daunting and tested, tried and true methods are far more comfortable – and I get that too. But let's face it, if he had used the GPS Paul and he probably would not have missed a turn and gone off in a wrong direction. I am not surprised when people are fearful of new technology, but I AM surprised how vehement that fear can be. To consider new technology something to be as fearsome as a nuclear war is stretching the bounds of credulity. Perhaps if he had gone to the Flow Hive demonstration he might have learned this new technology is not something to be feared, but rather just a different and far easier method of harvesting.

Chip Monk
Chattanooga, TN

What' New In June –

The Honey Stick Making Machine is an easy and convenient way for thee small beekeeper to make their own honey sticks with their own honey. Honey Stick Machine Creator, Wayne Flewelling, Jr of Quenemo, KS invented the machine because he was frustrated with having honey sticks for sale and people asking if it was his honey in them. So in 2003 he tinkered and came up with a simple and easy way to make a lot of honey sticks in a short amount of time with his own honey. In 2006 he had made a few for other beekeepers and decide to go online. **www.honeysitckmachine.com** was born. Everything you need to start making your own stick, from your own honey, is included. There is also a DVD along with instruction on how to get started. The Honey Stick Making Machine is great for samples too. Long gone is the day with tiny spoons or customer's sticky fingers. Just take your own honey stick and cut it in half and hand to the customer. Wayne reports, and any beekeeper selling fresh honey knows, that once a customer tries fresh honey a sale is in the works.

The machine is affordably priced at $395 and can be bought online at **www.honeystickmachine.com** or call Wayne at 7852214756 or send check or money order to: John & Wayne Honey Farm LLC, 3117 E 261st ST, Quenemo, KS 66528

Bennett Apiaries, Inc. –

"Beekeepers First!" This phrase represents our family's business in two ways. One, we were beekeepers before we were box makers. Two, now that we are beehive manufacturers, we put our beekeeping customers first!

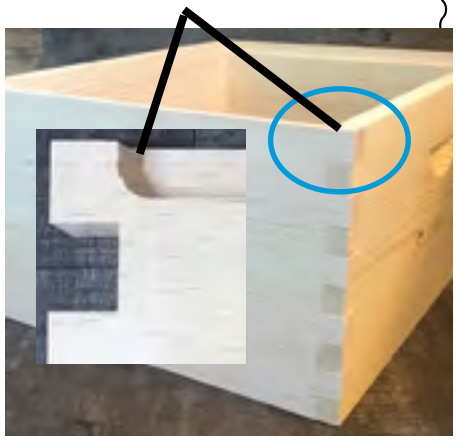
My husband Tom and I value family and hard work. Beekeeping and woodenware manufacturing has allowed us to build a business, providing ourselves and other small and large beekeeping operations with quality hive equipment, all while working as a family with our children.

Manufactured in Northern California, we specialize in hive bodies (eight-frame or 10-frame), lids, bottoms, four-way pallets, wood and plastic frames, and nuc boxes. Hive kits are also available for beginner beekeepers. Please go to our website at BennettApiaries.com to learn more about us and see for yourself our quality products! Be sure to notice our new top joint and routered frame rest on our hive bodies and supers. The full top joint allows space for a nail or screw while reducing the chances of cracking or splitting the frame rest.

We might have started small, cutting wood on a little $99 table saw in our garage, but we now have state-of-the-art machinery allowing us to produce with precision and quality that will last. We use kiln-dried pine for our hive equipment and only new lumber for our boxes and pallet materials.

Our goal is to develop long-term friendships with our customers by interacting with honesty, providing quality products, and resolving any concerns quickly. For smaller orders, please use our website shopping cart. For pallet quantities and large commercial orders, please contact Tom by text or email at 530.526.5504/**Thomas@bennettapiaries.com**.

Full top joint and inset frame rest.



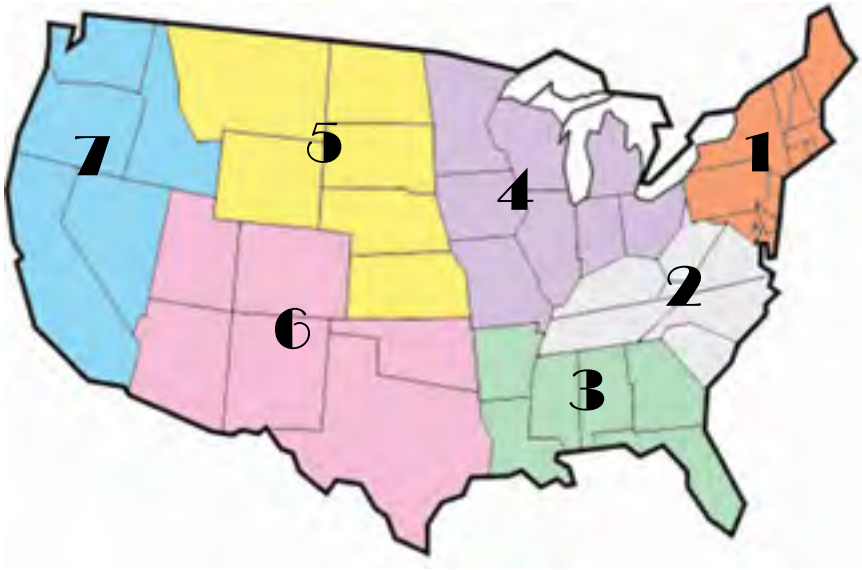
Design of the **Colorado Bee Vac** was created by Guy Shingleton, Colorado Bee Rescue, Inc. in Castle Rock, Colorado. In 2010 I began to experiment with different designs for bee vacuums and started with a six gallon bucket and then different box designs. I relied on J.P. the Beeman, (Jeff Armstrong) down in Lousianna to test my different vacuum designs that I was coming up with because his bee season is eleven months long verses my six month bee season at 6200 foot elevation. I went through designs where unfortunately I killed a number of bees. Problems with "bee splat", over heating, vacuum pressure, and portability were all problems of various designs.

I gravitated towards using a standard size hive body for the catch box and just had to come up with a method of getting the bees inside. You only need to get on the internet to see that there are dozens of designs and contraptions for people to catch bees with. I wanted to make it easy for the beekeeper and easy on the bees. By incorporating the vacuum in the top cover of the catch box I made it easy for the bee keeper and with simple addition of peg board to distribute the vacuum pressure I made it easy on the bees.

Currently selling the Colorado Bee Vac on Amazon, E bay, and direct sales. I have sold close to 500 of them so far and have not had a return yet so the beekeepers who have them, like them. My customers are my best sales tool because satisfied customers showing their friends the vacuum in operation have accounted for multiple additional sales all over the country.

Guy Shingleton, **guysemail@aol.com**, 303-898-1267

JUNE – REGIONAL HONEY PRICE REPORT



Spring Reckoning

We went to our reporters this month and asked about their Spring weather, and how it had affected the bees, and them, and then their Winter and to date (early May) losses so far. Here's what we got back.

Region 1 was way too cold, with enough but not too much rain, which held them back a bit in their bee work, but got their bee going a bit ahead of schedule. Averages losses so far this season come to 41%.

Region 2 warm and dry for the most part, but some cool and wet areas existed, good timing on rain kept things going, so they and their bees got a bit ahead for a change. Some late frosts and late cool weather threw a wrench in some early crops though. 26% loss so far this year is the average for all reporters in 2.

Region 3 was warm and dry, but enough rain helped out and things were about as usual. So both bees and beekeepers are doing well up to now. Across the region, losses amount to an average of 26% so far.

Region 4 was warm and dry, or cold and wet, depending on where you were. But most everybody seems to be ahead of their usual schedule, and the bees seem to be ahead a bit also. Losses on average in this region amount to 45% however, with several completely wiped out.

Region 5 was wet for the most part, with enough, or more than enough rain. This gets beekeepers right about where they think they should be for this time of year, and the bees are about normal too. Not a bad place to be in this time of year. Losses amount to an average of 42%

Region 6 was for the most part dry this year – not surprising we suppose, with the right amount of rain in most places. But most reports are behind in bee work, and their bees are somewhat behind where they should be too. Losses here averaged 31%.

Region 7 was wet, wet, wet. Did we mention it was wet out west this spring? Too much rain, way too much. And as a result work is way, way behind schedule, as are the bees. So it goes. Losses out west averaged 35% this year.

Overall, Winter and Spring losses came to just over 35% for all reporters across all regions. Replacing just over a third of your colonies is a tough row to hoe, and the cost can be extreme, especially considering several lost 100% of their colonies. We'll wait to see what the BIP and USDA surveys show for Winter and Spring losses to compare our group with larger groups.

	REPORTING REGIONS							SUMMARY			History	
	1	2	3	4	5	6	7	Range	Avg.	$/lb	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS												
55 Gal. Drum, Light	1.88	2.06	2.36	2.41	2.28	2.16	2.45	1.50-3.60	2.25	2.25	2.09	2.31
55 Gal. Drum, Ambr	1.80	2.02	2.03	2.40	2.00	2.13	2.80	1.35-3.50	2.17	2.17	2.00	2.20
60# Light (retail)	209.00	187.50	203.75	203.68	102.60	190.35	232.00	102.60-300.00	202.99	3.38	195.54	200.46
60# Amber (retail)	206.11	185.70	194.00	181.72	125.00	189.48	233.33	80.00-300.00	196.55	3.28	198.05	201.83
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	95.97	74.64	85.20	72.31	66.00	86.40	144.00	55.92-144.00	88.81	7.40	81.97	83.00
1# 24/case	134.59	106.55	119.45	104.46	112.08	124.66	199.47	72.00-240.00	126.09	5.25	118.81	119.48
2# 12/case	119.51	96.13	117.22	105.04	98.72	101.60	139.50	79.20-182.40	114.81	4.78	108.33	108.54
12.oz. Plas. 24/cs	112.99	84.03	92.00	89.34	74.70	105.00	125.10	66.00-192.00	100.91	5.61	96.17	97.84
5# 6/case	139.55	108.50	138.00	111.92	102.30	121.00	147.75	71.50-206.00	127.63	4.25	120.00	122.75
Quarts 12/case	188.44	126.91	128.84	132.70	155.32	140.94	172.00	85.00-300.00	146.43	4.07	149.68	144.41
Pints 12/case	113.03	85.88	73.20	105.25	111.00	76.32	96.00	60.00-180.00	92.42	5.13	88.55	94.68
RETAIL SHELF PRICES												
1/2#	5.50	4.36	4.65	4.37	3.53	4.04	7.00	1.98-7.95	4.77	9.54	4.70	4.55
12 oz. Plastic	6.44	4.93	5.44	5.50	6.16	7.18	6.64	3.25-11.50	5.99	7.98	5.73	5.70
1# Glass/Plastic	7.65	6.87	7.50	6.55	6.05	7.01	10.38	3.00-16.00	7.43	7.43	7.01	7.39
2# Glass/Plastic	13.00	10.44	11.31	10.76	11.32	11.80	14.08	6.00-21.50	12.04	6.02	11.82	12.31
Pint	12.49	9.08	7.74	11.12	8.81	9.61	11.58	4.00-18.50	9.78	6.52	10.11	10.61
Quart	18.47	15.65	15.35	16.21	14.79	16.97	19.40	8.00-31.00	16.61	5.54	16.55	16.76
5# Glass/Plastic	27.00	24.53	33.00	26.33	23.76	24.85	31.08	14.48-41.00	26.40	5.28	26.70	26.88
1# Cream	9.97	8.48	11.25	7.82	9.44	5.60	11.45	5.50-18.00	9.43	9.43	8.92	8.33
1# Cut Comb	12.87	9.15	8.33	10.25	10.57	8.25	15.69	6.00-22.00	11.34	11.34	11.07	10.65
Ross Round	10.28	6.88	8.76	9.50	8.76	7.83	8.70	5.00-12.00	9.02	12.03	8.42	8.74
Wholesale Wax (Lt)	7.36	5.09	4.93	5.83	6.23	5.50	5.94	3.00-12.00	6.02	-	6.03	5.85
Wholesale Wax (Dk)	6.41	4.70	4.21	5.07	5.51	3.17	2.25	2.00-10.00	5.01	-	5.32	5.21
Pollination Fee/Col.	98.75	72.50	50.00	82.50	80.00	138.33	119.29	30.00-200.00	93.48	-	87.12	90.71

BRAD THE BEE FUN WORDSEARCH

H	C	C	P	A	Z	E	B	J	W	Q	X	I	R	I
P	E	Y	O	E	J	R	M	A	I	I	A	N	E	X
D	L	O	L	E	X	E	O	R	N	N	W	S	P	A
S	L	F	L	B	A	G	C	E	G	E	S	E	E	P
I	M	L	I	E	R	N	Y	B	S	L	E	C	E	I
L	E	O	N	L	O	I	E	M	H	L	E	T	K	S
O	A	W	A	B	H	T	N	A	S	O	B	G	E	M
P	D	E	T	M	T	S	O	H	J	P	N	G	E	E
O	O	R	I	U	F	T	H	C	J	K	K	E	B	L
R	W	E	O	B	B	E	E	D	A	N	C	E	Y	L
P	F	K	N	A	C	A	P	I	A	R	Y	J	D	I
A	R	O	K	A	N	T	E	N	N	A	Z	A	R	F
E	A	M	Y	L	L	E	J	L	A	Y	O	R	O	E
G	M	S	E	E	B	E	S	R	U	N	T	W	N	R
X	E	C	B	N	E	M	O	D	B	A	E	E	E	A

ABDOMEN
ANTENNA
HONEY
POLLEN
STINGER
BEESWAX
WINGS
CELL
DRONE
EGG
ROYALJELLY
BEEDANCE
HONEYCOMB
BEEKEEPER
INSECT

POLLINATION
FLOWER
APIARY
APISMELLIFERA
BUMBLEBEE
MEADOW
CHAMBER
FRAME
NURSEBEE
PROPOLIS
SMOKER
THORAX

ROOT CANDLES

FIND ALL THE BEE-RELATED WORDS IN THE GRID ABOVE

Answers on Page 52

INNER COVER

Toward the end of this month we will be hosting three webinars as part of the Healthy Bees 2020 program organized by Project Apis m. I'll be moderating, with Danielle Downey and Dave Mendes helping out. PAm distributed a significant amount of money a bit ago, and the three projects below are the results of that research.

Monday, June 19 from 12 – 1 p.m. ET

Stephen Martin, Ph.D., Professor, School of Environmental & Life Sciences, University of Salford, UK will discuss how the viral landscape is changing, how these changes are affecting U.S. honey bees and specifically how the *Varroa* mite is providing a new viral transmission route for a previously rare and largely benign virus called Deformed Wing Virus (DWV). The mite's main role in causing the death of honey bee colonies is by acting as a transmitter of this virus. DWV is now one of the most wide-spread insect viruses in the world with most colonies in the U.S. infected – healthy-looking bees are also potentially infected, not just the deformed ones, as people often think. DWV is made up of several distinct viral strains, and each viral strain may have a different effect on the honey bees. The project is seeking to determine if non-virulent strains can be linked to increased colony survival to develop a long-term solution to the problem of *Varroa*-transmitted viruses.

Wednesday, June 21 from 12 – 1 p.m. ET

The Keys to Colony Success

Julie Shapiro, Coalition Facilitator, Keystone Policy Center, and Mike Smith, Project Director, Conservation Technology Information Center (CTIC), will discuss the Honey Bee Health Coalition's (HBHC) Bee Integrated Demonstration Project showcasing the best management practices (BMPs) that help to reduce honey bee colony loss through a coordinated and collaborative effort. The project will utilize a suite of tools, guides and techniques developed by diverse partners in beekeeping and crop production that can effectively address the primary risk factors influencing bee health, including honey bee forage and nutrition, hive management, crop pest management and education/cooperation. The demonstration project will measure colony losses throughout the season and use the gathered data to inform beekeeping BMPs with the goal of minimizing colony losses.

Friday, June 23 from 12 – 1 p.m. ET

Smarter Hives, Healthier Bees

Joseph Cazier, Ph.D. and Ed Hassler, Ph.D. of the Center for Analytics Research and Education, Appalachian State University, and James Wilkes, Ph.D., Computer Science Department, Appalachian State University, and Founder, HiveTracks.com, will discuss advancements in the use of technology-assisted data collection at the honey bee colony level to assist beekeepers in making wise hive management decisions. This "Smart Hive" project is aimed at building a data platform that identifies and improves best management practices (BMPs) through the tailoring of BMPs to specific apiary or hive locations. Additionally, the improved monitoring of hive conditions aims to reduce costs, increase efficiency in honey bee colony management and provide a measurable reduction in annual colony losses within both commercial and hobbyist operations.

These are all aimed at making life a bit better for our bees. They're free so be sure to get registered – you'll see registration links on our web page – and tune in if you can and catch them live and be able to ask questions and get answers, or later they will be archived and you can catch them there when you have the time.

•

Our honey report this month takes a look at spring weather in each region, and how it affected both bees and beekeepers. We don't often take a look at the past because by the time you get this, it is – well, already past. This has value though, because what happened this Spring goes a long way in determining what will be happening the rest of this Spring, and early Summer. Delayed honey flows, or early honey flows, early swarming, frosted crops, bunched pollination dates, slow build up or too-fast build up – all play a role in what we have to do.

We've reprinted articles by the Cowboy poet Baxter Black on occasion because he touches on a lot of things that happen to both cowboys and beekeepers, and one of the things we have in common is that we have to play the hand we're dealt. When the weather says you can't get feed to – either cattle or bees – for longer than it should take and nobody dies because of it ~ you got lucky.

We have those kinds of things happen. You got three days off, and it pours rain for all three days and nothing gets done. Not only can't you get to the beeyard, you get soaked just getting to the truck to get your stuff. So you didn't get lucky. And the deadline for what was supposed to get done got moved.

It's those deadlines that make us crazy sometimes. And they are either self-imposed – I'll get this done by Thursday so I can get that done over the weekend. And when Thursday comes and goes and it isn't done – the weekend just got busier.

Planning Ahead

Sometimes the deadlines aren't self-imposed because some body, or something else says – get it done, now. You got to pull bees out of the orchard because they are going to spray tonight, and your truck's cooling system is spread out all over the warehouse floor, waiting for a part. Or those packages are flat out of food, it's rained for four days, the mud is hip deep and the syrup truck is stuck somewhere in the next state.

Deadlines. The best you can do is be prepared, know it's not going to work just the way you thought it would and what can you do then, and maybe it won't work at all and what then? Then, is being prepared, ready for the delay, the missed delivery, the bad weather, the missing employee, the broke truck…it's the way it is, and…like it or not, we're not in charge. Know that, and it gets a lot easier. It still doesn't get done, or done on time, or done right, but it will be what it will be. Living with the unknown sets you up for that you know. You just think you know what the weather will be tomorrow. Your phone said sun, warm and dry. And it was, and it got done, or it wasn't and why not and what now. Biological systems, paired with meteorological systems add up to an infinite number of outcomes for everything you do. You're not in charge. But then, that's why you do this, right?

•

Well, that's one of the reasons I do this. I'm not a poker player so I try not to bet that I'm going to be right, given the odds of the weather, the bees, my schedule and the rest of my life. You don't bluff below freezing weather in May, or a flight delay that keeps you overnight one more night. You do have to play the hand you're dealt, but it's how you play it that counts, and my plan is always to anticipate the absolute worst that can happen and have fixed it before it happens (mostly). For instance . . .

Packages and splits this Spring were right on time, well, within the window I'd planned for. Split the two biggest way before they think of swarming, get some brood in them, lots of bees, and lots and lots of food. I have enough honey left over this year that I didn't need that box of fondant I got this Winter just in case. So every hive had at least a super of honey – a medium super – and several frames of pollen. I harvest light so I have all this ready, because mixing syrup is way more of a pain than I want to deal with, so if I have to, it's a slice of fondant. Quick done and gone. No mixing, no broken jars, no refilling, no carrying them all over creation – no, no jars, no syrup, never again.

But with enough honey, there's not even any fondant. So, right after the packages were installed and the splits made, there was essentially two weeks of rotten, cold, rainy weather. Opening a hive was possible, but suicidal and if I'd had to feed – well, I'm glad I didn't. There was a Sunday afternoon break and you take it and run, or miss it and wish, so we took it and checked queens and cells and found an interesting thing about queen cages.

The cages in the packages were the California cages, without the tube for fondant and the plastic cap. Just a cork, put in sideways so there was actually a bit of a gap. My plan was to leave the cork in for about a week, then remove it and fill the hole with fondant and let them release the queen when the fondant was gone. That didn't work. They ate the cork. I'm conservative when it comes to releasing queens. I like 10 days in the hive in the cage minimum. Because of the cork being eaten, she was only in the cage about nine days total. Three or four days less than I like. But there is no going back. So we closed them up and – another week of foul weather where looking in would have been – not pleasant for bees or people.

Finally, after another week, it was just barely good enough to open and pull a frame or two. Yup, brood, yup, still lots of honey. Yup, I'd fixed it as good as I could before it broke. Got lucky this time.

•

In early June I'm traveling to a pretty special place for a beekeeper. I, along with several others, including the Governor of Massachusetts, will be speaking from the pulpit of the Second Congregational Church in Greenfield Massachusetts, where L.L. Langstroth was minister from 1843 – 1848. I've been there before, the guest of Dan Conlon, who runs Warm Colors Apiary near Deerfield where he is a honey producer, sells Russian queens and nucs and bee supplies. We didn't go inside when there previously, but this is the front of the Church. We'll spend the morning there then go to Dan's in the afternoon and look at some of his bees and talk about 10 Rules Of Modern Beekeeping, and more. See his web page **http://www.warmcolorsapiary.com/classes/** for more information. And maybe don't sit too close to that pulpit – lightening hurts, I'm told.

•

So it's really finally Spring, heading to Summer. Maybe. Mostly. But just in case, keep your veil tight, your smoker lit, and your hive tool handy. Time to go to work.

Second Congregational Church in Greenfield MA.

It's Summers Time –

Root Company, Kids and Still . . . No Ducks!

A couple of weeks ago I had the opportunity for the second year in a row to talk to about 100 third graders from one of the local elementary schools here in Medina. The kids go on a walking tour of our town as the end of the school year gets near. The A.I. Root Company/Root Candles is the last stop of their day. They land on our doorstep about 2:00 and we have them until 2:45 – so it's a short talk.

Before I give my talk the kids watch a video that is about 10 minutes long on the history of the A.I. Root Company. Now I've watched this video probably at least a dozen times since it was created a few years ago. And each time I see it, it reminds me of what a very "cool" place this is to work. I've been around the Root Company off and on for almost 30 years and sometimes tend to take things for granted or maybe even start to complain a bit about one thing or another. But this video and these kids woke me up and reminded me of this history.

If you've never taken the time to read about Amos Ives Root I encourage you to do so. It's a great story and he was a courageous, industrious man for his time. The video speaks about his interacting with the Wright Brothers and with Helen Keller.

And I love talking to kids because they ask such interesting questions. I talk to them for about 15 minutes just going over basics of what's in the hive and then let them go with their questions. There's always one little boy that has his hand up the whole time with 27 different questions. And there's always one very shy little girl toward the back who's hand goes up but not very far.

If you're planning on coming to our *Bee Culture* event this year you'll have the rare opportunity of getting a tour of the Root Candle factory – and that is very cool also. So make sure you sign up soon and get on our Friday list of tours. The space is limited as to how many we can take in a group, so register now! See you in September.

Kim spoke about the weather we've been having here in northeast Ohio. Hard on the bees and apparently detremental to the breeding of Call Ducks. I've had an order in for six baby Call Ducks since early April and the local feed store still has not been able to get them from the breeder. It's very disappointing, but it has given me more time to spend with the baby chicks we got. We lost two when they were still very tiny. This seems to happen each time we get babies – we lose one or two. But nine are thriving, getting their feathers and will soon – weather permitting – be able to be out from under the warming lights and start getting to know the old girls. So we're holding at 22, four that are five years old, nine that are two years old and nine babies.

POULTRY

Rhode Island Reds. Strong baby chicks for sale. Write me. E. G. WALTZ, Medina, Ohio

Eggs for hatching, S. C. White Orpingtons. Mating list free. JAMES R. LAWSON, box R, Medina, O.

Eggs for sale. Rhode Island Reds and Barred Rocks, $1.00 per 15.
H. J. BOSENBERG, R. 4, Metropolis, Ill.

Stock and eggs for sale, all leading varieties; also geese and Belgian hares. Catalog free.
LEVI BEUM, Richland Center, Pa.

Purebred Indian Runner ducks, cream-white eggs, 15 for $1.00; 100 for $6.00. J. C. WHEELER,
921 Austin Boul., Oak Park, Ill.

Silver Campines are money-makers. I offer first-class stock, $10; $12 per trio.
ELMER W. PALMER, Catskill, N. Y.

Pure white and fawn and white Indian Runner Pekins. Catalog free. White-egg strains.
THE DIMOCK TAYLOR CO., Lyons, N. Y.

Leghorns.—Eggs for hatching. S. C. W. Leghorns, $5.00 per 100; $1.00 per 15. Send for catalog.
WOODCREST FARM, Wilton, Ct.

Eggs—30 for $1.00; leading varieties prize poultry, pigeons, hares, etc. Booklet free. Large illustrated catalog, 10 cts. F. G. WILE, Telford, Pa.

Corning strain S. C. White Leghorn eggs and day-old chicks for sale. Also a few lusty cockerels. This strain lays, weighs, and pays.
P. J. ARMSTRONG, Nevada, Ohio.

S. C. White Leghorn, 15 eggs, $1.25. Day-old chicks, 15 cts. each. Buff Wyandott, utility-stock eggs, per setting of 15, $2.00. Day-old chicks, 20 cts. each. JOHN KISSER, Medina, Ohio.

Rhode Island Reds, Partridge Wyandottes, Mottled Anconas, White Leghorns, White Cornish, Pekin, Rouen, Fawn and White Indian Runner ducks; also pure-white Indian Runners and White Call ducks. Line-bred stock for sale. Eggs in set. Prices reasonable for high-class stock.
L. G. CARY, Toledo, Ohio

On a whim, because of my disappointment with not getting my ducks, I Googled 'Call Ducks for sale in Medina, Ohio' just to see what would come up. One of the links that came up was to the February 15, 1914 *Gleanings in Bee Culture*. A.I. had poultry for sale in his Classified Ad section. Can you believe that. A.I. sold a little bit of everything in the early days – washing machines, real estate, bicycles, seeds, fencing – and of course, bees and queens and honey and beeswax.

We've had so much rain this Spring and cold weather that it will seem like a miracle if we ever get dry enough to plant a garden. Good thing Kim started all of those plants by seed. I tried to mow this past weekend and everywhere I went with the tractor I was leaving squishy tire tracks. So I gave up that idea and spent the time picking up branches and sticks so when it is finally dry enough I'll have a clear path. Along with the rain this Spring we've had a lot of wind, so there are a lot of branches down. So far we haven't lost any big trees, but others around us have. I usually don't get to involved in discussions about climate change, but something is sure going on. Our weather is stranger every year.

It was 32° this morning, middle of May. That's crazy. We've lost a small Japanese Maple and a Sourwood – I know Sourwoods really aren't supposed to thrive in NE Ohio, but we have one that is well protected and doing OK.

I hope your Spring is going a little smoother than ours and that your bees are doing well.

We're off to Florida this week and the following week to NY. Hopefully we'll see some of you there.

John **Dietz**

NO SPRAY REQUIRED

A Better Way To Protect Crops, and Bees

Beekeepers may be delivering a new service for crop producers, in North America and overseas, if a Canadian crop protection company is able to launch successfully in a year or two.

Bee Vectoring Technology (BVT), based in southern Ontario, already has a new production facility at Mississauga for the Vectorpak™ trays and Vectorite™ powder they intend to market.

Vectorite is a patent-pending biocontrol formulation of a unique strain of a naturally – occurring beneficial fungus, *Clonostachys rosea*. The strain is patented as BVT-CR7.

Bees walk through the Vectorpak tray as they emerge from the hive. They leave loaded with powder on legs and undersides. Visiting flowers, they leave behind the spores of BVT-CR7.

Like a gatekeeper or shield, the fungus stops many economically important fungal diseases from getting a foothold. It blocks development of diseases caused by pathogens such as *Fusarium*, *Botrytis*, *Rhizoctonia*, *Sclerotinia* and *Monilinia*.

BVT has applied for product registration in the United States and Canada. Vectorite may be commercially available for 2018.

BVT is using bumble bees for the outset. It plans to modify the trays for use by honey bees in the next phase of production. Replicated field trials are in progress.

- Strawberry trials, organic and conventional, began in Florida Winter strawberries this past Winter. The target is prevention of Botrytis grey mold, a common issue for strawberry growers.
- Sunflower trials, for controlling sclerotinia head rot, are underway in North Dakota, Minnesota and southwest Ontario for a second year.
- Almond trials began in California in early 2017.

"We (BVT) have a microbial product that is actually a beneficial fungus, and a dispenser system that uses bees to deliver the product," says Ashish Malik, BVT's president and chief executive officer.

"When bees leave their hive, they pick up this powder that contains the beneficial fungus. When they forage for pollen or nectar, they take the product and leave it on the flower."

Beekeepers replace the depleted trays every three to nine days throughout the flowering season so that each new flower is protected before it can be infected by a pathogen.

Prior to the field trials, Vectorite was proven to be a safe product in bumble bee feeding studies. BVT supplied the studies as part of the required EPA regulatory submission.

Malik said, "Our initial focus is to launch a system that works with commercially reared bumble bees. We

will be doing additional work to confirm the safety for the honey bee brood."

The Company

Five patent families are being launched, worldwide. Registration and licensing applications are underway with the Environmental Protection Agency (EPA) in the United States and with Canada's Pesticide Management Regulatory Agency (PMRA).

"We have focused on approval from the EPA first as a conventional, mainstream product," Malik says. "After that, we will look for organic certifications and will start scaling up for global distribution."

Malik and others on the BVT executive come from long careers in the agricultural chemistry industry.

"I came from 14 years on the agri-chemical side and have worked for two of the biggest global multinationals," Malik says. "I really believe in this bio-technology, and that it has the next level of impact in terms of sustainability for farming."

Previously, Malik was the VP of Global Marketing for Biologics at Bayer CropScience. He managed the biological assets and developed strategies for integrating biologicals with traditional chemical products, seeds, traits, seed treatments and services.

Before that, he was Senior VP of Global Marketing for AgraQuest, a biological product company, which Bayer acquired in 2012. He had earlier roles with Syngenta, Imerys and BF Goodrich. Malik serves on the board of the Biopesticides Industry Alliance, holds an MBA from Carnegie Mellon University and a degree in engineering from Swarthmore College.

Roots in Guelph

John C. Sutton, a plant pathologist formerly at the University of Guelph, is the discoverer of the beneficial effects of *C. rosea*. He has specialized in the epidemiology and management of crop diseases.

Around 1985, Sutton started looking for a biological agent to effectively control economically important plant diseases. He began with strawberries and grey mold.

"Disease organisms, or pathogens, were developing resistance to a lot of the fungicides," Sutton said in a recent interview. "There was increasing public concern about pesticides, and about fungicides getting into foodstuffs and animal feeds. The question was, could we find and use something more natural – such as a biological control agent."

Sutton's team searched for the fungi or bacteria that naturally associate with strawberry plants. They gathered strawberry plant specimens from home gardens, commercial crops, and natural areas, anywhere strawberries were growing in Ontario. At the end of that stage, they had more than 1,400 isolates of bacteria or fungi from strawberries.

"We screened them all. Initially we put them on tiny pieces of leaf tissue, petals and sepals in controlled conditions, at a particular concentration, and challenged them with the grey mold pathogen, *Botrytis cinerea*," Sutton said.

One kind of fungus consistently gave a complete, or almost complete, control of the botrytis fungus when applied at the flowering stage. It was then called *Gliocladium roseum*, and now is known as *Clonostachys*


Loading up.

rosea.

"There turned out to be 12 or 15 isolates of this in our collection," Sutton said.

Applications during the flowering season were particularly effective. Many pathogens use the flowers as an entry point for fruit infection. *Clonostachys* is able to block that point of entry.

The team began using honey bees to deliver, or vector, the friendly fungus directly into flowers. In 1992, Sutton and colleagues were the first to publish this technique. Later, they also used bumble bees.

Their story was published in 1997 in the professional, peer-reviewed journal, *Plant Disease*.

By then, Sutton had proof that the *C. rosea* was effective against botrytis in plants as diverse as strawberry, geranium, tomato and black spruce.

He also was learning that it could act as a shield against *Fusarium, Monilinia, Pythium, Sclerotinia* and other pathogens.

"It establishes as an endophyte in every kind of crop plant we've looked at – and that must be at least a hundred!" Sutton said.

"For example it establishes beneficially inside flowers, stems and roots of grasses, tomatoes, peppers, corn, blueberries, almonds, canola, wheat, sunflowers and many greenhouse flowers. To my knowledge, no other fungus on the planet can associate with such a diverse taxonomic group of plants."

In about 2010, Sutton along with colleagues Peter Kevan and Todd Mason, began moving forward toward commercialization, using bee vectoring (delivery) for biological agents.

It took years to formulate and test the Vectorite powder. It had to meet several requirements:

- The fungal spores had to remain alive.
- The bees needed to maintain their own health.
- It could not be toxic to bees.
- It had to attach to bees.
- Bees needed to pick up enough powder, reliably, so a dispenser system was designed for use in hives.
- And, it had to be commercially interesting.

Today, talking about Vectorite, Malik and Sutton avoid calling it a fungicide or biofungicide.

"Those terms have erroneous connotation," Sutton said. "For the most part, *Clonostachys* doesn't kill

organisms."

Inside plant tissue, the fungus grows as extremely tiny colonies that interact beneficially with the plant. There is no visual evidence that it is present.

However, *Clonostachys* quickly reacts when a pathogen such as *Botrytis* attempts to attack.

"At that stage, *Clonostachys* rapidly grows and occupies the tissues immediately around the (invading) pathogen like a shield. As well, it also induces the plant's natural resistance mechanisms to numerous pathogens," Sutton said.

Sunflower Trials

A North Dakota State University research station at Langdon did replicated sunflower trials in 2016. The Vectorite was carried by bumble bees.

Plant pathologist Venkata Chapara said the NDSU trial plots were sprayed with disease spores, and had a wet flowering season.

On non-protected sunflowers, the disease level index was 12 percent. Disease on the Vectorite-protected sunflowers was only five percent.

The yield difference was nine percent.

Chapara says, "We had 1,880 pounds per acre on the control plots and the BVT plots had 2,053 pounds per acre. That's a difference of 173 pounds, or a nine percent increase."

NDSU is continuing the trial in 2017 and expanding it to a second location.

A second sunflower trial site involves industry veteran John Swanson in northwest Minnesota. Swanson worked about 40 years in the sunflower industry, in agronomy, research, product development and sales.

Swanson put out about 60 hives of bumble bees with Vectorite on eight fields, across a distance of about 35 miles, in 2016.

"We started out extremely dry. It stayed dry until July, then it was extremely wet until harvest. We had 43 inches of rain on several of our fields," Swanson says. "The night after we first set up the hives, we had a 6-inch rain."

Swanson eventually got his sunflowers harvested. It wasn't a good trial, from his perspective.

"We didn't have any yield differences that we could identify. We had almost zero sclerotinia in all locations," he says. "Almost all our rains came at night, and every day, we had some sunshine. That's why we didn't have the sclerotinia, in my opinion."

When it comes to cures for sunflower diseases, Swanson calls himself a skeptic.

"I've tried many things that don't work, but yes I

The Result – Healthy, spray-free berries.

will try again in 2017 with both honey bees and bumble bees," he says.

"Either way, in my opinion, Vectorite needs to have a return of $3 or $4 for every dollar invested because you don't have the disease every year. If it does that, and if we have data that Vectorite works effectively, I think this will take off."

Back To Strawberries

A few fields of strawberry plants, organic and conventional, were treated with the BVT Vectorite powder in Florida's winter growing season that began in late 2016.

Grey mold or botrytis is one of the most costly fungal pathogens for the industry that supplies most of the strawberries for North America from November through March.

Greg Faust, a contractor working closely with BVT to bring the new product to market, is coordinating the trials.

Faust is a co-founder of Cirrus Partners an Ag Consulting Group. He has worked in sales, marketing and product management with fungicides and insecticides for about 35 years.

"We are into advanced trials this year in Florida. Our objective is to position Vectorite as a foundation system for the season. We put out the bees and Vectorite powder at the start of the season, then maintain that system for the entire season," Faust says.

He adds, "The bees continuously deliver the biological agent providing continuous protection against botrytis. Technically, the strawberries don't need the pollination because they are wind-pollinated, but the BVT product is bringing disease control and a pretty strong vigor effect to the plant and to the field."

He adds, biological systems have a lot of variables.

They are different, Faust says, than formulated chemicals delivered in bottles and bags with long shelf life and low sensitivity to temperature.

"It takes a lot of work. Are the bees out when it's windy or when it's cold? What if it's too hot? What about the effects of a three-day rain? These factors have to be thought through and tested before we bring this to market. Part of the effort is to really work with the growers to design effective protocols that integrate the BVT system into the growers overall agronomic systems," he says.

The BVT disease control solution won't be on the shelf at Ag retailers this year (2017), but it is well along the way in the development process.

Faust says, "We are expecting registration in the first half of 2018 by the EPA as a bio-fungicide."

For organic growers, Malik adds, it will be a bit longer.

"Hopefully, by the end of 2018, we will be OMRI-certified for use by organic growers. The implications, for the organic industry, will be dramatic."

As for pricing, it will be settled closer to release.

"We are in the process of quantifying the value proposition in terms of better disease control and greater marketable yield, and will set the price once that is better understood. You can be assured that the cost to a grower, or a beekeeper, will be competitive with other conventional practices." BC

John Dietz writes is a professional Ag reporter and author.

Bee Audacious

Mark **Winston**

Bee Audacious was a collaborative working conference that utilized dialogue to envision bold evidence-based ideas through which honey bees, other bees, beekeepers and pollination managers could prosper.

The meeting, held over three days (11-13 December 2016) at the Marconi Conference Center in Marshall, California, adopted the dialogue process pioneered at the **Simon Fraser University Centre for Dialogue**, and used lessons learned from the **bees themselves**.

Sessions alternated between facilitated breakouts with small groups of participants, and plenary reporting out/discussions with the entire conference.

The perspective that evolved during the meeting was that it is not business as usual today for bees, beekeeping and pollination, and current challenges will require some novel solutions. In that spirit, the conference attempted to develop **audacious** ideas that would not only inspire discussion among all those interested in the health and welfare of pollinators, but also respect the diverse interests and perspectives in the bee-related community.

The complete results of our deliberations were a rich set of bold, tangible and actionable proposals. Below I summarize some of the audacious ideas that generated the most interest during the conference:

Values Participants noted that concerns about bee welfare are often framed in terms of threats to human interests, such as economic impact, food security or production of goods such as honey or beeswax. Another central motivation for protecting bees should be our admiration for these unique and beautiful creatures. They discussed how bees are widely beloved and inspirational, even sacred in some cultures, and how this sentiment has often been expressed in art around the world. Further, bees contribute to a sense of well-being beyond material gain, strengthening social ties and building local communities.

Habitat Almost every session, no matter what the topic, touched on the essential importance of habitat for managed and wild bees. One core group of outcomes from Bee Audacious included many ideas to protect the integrity, diversity and overall health of the agricultural, natural, urban and in-between ecosystems upon which bees depend.

Pollinators require abundant and diverse forage, habitats free of toxic pesticides and appropriate sites for wild bees to nest and for managed honey bee apiaries to be located. For agro-ecosystems, one set of ideas emerged around effective lobbying to protect pollinators through upcoming revisions of the U.S. Farm Bill, as well as similar legislation in other countries. Lobbying might focus specifically on:

- Shifting farm subsidies and tax credits to sustainable agricultural systems that include pollinator protection as an important component of their management paradigms;
- Mandating considerably stricter regulations around pesticide use;
- Enhancing application of the Environmental Quality Incentive Program and the Conservation Reserve

Programs to restore or enhance habitat for pollinators on working farms and private lands;
- Increasing conservation easement payments for growers to transform marginal agricultural land into bee-friendly zones; and
- Developing a clear, broad pollination bill that could be rolled into the Farm Bill.

Another particularly striking outcome from our Bee Audacious conversations around habitat was the congruence between policies and programs that would benefit wild bees and those that would benefit managed honeybees. The shared interests between the wild and the managed were palpable, and bode well for creating the strongest possible alliances to protect all pollinators.

Pollination Consensus developed on the value of protecting pollinators and diversifying the bees and other species used for commercial pollination. To achieve the objectives of protecting and diversifying pollinators, intensive advocacy and education programs should be encouraged, everything from extension projects for farmers to sophisticated public education programs. Economic models need to be developed, specific to crops and regions, which demonstrate the financial viability and benefits for growers who implement pollinator-friendly practices. Technical support could be provided to advise farmers on their pollination options. A label, with accompanying certification, might be designed to inform consumers that their food purchases come from pollinator-friendly farms. Finally, closer collaboration between beekeepers, wild bee advocates and farmers could be targeted, with economic incentives for each to participate.

National Bee Corps Another audacious outcome from our conference was the exciting proposal to create a National Bee Corps across the United States and perhaps internationally, modeled after the Peace Corps. The Bee Corps would enhance extension/education for beekeepers, from the smallest scale hobbyists to the largest commercial operations. Its core objective would be to formulate and deliver programs that assist current beekeepers while educating the new generation of beekeepers that is expanding dramatically all across the United States and globally.

Participants favored a national-level Bee Corps that would provide significant federal resources to train professionals who would then fan out across the country and provide direct, local and hands-on services for beekeepers. Their network would be enhanced by developing core information about beekeeping, deliverable through web-based, social media and print options, using high-powered graphic and video presentation for clear, effective information delivery, and modified to suit local regions and a range of beekeeping styles.

Darwinian Beekeeping A number of ideas arose during Bee Audacious that reflected an increasing interest in better matching honey bee management practices with the natural biology of honey bee colonies. Indeed, it became clear during the conference that these ideas, well

named as Darwinian Beekeeping, have reached the level of a not-yet-organized international movement.

We heard from beekeepers from around the world who are looking to the biology of wild honey bee colonies to redesign colony management, disease control and apiary geography. The essence of this bee-friendly beekeeping is to let the bees live as naturally as possible, making use of the adaptations that they have acquired over the last 30 million years. Darwinian beekeepers are willing to accept lower yields per colony and forego moving honeybees for pollination, in favor of improved colony health and survival as well as enhanced enjoyment for the beekeeper. Just a few of the management paradigms in this beekeeping philosophy include:

- Smaller colony sizes closer to that of average wild colonies;
- More space between apiaries, fewer colonies per apiary, and more distance between colonies within apiaries;
- Use of local queens, selected and reared for local conditions;
- Reduced or no swarm control, and capturing swarms to initiate new colonies and replace colonies that have died;
- No chemical disease or pest management, allowing natural selection to play a stronger role.

Darwinian beekeeping may be best suited to hobbyists or sideline beekeepers, but many elements in this management philosophy would be adaptable for commercial beekeeping as well.

New strategies to deal with diseases and pests Virtually all the participants agreed on the need to reduce the use of pesticides, antibiotics and fungicides in beekeeping. We also recognized that hobby and commercial beekeepers may take different approaches, and not all will be as comfortable with the speed and extent at which chemical use might be reduced.

Still, there was considerable support to take audacious steps towards reducing or eliminating chemical and antibiotic treatments against diseases and pests, while recognizing the need for commercial beekeepers to have tools they can use in the interim. There have been many reports globally about resistant bees, but there has yet to be a well-funded, widespread international effort towards selection and breeding for natural resistance.

Bee Audacious participants envisioned a well-coordinated international effort at a considerably broader scale than has yet been attempted. Breeding programs to date have been local, not always connected with hobbyist or commercial management needs and lacking the long-term funding through which successful stocks could persist. Partnerships with queen breeders would be essential, as would the research infrastructure to conduct robust, long-term and regionally focused projects to select and maintain successful stock long-term, and to support tech teams that transfer successful stock to hobby and commercial sectors.

Diversify Management Just as diversity builds resilience into habitats, building more diversity into management systems would provide protection

against high levels of honey bee colony loss and disruptions in pollination.

Bee Audacious turned what are often sources of conflict into positives. Beekeepers and pollination proponents often face off to argue about which system is better, sometimes vehemently and occasionally personally. Dichotomies develop: top bar hives vs. Langstroth, honey bees vs. non-*Apis* bees, treating for *Varroa* mites vs. treatment-free, antibiotics for AFB vs. burning, hobby vs. commercial, migratory vs. stationary.

All these views were represented, yet in the dialogue format we learned to appreciate each other's systems rather than criticize. It also became clear that there is very little reliable information, based on evidence from rigorous research, which would favor one system over another.

We addressed a number of specific tensions in the beekeeping and pollination communities, with some innovative bridge-building solutions emerging. For example, at times commercial migratory beekeepers and non-*Apis* bee proponents who support the ecological services of bees other than honey bees to pollinate crops have appeared to conflict. Yet, a consensus developed at Bee Audacious that a mixed pollination system that relied on habitat improvements to enhance wild bee numbers while also supporting managed honey bee colonies would be both resilient and economically viable for both beekeepers and farmers.

In another example, the conference addressed the tension between treatment-free beekeepers and those using pesticides and antibiotics. These groups have increasingly been in conflict; Treatment-free is perceived as contributing to pest outbreaks, while treating colonies is considered to interfere with the natural selection of resistant bees. The dialogue format of Bee Audacious allowed participants to respect the differences between these options while developing ideas for how both could thrive, perhaps by implementing geographic separation that encourages beekeepers to decide what they prefer in their locales.

Build alliances Perhaps the most audacious idea of all was to build an alliance of interests that could effectively lobby for pollinators. The raw material is there for a robust and powerful lobbying force. There has been a public upwelling of interest and concern around bees, but it has not yet been well organized. Similarly, there are copious organizations with direct or tangential interests in pollinator health, but they have not coalesced into an effective lobby.

The Bee Audacious conference was enthusiastic about the creation of a National Pollinator Association (NPA), a group under the broadest possible tent that would respect each organization's individual mandates while working collectively to support broad areas of agreement around pollinator policy.

The groups that might collaborate together would include beekeeping and grass roots pollinator organizations, such as the American Beekeeping Federation, American Honey Producers, Eastern and Western Apicultural Societies, Project Apis m, local and state beekeeping associations and the groups that have emerged recently with interests in wild bee health, such as Seattle's Pollinator Pathway, New York City's Great Pollinator Project and the national Great Sunflower Project. Then there would be the non-profit organizations that are broadly advocating for pollinator health, such as the Pollinator Partnership, Bee City, Hives for Humanity, The Xerces Society and the Pollinator Stewardship Council.

A strong coalition should reach well beyond these pollinator-centric groups. Environmental organizations could be involved, such as the Sierra Club, Monarch Watch, Ducks Unlimited, Environmental Defense Fund, Centre for Food Safety, Centre for Biological Diversity, Friends of the Earth and Pheasants Forever. The sustainable and organic farming communities would be another set of natural allies; examples include the National Sustainable Agriculture Coalition, Organic Trade Association, Whole Foods, Costco and the Rodale Institute, among many others. Finally, there has been an urban food revolution in recent years with a focus on local food, municipal agriculture and farmers' markets, a potentially powerful collection of consumers willing to support pollinator protection. Growing Power, Slow Food and Farm Folk City Folk are just a few organizations representing this field.

Dialogue Finally, and perhaps most significantly, Bee Audacious demonstrated that diverse perspectives can indeed come together and reach broad, effective outcomes that still respect individual and organizational interests. Sometimes the most audacious thing we can do is reach across the aisles that separate us to work collaboratively with those with whom we disagree.

In that way Bee Audacious taught us something considerably more important than the pollinator issues that brought us together. Civility is possible, and positive collaborative outcomes likely, when we rise to respectfully listen to each other above perceived differences.

We are our finest and most effective selves when solitary becomes communal. It is through collaboration that our future prosperity and the health of pollinators will be best assured. BC

Mark L. Winston is a Professor and Senior Fellow at Simon Fraser University's Centre for Dialogue, and author of Bee Time: Lessons From the Hive ***www.winstonhive.com***

(This report has been condensed from the Bee Audacious summary report. The full report can be found at ***http://beeaudacious.com/wp-content/uploads/2017/04/BA_Final_Reportv1.8.1.pdf****).*

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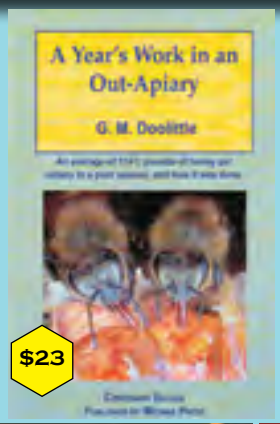

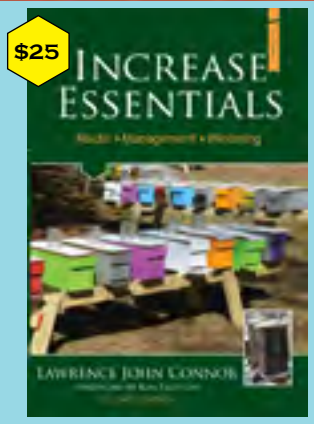

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#SCIENCEMARCH

Toni **Burnham**

Honey bees, unlike marchers, stay inside when it pours down rain. Here in DC, advocates for pollinator research got soaked, instead.

The March for Science was controversial among scientists, in part because science needs to be the pursuit of truth, not of political expediency. However, bee research has already come under the knife in the United States (anyone remember the Tucson Bee Lab?) and is operating under difficult conditions now. At some point, if it bears value, you might need to make sure that decision makers factor *that* into their mathematical models.

Bees, including natives, were prominently featured in among the speakers and scattered among the marchers: Sam Droege (**https://www.usgs.gov/staff-profiles/sam-droege**) was on the main platform, and there was even a "Bee Swarm" sponsored by the Pesticide Action Network North America (and five other organizations). In 600 other cities (most considerably dryer) supporters of bee science were also present, pun-bearing signs in hand.

One of the issues that created some urgency among local beekeepers attending the March was the recent news that the USDA-ARS Bee Disease Diagnostic Service, offered free to beekeepers for 100 years, was on hiatus immediately and indefinitely. Members of our group connected with folks close to the issue, and learned that the Lab is unable to hire due to a government-wide order affecting all agencies except Defense and the Veterans Administration, even where there is already budget on hand and an existing staff slot in place. This is a case where beekeepers all over the country who need to know what is happening with their colonies might want to advocate not just for funding, but for the continued, common sense operation of a lab which has delivered a valuable and high-quality service for a century. I doubt that anyone would agree with all the issues raised by marchers across the country, but it is hard to credit the public benefit of hamstringing what has been successful and valuable for generations of widely divergent beekeeping practitioners. BC

Toni Burnham lives and keeps her bees and gets involved in Washington, DC.

A Closer Look

WORKER REPRODUCTION

Clarence **Collison**

Reproductive workers are seldom seen in colonies with a laying queen.

Honey bee workers are sexually undeveloped females and under normal hive conditions do not lay eggs. However, workers have small ovaries which under the right conditions can produce eggs which will develop into drone progeny. Since workers are incapable of mating they can only produce unfertilized eggs. Reproductive workers are seldom seen in colonies with a laying queen (Visscher 1989; Page and Erickson 1988) because a suite of pheromones derived from the queen and the brood inhibits ovarian development in workers. If a colony loses its queen and fails to replace her, the queen pheromone will cease to be present and the brood pheromone will gradually disappear as the brood emerges. By the time all of the brood has emerged the workers' ovaries will have started to develop, although considerable difference in the rate of development occurs in different individuals, as does the number of eggs a particular worker can produce when its ovaries are fully developed (Morse and Hooper 1985). Another mechanism that limits successful worker reproduction is a behavior known as worker policing: the removal of worker-laid eggs by other workers (Dampney et al. 2002). Visscher (1996) estimates that in queenright colonies of mixed European origin, only approximately 7% of all male eggs originate from laying workers.

While workers with fully developed ovaries are rare in queenright honey bee colonies, Smith et al. (2013) showed that partial ovary development is common. Across nine studies, an average of 6% to 43% of workers had partially developed ovaries in queenright colonies with naturally mated queens. Workers with partially developed ovaries have ovaries that are neither resting (i.e., no swelling of the ovarioles) nor at an advanced stage of development (i.e. completely elongated eggs visible within ovarioles) (Velthuis 1970). There was substantial variation across these studies in the proportion of workers that had partially developed ovaries, which is probably attributable to differences in year, location, season, genetics and dissection methodology (Backx et al. 2012; Hoover et al. 2006). Nevertheless, it is clear that partial ovary development is consistently observed among workers in queenright colonies. This observation raises the question: if workers with only partially developed ovaries are effectively sterile, what is the significance of this incomplete investment in reproductive physiology?

Stimulated Ovaries of a Laying Worker

BIP Photo

Hoover et al. (2006) examined the effect of larval and adult nutrition on worker ovary development. Workers were fed high or low-pollen diets as larvae, and high or low-protein diets as adults. Workers fed low-protein diets at both life stages had the lowest levels of ovary development, followed by those fed high-protein diets as larvae and low-quality diets as adults, and then those fed diets poor in protein as larvae but high as adults. Workers fed high-protein diets at both life stages had the highest levels of ovary development. The increases in ovary development due to improved dietary protein in the larval and adult life stages were additive. Adult diet also had an effect on body mass. The results demonstrate that both carry-over of larval reserves and nutrients acquired in the adult life stage are important to ovary development in worker honey bees. Carry-over from larval development, however, appears to be less important to adult fecundity than is adult nutrition. Seasonal trends in worker ovary

"While workers with fully developed ovaries are rare in queenright honey bee colonies, Smith et al. showed that partial ovary development is common."

development and mass were examined throughout the brood rearing season. Worker ovary development was lowest in Spring, highest in mid-Summer, and intermediate in Fall.

Ratnieks (1993) investigated whether worker policing via the selective removal of worker-laid male eggs occurs in normal colonies with a queen. Queenright colonies were set up with the queen below a queen excluder. Frames of worker brood and drone comb were placed above the queen excluder. Daily inspections of the drone frames revealed the presence of a few eggs, presumably laid by workers, at a rate of one egg per 16,000 drone cells. Eighty-five percent of these eggs were removed within one day and only two percent hatched. Dissections of workers revealed that about one worker in 10,000 had a fully developed egg in her body. These data show that worker egg-laying and worker policing are both normal, though rare, in queenright colonies.

Lin et al. (1999) examined the factors that might influence ovary development in worker honey bees. Queenless workers at different ages (≤ 12 hours, and four, eight, and 21 days) were tested in cages for ovarian development. Newly emerged, four- and eight-day-old, and 21-day-old workers had medium-, large- and small-sized ovaries, respectively, suggesting that of the worker ages tested only four- and eight-day-old workers are likely to become egg layers in a queenless colony. Also, they compared ovarian development of newly emerged workers that were caged for 14 days and allowed to consume either pollen or royal jelly to that of another group of workers similarly caged but screened so that they could only obtain food via trophallaxis from young bees. Ovaries of newly emerged workers that received food from young bees were as well developed as those of newly emerged workers allowed to take pollen or royal jelly directly. Screened workers also had lower but still elevated vitellogenin levels compared with bees having direct access to food. These results indicate that nurse-age bees functioning as pollen-digesting units affect the ovarian development of other workers and to a lesser extent vitellogenesis via food exchange. They compared the influence of group sizes of 25, 125, and 600 bees per cage on ovarian development for 14 days. The two groups of 25 and 125 bees had similar mean ovary scores, and higher scores than a group of 600 bees. Their findings suggest that nurse-age bees could play an important role in mediating worker fertility via trophallaxis, possibly by differentiating worker dominance status, and generally only young workers become fertile when a queen is lost in a colony.

Hoover et al. (2003) investigated the identity of the queen-produced compounds that inhibit worker honey bee ovary development. They examined the effects of synthetic honey bee queen mandibular pheromone (QMP), four newly identified queen retinue pheromone components (methyl (*Z*)-octadec-9-enoate (methyl oleate), (*E*)-3-(4-hydroxy-3-methoxyphenyl)-prop-2-en-1-ol (coniferyl alcohol), hexadecan-1-ol, and (*Z*9,*Z*12,*Z*15)-octadeca-9,12,15-trienoic acid (linolenic acid), and whole-queen extracts on ovary development of caged worker bees. The newly identified compounds did not inhibit worker ovary development alone, nor did they improve the efficacy of QMP when applied in combination. QMP was as effective as queen extracts at ovary regulation. Caged workers in the QMP and queen extract treatments had better developed ovaries than did workers remaining in queenright colonies. They concluded that QMP is responsible for the ovary-regulating pheromonal capability of queens from European-derived *Apis mellifera* subspecies.

When workers activate their ovaries and begin to lay eggs, this physiological change is accompanied by a shift in their pheromonal bouquet, which becomes more queen-like. Tan et al. (2012) found that the pheromonal components HOB, 9-ODA, HVA, 9-HAD, 10-HDAA, 10-HDA have significantly higher amounts in laying workers than in non-laying workers.

Genetic markers were used to study the reproductive behavior of worker honey bees. Five experiments were conducted that demonstrate the significance of worker reproduction. Biases were found in the egg-laying success of workers belonging to different subfamilies within queenless colonies, however, members of all subfamilies laid eggs. These biases were probably not a consequence of direct reproductive competition among subfamily members but most likely represent genetic variability for the timing of the onset of oviposition. Workers preferentially oviposit in drone-sized cells, demonstrating a caste-specific adaptation for oviposition behavior. Drone brood production is highly synchronous within colonies and can result in the production of more than 6,000 drones before colonies die (Page and Erickson 1988).

Wegener et al. (2010) investigated whether differences in the reproductive biology of queens and laying workers are reflected in their eggs. They first tested the capacity of queen- and worker-laid male eggs to withstand dry conditions, by incubating samples at 30.0, 74.9 and 98.7% relative humidity. They found that worker-laid eggs were more sensitive to desiccation. Secondly, they measured the weight and quantities of vitellin, total protein, lipid, glycogen, and free carbohydrate in queen- and worker-laid eggs. Although worker-laid eggs were found to be heavier than queen-laid eggs in two of the four replicates, no systematic differences were found regarding nutrient content. Finally, they compared the duration of embryo development in the two egg types. Worker-laid eggs developed more slowly than queen-laid eggs in two out of three replicates, suggesting that they may only be

"When workers activate their ovaries and begin to lay eggs, this physiological change is accompanied by a shift in their pheromonal bouquet, which becomes more queen-like."

partly mature at the moment they are laid.

Miller and Ratnieks (2001) measured changes in worker egg-removal behavior, ovary development, and egg-laying rate in hives following the removal of their queens. They carried out weekly assays of worker removal of experimentally transferred eggs, dissection and inspection of worker bee ovaries, and daily checks of worker oviposition. Following queen removal, the egg-removal rate by workers generally first increased, then decreased or leveled off over the four-week time course of the experiment; this behavior was closely synchronized with the increase in worker ovary development and egg-laying.

The physiological state and behavior of laying workers partly resemble those of queens. Laying workers have low juvenile hormone titers and relatively high vitellogenin levels in the hemolymph (blood) similar to queens. Nakaoka et al. (2008) investigated whether the physiological state of laying workers is more similar to that of nurse bees or foragers by examining the hypopharyngeal gland (produces brood-food) and hemolymph vitellogenin titers. In a normal colony, nurse bees have well-developed hypopharyngeal glands that synthesize royal jelly proteins and high hemolymph vitellogenein tiers, whereas foragers have shrunken hypopharyngeal glands and low hemolymph vitellogenin titers. In queenless colonies, however, laying workers tended to have more developed hypopharyngeal glands and to synthesize royal jelly proteins, whereas workers with shrunken hypopharyngeal glands tended to synthesize α-glucosidase (which is needed for processing nectar into honey) and to have undeveloped ovaries. Furthermore, the workers with developed ovaries had higher vitellogenin titers than nurse bees, whereas, those with undeveloped ovaries had lower vitellogenin titers. These findings indicate that the physiological state of laying workers is similar to that of nurse bees, but opposite that of foragers.

Three experiments were performed to determine the role of juvenile hormone (JH) in worker reproduction in queenless colonies of honey bees. In the first experiment, egg-laying workers had low hemolymph titers of JH, as did bees engaged in brood care, while foragers had significantly higher titers. Experiment 2 confirmed these findings by demonstrating that laying workers have significantly lower rates of JH biosynthesis than foragers do. In the third experiment, ovary development was inhibited slightly by application of the JH analog methoprene to one-day-old bees, but was not affected by application to older bees, at least some already displaying egg-laying behavior. These results, which are consistent with earlier findings for queen honey bees, are contrary to a common model of insect reproduction, in which elevated JH titers trigger ovary development, which then leads to oviposition (Robinson et al. 1992).

Vasfi Gencer and Kahya (2011) compared sperm traits of small drones from laying worker colonies (LWC) with those of large drones from queenright colonies (QRC). The drones from QRC were 50.4 percent heavier (221.6 mg) than the drones from laying worker colonies (147. 3 mg). The mean volume of ejaculate of drones from QRC (1.01µl) was 53 percent larger than that of drones from LWC (0.66 µl). The mean sperm number in drones from QRC (7.320×10^6) was significantly higher than that of drones from LWC (4.425×10^6). Sperm concentration of drones from queenright colonies (7.256×10^6/ µl) was significantly higher than that of drones from laying worker colonies (6.661×10^6/ µl). In addition, the drones from

queenright colonies (33.155 x 10^3 mg) produced 3.189 x 10^3 more sperm cells per mg body mass than drones from laying worker colonies (29.966 x 10^3 mg). No significant differences were found between drones from QRC and LWC in sperm viability and sperm length. BC

References

Backx, A.G., E. Guzmán-Novoa and G.J. Thompson 2012. *Factors affecting ovary activation in honey bee workers: a meta-analysis.* Insect. Soc. 59: 381-388.

Dampney, J.R., A.B. Barron and B.P. Oldroyd 2002. *Policing of adult honey bees with activated ovaries is error prone.* Insect Soc. 49: 270-274.

Hoover, S.E.R., C.I. Keeling, M.L. Winston and K.N. *Slessor 2003. The effect of queen pheromones on worker honey bee ovary development.* Naturwissenschaften 90: 477-480.

Hoover, S.E.R., M.L. Winston and H.A. Higo 2006. *Worker honey bee ovary development: seasonal variation and the influence of larval and adult nutrition.* J. Comp. Physiol. B. 176: 55-63.

Lin, H., M.L. Winston, N.H. Haunerland and K.N. Slessor 1999. *Influence of age and population size on ovarian development, and of trophallaxis on ovarian development and vitellogenin titres of queenless worker honey bee (Hymenoptera: Apidae*). Can. Entomol. 131: 695-706.

Miller, D.G. III and F.L.W. Ratnieks 2001. *The timing of worker reproduction and breakdown of policing behaviour in queenless honey bee* (Apis mellifera *L.*) *societies.* Insect. Soc. 48: 178-184.

Morse, R.A. and T. Hooper 1985. *Laying workers.* In: The Illustrated Encyclopedia Of Beekeeping. E.P. Dutton, New York, pp. 235-236.

Nakaoka, T., H. Takeuchi and T. Kubo 2008. *Laying workers in queenless honeybee* (Apis mellifera *L.*) *colonies have physiological states similar to that of nurse bees but opposite that of foragers.* J. Insect Physiol. 54: 806-812.

Page, R.E., Jr. and E.H. Erickson Jr. 1988. *Reproduction by worker honey bees* (Apis mellifera *L.*). Behav. Ecol. Sociobiol. 23: 117-126.

Ratnieks, F.L.W. 1993. *Egg-laying, egg-removal, and ovary development by workers in queenright honey bee colonies.* Behav. Ecol. Sociobiol. 32: 191-198.

Robinson, G.E., C. Strambi, A. Strambi and Z.-Y. Huang 1992. *Reproduction in worker honey bees is associated with low juvenile hormone titers and rates of biosynthesis.* Gen. Comp. Endocrinol. 87: 471-480.

Smith, M.L., H.R. Mattila and H.K. Reeve 2013. *Partial ovary development is widespread in honey bees and comparable to other eusocial bees and wasps.* Commun. Integr. Biol. 6:5 e25004, doi:10.4161/cib.25004

Tan, K., M. Yang, Z. Wang, S.E. Radloff and C.W. Pirk 2012. *The pheromones of laying workers in two honeybee sister species:* Apis cerana *and* Apis mellifera. J. Comp. Physiol. A. 198: 319-323.

Vasfi Gencer, H. and Y. Kahya 2011. *Are sperm traits of drones* (Apis mellifera *L.*) *from laying worker colonies noteworthy*? J. Apic. Res. 50: 130-137.

Velthuis, H.H.W. 1970. *Ovarian development in* Apis mellifera worker bees. Entomol. Exp. Appl. 13: 377-394.

Visscher, P.K. 1989. *A quantitative study of worker reproduction in honey bee colonies.* Behav. Ecol. Sociobiol. 25: 247-254.

Visscher, P.K. 1996. *Reproductive conflict in honey bees: a stalemate of worker egg-laying and policing.* Behav. Ecol. Sociobiol. 39: 237-244.

Wegener, J., M.W. Lorenz and K. Bienefeld 2010. *Differences between queen- and worker-laid male eggs of the honey bee* (Apis mellifera). Apidologie 41: 116-126.

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FOUND IN TRANSLATION

Can Propolis Be Used To Improve Colony Health

Jay **Evans**, USDA Beltsville Bee Lab

Having visited Brother Adam's apiaries at Buckfast Abbey and his honey sites in lonely Dartmoor, I was struck by how orderly and thoughtful the setting was, a truly meditative place to breed a holistic bee. Brother Adam applied the science of the time and a healthy travel budget to do just that. One thing he thought bees could do without was propolis (plant resins laboriously collected by worker bees, stripped from their bodies, and applied to hive surfaces). Despite increased interest in the benefits of propolis for human health in the first half of the 1900s, the concept that collected plant resins could aid bees was lost on Brother Adam. Instead, he saw the down-side for beekeepers dealing with hesitant removable frames and consequently sought breeding stock that left plant resins to the plants.

Coincidentally, just before Brother Adam returned to Buckfast Abbey with Anatolian bees from North Africa that would erase the desire of his breed for propolis, P. Lavie in France showed that propolis had antimicrobial properties against the causative agent for American foulbrood, and thereby might be of benefit to bees. Lavie's work set off several decades of work, continuing now, aimed at characterizing specific propolis sources and specific bee diseases these sources might impact. More generally, propolis is one of many plant-derived substances that can impact bee health directly as antibiotics and indirectly by improving bee immune responses. Silvio Erler and Robin Moritz in Halle, Germany, have nicely summarized decades of experiments focused on determining the impacts of propolis and a wide pharmacopeia of bee-collected products on honey bee health (**https://link.springer.com/article/10.1007/s13592-015-0400-z**).

While health benefits to bees from propolis are evident from controlled experiments in the laboratory, studies of longterm effects on colony health are scarce. In one such study, Renata Borba and colleagues at the University of Minnesota placed commercial propolis traps into twelve experimental colonies, greatly increasing propolis levels in these colonies when compared to control colonies housed in standard hive bodies (**http://jeb.biologists.org/content/jexbio/218/22/3689.full.pdf**). These researchers then measured both disease loads and colony health across a full year. This experiment was repeated in consecutive years, involving a total of 24 experimental and 24 control colonies. In the first series, propolis-rich colonies survived better across Winter and carried more brood when sampled the following Spring. These colonies also invested less in six proteins known to be involved in the bee immune response during their first Summer and Fall, arguably conserving energy and resources. In the second round, propolis-rich bees showed reduced expression for only two of these six immune proteins, and no differences were found in either production or colony survivorship. Interestingly, bees in propolis-rich colonies showed much less variation for immune gene activity when compared to control bees, a result that might indicate a more uniform disease threat in these colonies, a good sign for bees threatened by a major colony-level disease breakout. Perhaps in support of this, nosema loads were lower in propolis-rich colonies, albeit with marginal statistical confidence.

More recently, Nora Drescher and colleagues in Germany and Switzerland conducted an even more aggressive experimental manipulation of the propolis envelope (**http://www.mdpi.com/2075-4450/8/1/15**). As in the prior study, they installed commercial propolis traps in colonies. In half of these colonies, traps were removed frequently, scraping propolis and delivering it to one of the propolis-rich colonies. They also scraped the naturally stored propolis from the propolis-poor colonies, increasing the differences between each set of colonies. They then assessed disease levels and colony health monthly across a single growing season in a total of 10 colonies. By the end of these assessments, propolis-rich colonies showed improved colony strength.

Neither study showed a significant effect of propolis on colony mite levels or on total virus or bacterial loads, in contrast to controlled lab studies. Interestingly, Drescher and colleagues showed that Deformed wing virus levels did not increase in step with their mite vectors in propolis-rich colonies, a hint that bees were in fact better able to fight off this virus. Finally, Borba and colleagues found differences in antibacterial activity when *Paenibacillus larvae* was exposed to propolis collected from colonies in the spring versus fall. Assuming both sets of propolis were derived from the same plant source, this result suggests that the benefits of propolis decrease in colonies over time.

These results indicate that the benefits of propolis can indeed outweigh the nuisance of sticky hive components. Natural propolis collected from multiple sources on two different continents was shown to lead to improved colony health and survival. It is exciting to think of the diversity of plant resins to which bees are exposed when collecting and unloading propolis. Surely, the observed antimicrobial traits seen in lab studies for distinct propolis sources can lead to natural or synthetic medicines for bees. Time will tell if beekeepers and scientists are better than bees in selecting specific plant medicines that consistently improve bee health. BC

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The Beehive Thief

Peter **Sieling**

Dresden, NY Feb. 1919 – William Keefer awoke to discover that eight of his honey bee colonies were missing. He was the latest victim in a string of robberies in and around the village of Dresden. The sheriff, Case Blodgett, had a pretty good idea who stole them, but needed hard evidence before he dared to act.

A resident had noticed some unusual activity at a neighbor's barn and reported it to the Sheriff. Obtaining a warrant, Blodgett, along with Keefer and two deputies, entered the barn where they found lanterns, sheet lead, canned goods, silverware, and other property belonging to Dresden residents and the New York Central Railroad. There were no bee hives.

The men turned to the house. The occupant, Zimri Norman, aged 44, had a police record from twenty years before, and two years earlier had been declared legally insane. He had recently been discharged from Willard State Hospital for the Chronic Insane.

"Zimri!" Sheriff Blodgett called from the yard. "You in there?"

No one answered. Blodgett tried the door. It was unlocked. There was a fire in the cook stove. They searched the upper and lower floors. He lifted the trap door to the cellar, revealing a staircase descending into the darkness. He and Keefer carefully felt their way down, while the other two men posted guard upstairs.

Standing on the stair landing, their eyes adjusted to the dim light. A stove, still hot, stood along one wall with a large steaming cauldron on top. The air reeked of scorched bees, wax, and honey. Someone had been boiling bees and honey combs together to separate the honey from the wax. Buckets of boiled honey, wax, and dead bees surrounded the stove. Sheriff Blodgett started toward a door leading to another section of the cellar when Keefer pointed to a large heap of rags in the corner. "It looks like someone's over there," Keefer whispered.

"Boys!" Blodgett called up the stairs, "Get me a pail of hot water off that stove. I'll find out if anybody is there."

The pile of rags shifted as Zimri slowly stood up. At six feet, six inches tall, he towered over the other men. His scraggly beard covered his chest and his untrimmed hair hung below his shoulders. "What do you want?" he asked.

"I'd like you to come upstairs with us." Walking toward the stairway, Blodgett saw Zimri's hand move toward his hip pocket. In a moment he relieved Zimri of a large caliber handgun, a gun big enough, Blodgett said, to "shoot across Seneca Lake".

He was taken into custody without further incident. Tried and convicted, Zimri Norman spent six months in the Monroe County Penitentiary. After serving his time, he returned to Dresden, entered the office of Justice Randolph, the man who sentenced him, and thanked him for placing him in such "good society", far superior to the company he had experienced at the State Hospital for the mentally insane.

This incident appeared in the *Penn Yan Democrat* newspaper in May, 1919. Fifty years later, when I was a teenager, my family moved to the picturesque village of Dresden, NY to a house just a couple blocks from Zimri Norman's. My friend Mark and I walked around Dresden, interviewing people who still remembered him. We explored that house, long vacant, including the cellar where Zimri rendered the stolen honeycomb. I mowed and trimmed the grass around his grave in the town cemetery. I only dimly remember the stories, but Zimri's eccentric life made a lasting impression on the residents of Dresden.

When Zimri rode into town on his high bicycle, children scattered and hid like rabbits. He had tried raising rabbits, but someone released them. He was a musician and organized "Zimri's Band". He tried teaching the violin, specializing in psalms and hymn tunes, but couldn't find enough students. He tried crime, stealing railroad property and ended up in jail. He set up shop in Penn Yan as a fortune teller until they shut off his gas. He tried and failed again in Corning and Elmira. He predicted that an "awful calamity" was coming, but was sworn to secrecy as to its nature. Every venture failed and he was treated with ridicule and contempt in the local newspapers.

When the Great War broke out in Europe in 1914, he walked into Miss Depew's classroom and accused her of teaching military tactics to the students, preparing them for war and the annihilation of Yates County residents. Two days later, Zimri was declared insane and committed to Willard State Hospital, his first term.

Zimri Norman was an inventor. He invented a rail car coupling system, and claimed to have invented a telescope lens cutter. He spent 20 years perfecting his most famous invention – a perpetual motion machine. By the time of

his "dabbling in the honey business", he had attempted to patent the device, but Washington, DC patent attorneys told him it would cost $10,000 to secure world patents. He was trying to sell stock in his company at the time of his arrest. I talked to a man who remembered seeing the machine in operation – metal spheres spinning around a center shaft, and enclosed in a glass case. He could not tell how it worked. Zimri claimed to have hooked up his "rig" to a family clock which had not needed winding for three years.

In July, 1921, he was picked up while asking for the whereabouts of a certain girl. He claimed to be Bluebeard and bragged that he had already killed four women. In September, after a second catch-and-release from Willard, according to newspapers, he was found lying in an outhouse, sick and helpless. Dresden residents told me he was under the outhouse and no one dared go in and pull him out because of the filth. He was declared insane a third time. Sheriff Blodgett took him to jail, shaved his head, and gave him a cold bath. The shock almost killed him. He returned to Willard.

Released again, Zimri continued to search for backers to fund his patent applications. He moved to Auburn and changed his name to avoid the stigma of his past. He died in 1925. According to the Weedsport *Cayuga Chief*:

"Zimri Norman, 50 – former inmate of Willard State Hospital, and self acclaimed discoverer of perpetual motion died in the poverty of a squalid shack where he lived alone. Norman lived an eccentric life, working very little and seeming to enjoy his poverty. He never begged charity from his neighbors or the city and even resented their help when they attempted to help him."

He is buried in the poor end of the cemetery, by the railroad tracks within sight of the family house. There is sometimes a fine line between genius and insanity. The newspapers never mention that Dresden's hymn playing musician turned honey thief and mad scientist started out sane. He had a wife, Grace, a son, Robert and two other children; Edward and Mary who both died in their first year – Mary probably while Zimri was serving his first prison term. A combination of tragedy, crime, relentless public ridicule, and the stigma of multiple trips to an insane asylum could not quell the optimism that he and his stock holders could someday make millions with his fantastic inventions. The least posterity could do for him is to give him a place in the ranks of great American folk heros. BC

Chronic Bee Paralysis Virus

Don **Coats**

Introduction: This article reports on a honey bee colony struggling for survival against an infection of CBPV. It describes history-predisposing factors and the sickness scene, and reviews the diagnostic report. A video link provides an opportunity to witness behavior of the sick bees on grass in the perimeter of the hive.

Background: Colony deaths, "Winter dead-outs" are often blamed on virus infections, especially if the colony had a history of high mite infestation. *Varroa* mites weaken bees by leaching their fat bodies and leaves them vulnerable to virus infections. However, recognized signs of these virus infections are rarely observed in action since beekeepers north of the Carolinas wait until spring to inspect their hives. This case occurred in southern Chester County, Pennsylvania, among a community of five different beeyards within a two mile radius, none, except for this hive reported similar signs.

Sick bees from the grass and some from the inner covers were collected and mailed live to Bee Informed Partnership (BIP) for virus testing.

Patient History: Knowing the history of a mammalian patient helps a clinician diagnose and characterize human or pet diseases. It was analogous here in knowing that the colony was a captured swarm 10 months prior to disease onset. It had very high mite loads in the previous Fall, 12%, much higher than six other colonies in the same yard, despite standard treatments of Amitraz strips in mid-summer and OAV in the fall. Signs of disease became very evident in late February, when hundreds of addled and dying bees were altruistically scattered around the hive during warmer days.

Below is a link to a video of the dying bees. The pattern exhibited for several weeks but the colony survived. Signs shown by these bees did not totally fit the descriptions of bees suffering from CBPV, such as trembling, bloated abdomen and "hairless black syndrome." They did seem to show partial paralysis and present thousands of crawling bees around the hive.

https://www.dropbox.com/s/qzl6hxl6tatjwz5/MVI_6392.MOV?dl=0

As a probable credit to a strong queen, this colony, having dwindled to a population of three frames of bees in early March, seemed to recover by mid-April. The virus appeared to not affect the queen and the workers didn't succumb until late maturity. In mid-April, foragers showed good entrance activity and regular amounts of pollen were entering.

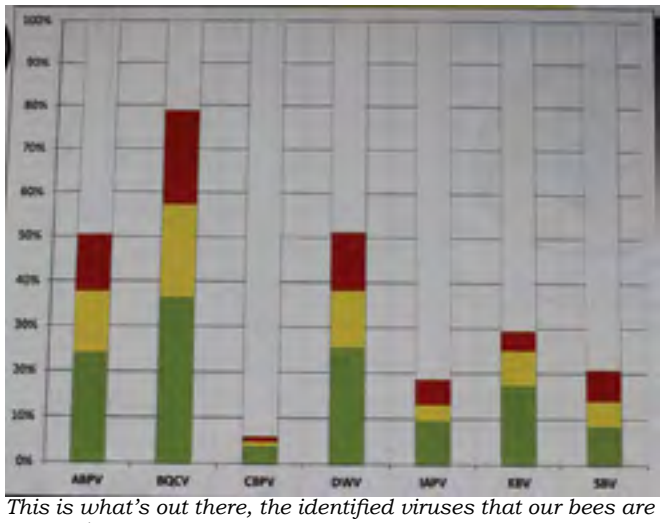
Virus assessment charts can be challenging to interpret, and it is good that laboratory staff usually provide commentary to do that for the beekeeper. It is particularly interesting that most reports find several different viruses at different intensities in the same sample but this one revealed only one of the 7 possibilities and at high "concentration".

Red color code indicates that portion of positives which most likely effect hive health.

BIP tests for seven viruses significant to colony health. The National Agriculture Genotyping Center, (NAGC) tests for a similar array plus a "satellite" virus.

Clinical signs of these different viruses are described in various text sources. The following is a summary of the description of **signs associated with CBPV** as found in *Honey Bee Diseases & Pests,* by the Canadian Association of Professional Apiculturists.

"CBPV causes abnormal trembling in adult bees, partial paralysis resulting in crawling and limited flight ability and bloated abdomens. In serious cases, thousands of bees can be seen crawling on the ground at the hive entrance. In addition, infected honey bees sometimes have reduced amounts of body hair and will appear darker and shiny. Hence CBPV is often referred to as hairless black syndrome." BC



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Pandora's Box

African Honey Bees & Climate Change

Ed **Erwin**

Pandora, of classical Greek mythology, was given a box which contained all the evils of the world. When she opened it, all the evils flew out, leaving only "hope" inside once she closed it. Today, climate change, in addition to the genetic traits of the Africanized Honey Bee, may be creating a modern-day Pandora's box.

In 1956, the Brazilian experiment to reduce the defensive, aggressive behavioral traits of the African honey bee failed. The bees were given away, swarmed, mated with feral European honey bee queens, and created the hybrid offspring known as "Africanized honey bees." The evil was out of the box.

The Africanized honey bees began a rapid expansion through South and Central America and in 1990, the Africanized honey bees entered the United States at Hidalgo, Texas. Map 1 is a map reflecting the early expansion of the Africanized honey bee from Brazil through South and Central America and the United States by area and year. Map 2 is another early map of the United States color coded to show the location and year the Africanized honey bees were discovered in each area.

As with Pandora's actions, introducing the African honey bee to Brazil seemed small and innocent, but it turned out to have severe, detrimental and far-reaching negative consequences.

Warmer Summers and milder Winters associated with climate change and additional traits such as adaptation and changes in genetic makeup; the Africanized honey bee's ability to resist pests and pathogens; the genetic superiority and dominance of the Africanized honey bee; and frequent swarming and absconding; have led to population increases and expansion of territory.

This is particularly significant since there are recent losses of European honey bee populations due to health and nutrition issues and the critical need for agricultural pollination. As the aggressive behaviors of the Africanized honey bees move into new, previously uninhabited areas, there is an immediate need to increase public awareness of the dangers associated with Africanized honey bees.

One trait of the African honey bee that exacerbates this rapid expansion is their "restless attitude." They stay in a location only long enough for the available forage to dwindle, then leave for a new location with more expansive floral resources. This behavior is critical in tropical environments where the bees migrate with the seasonal rains. In Africa, honey bees travel at a rate of 200 – 300 miles per year. They also construct smaller nests with less honey storage necessary to survive a lengthy, cold season.

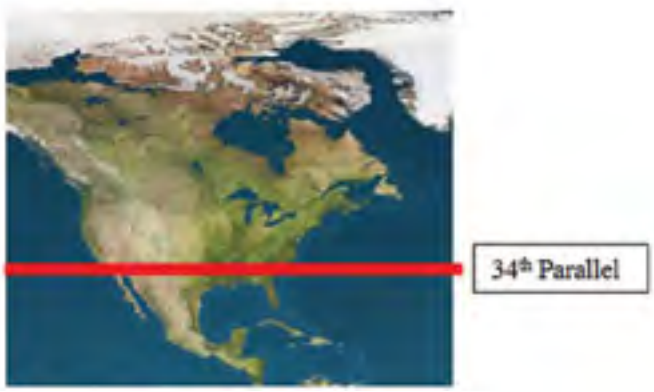
Early researchers predicted the northern limit to be south of 34° latitude. One factor that changed this "Northern Ceiling" is climate change. As our winters became milder, the region of habitability expanded further north.

Joshua Kohn, a professor of biology at The University of California San Diego stated that, "higher temperatures caused by global warming could mean that Africanized honey bees may continue to push north in the coming years."

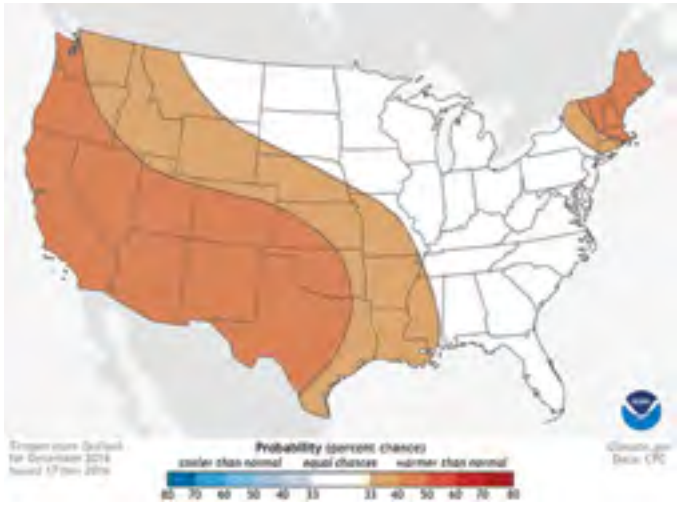
In January 2017, both NASA and NOAA reported that the earth's 2016 surface temperatures were the warmest since modern record keeping began in 1880. Most of this warming has occurred in the past 35 years, with 16 of the last 17 warmest years on record occurring since 2001. NASA's Goddard Institute for Space Studies Director Gavin Schmidt remarked, "We don't expect record years every year, but the ongoing long-term warming trend is clear."

There is little disagreement that previously known cooler areas are becoming warmer. In late 2015, the American Meteorological Society published the 26th edition of a peer-reviewed series titled "The State of the Climate." This report highlights the previous year's record heat, global surface recorded temperatures, and

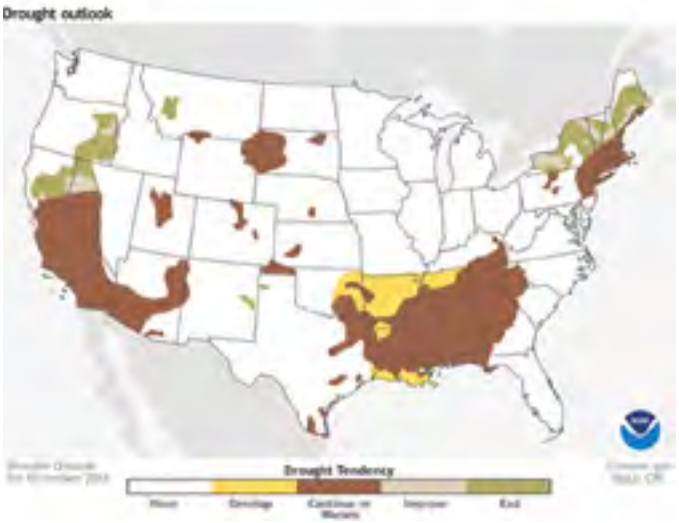
Map 1 *– Expansion of the Africanized honey bee from Brazil through South and Central America and the United States by area and year.*



Map 2 *– Where the 34th Parallel crosses.*



Map 3 *– NOAA, Climate Prediction Center expected forecasts for above-average temperatures to expand principally northwest, north and in isolated areas of New England.*



Map 4 *– NOAA forecast areas expected to experience more intense droughts and heat waves, and less intense cold waves.*

the majority of indicators reflect climate change trends consistent with long-term global warming.

Scientists in the Climate Prediction Center of NOAA, are also projecting higher temperatures for the year 2017. Their work includes the review of historical records to see how temperature conditions behaved as a result of similar conditions in the past. Map 3 is a map illustrating the expected forecasts for above-average temperatures to expand principally northwest, north and in isolated areas of New England. Managers in agricultural industries utilize this group's analysis to help them optimize food production, in which honey bees play a critical role.

On November 15, 2016, the U.S. Drought Monitor Project run by NOAA published a paper titled "A Trio of Drought Hotspots Across the United States." This paper supports the forecast prediction by the Climate Prediction Center of warm temperatures and lower than average precipitation particularly in California, the Southeast United States, and New England. These three areas have experienced severe, extreme, or exceptional drought conditions and are considered "hotspots."

This data along with the length of the frost-free season (and the corresponding growing season) has been increasing nationally since the 1980s. With the largest increases occurring in the western United States, affecting ecosystems and agriculture. Heat waves have become more frequent and intense, especially in the west. Cold waves have become less frequent and milder across the nation. Map 4 is a map reflecting the areas expected to experience more intense heat waves, and less intense cold waves.

Based on the research articles and the projections of warming weather, milder Winters, and drought expectations, new portions of the United States are or may experience climate conditions conductive to the range expansion of the Africanized honey bee.

The warmer climate, and the northerly migration of Africanized honey bees allows hybridization with the European bees. These hybrids adopt traits from indigenous European bees allowing them to adapt to the new cooler climate. However, studies have shown that the African genetic traits and qualities they exhibit are dominant over some of the European genetic traits resulting from favored natural selection. Therefore, the hybrid bees behave more like African bees, while inheriting some of the traits of the European bees.

Over time, the European relatively docile trait is lost when the Africanized bees dominate an area. In addition, over time European alleles will largely disappear mainly due to the continued migration of African genotypes into an area and the possibility of hybrid workers exhibiting reduced fitness.

Studies have confirmed that Africanized honey bees are more resistant to many pests and pathogens effecting European bees including: tracheal mites; small hive beetles; American foulbrood; and microsporidian gut pathogens, *Nosema apis, N. ceranae* and *Varroa destructor.*

Africanized queen honey bees produce more drone bees than European queens. This is attributed to the fact that African bees are more prone to swarming than European bees, leading to the need for an increased stock of available drones. Once the Africanized honey bees are established in an area, the Africanized drones dominate as a result of the larger number of feral Africanized hives. Over a short period, the European bees become Africanized as a result of European queens mating with the predominant Africanized drones.

Along with the larger number of drones produced, the number of times an Africanized hive will swarm allows them to dominate a greater geographic area. Compared to a European colony which may swarm one to two times a year, the Africanized colony may swarm five to six times a year.

Another interesting behavioral characteristic of Africanized honey bees is their ability for hive usurpation, or colony takeover, of European colonies. Africanized honey bees swarm and land on the outside of the hive containing the European colony. Over time, the Africanized worker bees begin exchanging pheromones and food with the workers of the European colony. Within a short period, the Africanized honey bees, including the queen, take over the colony and subsequently the entire hive becomes a hybridized Africanized colony.

Absconding, or abandoning the hive is a trait that occurs regularly with Africanized honey bees, as opposed to the number of times European bees abscond. Absconding colonies differ from a reproductive swarm, in that no workers are left in the original hive to produce a new queen. Absconding typically occurs when the hive is disturbed or resources are no longer available. These relocations have been documented as far as 100 miles or more away from their original site, to locate abundant, nutritional floral resources.

Map 5 *– Honey Bee Forage Map, reflecting the bee forage regions of North America, based on native flora distribution and land use patterns created by G.S. Ayers and J.R. Harman, both of Michigan State University.*

Map 5, titled Honey Bee Forage Map, was created from information gathered by G.S. Ayers and J.R. Harman, both of Michigan State University, reflecting the bee forage regions of North America, based on native flora distribution and land use patterns. When comparing Map 5 with Map 1, a map showing when and where Africanized honey bees were discovered, it is not surprising to see that the migration of the Africanized honey bees traveled through the geographic areas of the Southwestern United States and into California.

The Africanized honey bees' ability to resist pests and pathogens will certainly assist in their dominance over the European bees. Additionally, the greater number of Africanized drones in the Drone Congregation Area would afford them a greater opportunity of mating with a European queen, thus expanding the range and numbers of Africanized honey bees.

Previous articles and studies asserted that the Africanized bees appeared to have a reduced ability to

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survive cold Winter temperatures and their northern range limits had been reached. A study by Harrison et. al., noted that "by 2006 Africanized honey bees were already found overwintering north of this prediction." Recently, states such as Tennessee, Utah and North Carolina announced that the Africanized honey bee had entered their states.

Although the Africanized honey bees' rapid pace of advancement has slowed due to the lack of traits necessary to survive colder climates, the warming associated with climate changes has allowed the Africanized honey bees to expand their range further than originally predicted.

The expected warming and drought conditions in the Southeastern United States, will create an environment conducive to the Africanized honey bee. The warming associated with "hot spots," and available bee forage will provide a "migration corridor" into colder areas. Warmer climates and reduced European bee populations could influence the increased expansion of the range of the Africanized honey bee. However, what remains to be determined is if they will establish a permanent, feral population, or if they will only be "seasonal visitors."

Genetic dominance, frequent swarming and absconding traits, and the lengthy distances traveled could allow the Africanized honey bees to travel up to 300 miles in a season. This distance along with their ability to take over an established European hive could furnish the invaders the honey stores necessary for colder climate survival.

There also exists the real possibility of the Africanized honey bee spreading inadvertently by human assisted transport, either by the shipping of individual packages of bees from Africanized areas, or the movement of managed beehives for agricultural pollination.

The professional beekeeper and the hobbyist can and will learn how to manage aggressive Africanized hives. However, the nature of the Africanized bee may cause future beekeepers to reconsider taking on this venture, particularly in urban areas.

Given the certainty of climate change, it is not a question of whether the Africanized honey bee will expand their range and be introduced to new areas, but what evils from Pandora's box we will face over the next 20 years. While it is difficult to make any firm predictions of the final distribution of the Africanized honey bee, it is critical that the public becomes aware of their nature before they arrive and become established.

As stated in the 1988 magazine, *Science,* in an article titled: USDA Fights to Repel African Bees' Invasion, "When the bees attack their first victim, the whole debate will change from a beekeeper's problem to a public problem. The day that a toddler is attacked by a feral swarm of Africanized bees, could spell the end of beekeeping as we know it." And, as already reported incidents where the public and these bees have interacted are occurring with, albeit slowly, increasing frequency.

Africanized Honey bees are here to stay and may become our principle agricultural pollinator. Imagine the public outcry if a semi-trailer truckload of Africanized honey bees were to overturn in any community. The only thing that remained in Pandora's box was "Hope," but hope is not a plan. We can hope for the best, but we must plan for the future. Lessons from the past have taught us to co-exist with nature, not seek to control it. BC

Ed Erwin is the Executive Director of Bee Harmony and a Master Beekeeper with the University of Montana program.

All The Buzzz in...

Beekeeper's Lab is here!

This book is full of 52 family friendly activities from around and about the hive including art projects, recipes, experiments, garden activities, and more. Author Kim Lehman is the columnist and creator of the Bee Kid's Corner. Enjoy one of the activities from the book *Beekeeper's Lab*! Used with permission. To order a copy of the book go to www.quartoknows.com.

LAB 12

HONEY STRAWS

YOU WILL NEED

- plastic straws
- scissors
- raw unfiltered honey in a squeeze bottle
- pliers
- candle
- matches
- damp cloth

Make your own honey straws to carry with you for an anywhere, anytime instant energy boost.

DIRECTIONS

1. Any plastic straws will work, but clear or translucent straws allow you to see the amount of honey in the straw. If using flexible straws, cut off the bendable part of the straws before filling. Cut the straws to the desired length.

2. Connect the opening of the squeeze bottle to the straw. The respective sizes of the straw and the bottle's spout will dictate whether the straw will fit inside or outside of the spout's opening. If possible, use a straw that will fit outside the bottle's spout, as a straw inserted into the spout is more prone to drips.

3. Gently squeeze the honey into the straw, leaving at least 2″ (5 cm) of space at the top. As much as possible, avoid stopping and starting the honey flow, as it will result in air bubbles. (Fig. 1)

4. Carefully remove the straw from the bottle's spout, keeping the straw level.

5. Pinch the clean end of the straw with pliers, exposing only a small amount of the plastic. (Fig. 2)

6. Tilt the straw so the honey flows toward the end with the pliers.

7. Light a candle. Carefully hold the pinched end of the straw in the flame until the plastic has melted. Remove the straw from the heat while continuing to clamp the pliers for a few seconds to complete the seal. (Fig. 3)

8. Stand up the straw, sealed-end down, to allow the honey to drain away from the unsealed end.

BEE BUZZ

One worker bee will produce about 1/12 teaspoon (0.5 g) of honey in her lifetime.

FUN FOR KIDS

Try sealing one end of the straw before filling with honey. What happens?

... Bee kid's corner

Produced by Kim Lehman
www.kim.lehman.com
www.beeculture.com
June 2017

Winners

Mary Beth Byler from Ohio and Keilani Wilson from Florida are the winners of the "count the bees" contest that was in the February Kids Page. There were 77 bees. They won rub on transfers courtesy of Liz Vaenoski!

Fig. 1: *Using constant pressure, squeeze honey into a straw, leaving plenty of space at the end.*

Fig. 2: *Clamp pliers so only a small piece of the straw's end can be seen.*

9. The second seal can be a little tricky due to the honey residue in the straw. To remove as much remaining honey as possible before sealing, pinch the end using the pliers, wipe the seeping honey from the straw's opening with a damp cloth, and then hold it in the flame for a few seconds. If the seal isn't complete after a few seconds, it may be necessary to hold the straw's end in the flame a second time to complete the seal.

10. Rinse the finished honey straws in water before storing.

11. Slip a few honey straws into your backpack for a quick pick-me-up during a hike or day trip.

Fig. 3: *Using the pliers, hold the straw's end in a candle flame for a few seconds to seal the straw.*

TAKE IT FURTHER

Using this technique, make a portable salve or cream pack by inserting propolis salve (Lab 34) or beeswax cream (Lab 36) into a straw using a syringe.

BRAD THE BEE WORDSEARCH

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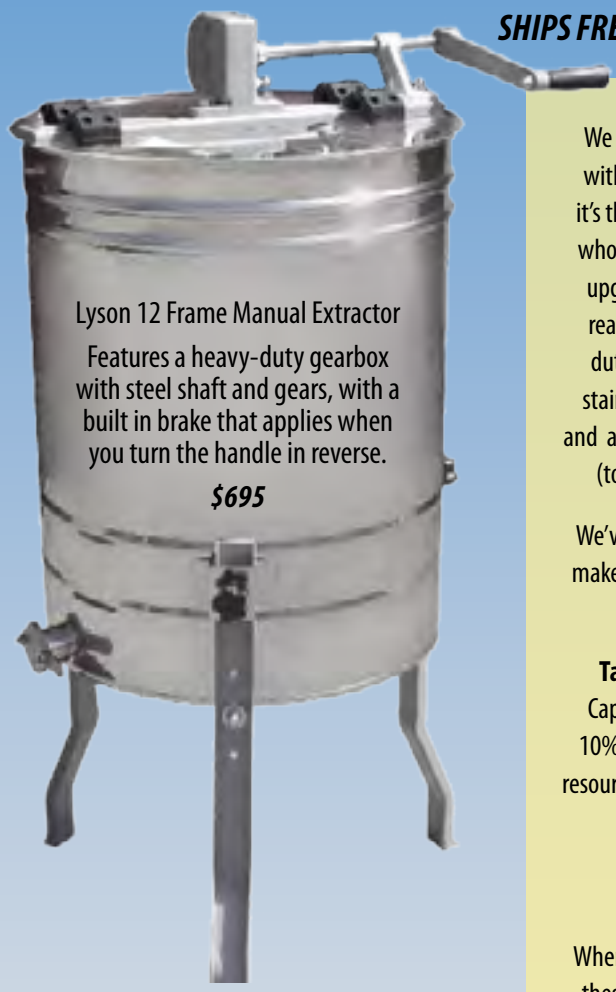

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REQUEENING, AGAIN

Larry **Connor**

The young worker looked at the owner, dumbfounded. "You want me to kill all the queens I find in these colonies?"

The owner skillfully and carefully explained his request, "This yard contains mostly two-year old queens. This Spring we have shaken these colonies for mating boxes, pulled out frames of brood for cell builders, and today you are shaking nurse bees for packages. This is the second time we have shaken these colonies for packages. It is time to smash her with your hive tool and I will come through tomorrow to introduce newly mated queens."

The worker looked at him quizzing, so the owner went on, "This way we will have an entire yard filled with young queens for the almonds and for shaking bees next year. We must constantly plan ahead."

The queens the worker was asked to crush were beautiful – long and productive egg layers. It takes a strong manager to order the replacement of hundreds of queens like her. "I have learned that the most important queen customer our business has is ourselves," the beekeeper explained. "Customers may be crying for queens, but If we don't take queens out of our production and sales cycle and replace our old queens with new, we will be in trouble next season."

Few of us can even begin to understand the experiences the scale of a large queen rearing and package bee operator. But we should all re-read what the queen producer said about replacing a good-looking queen and planning for next season. We will discuss some of the conditions under which the average beekeeper should replace young queens, or queens that are doing a great job but we expect will reach the end of its productive live in a few months or over the Winter.

Replacing Young Queens in Packages and Nuclei Colonies

More and more beekeepers are replacing queens soon after they received their new package colonies, or even in nucleus colonies. Generally, they let the original queens build the colony to a level they find acceptable, while feeding the bees, monitoring mite loads and searching for brood diseases. They allow one to three months of the original queen's brood to develop and emerge so they may evaluate the queen's workers for productivity and defensiveness.

This is especially true for areas on the fringe of African honey bee occupation. Most northern beekeepers do not want colonies that have queens that have mated with one or more African drones, or drones that are hybrids of European and African races. Beekeepers must monitor colony behavior, especially in urban and suburban locations, and one to three months is adequate for this monitoring. Commercial beekeepers tolerate a degree of subtle Africanization and will most likely move the bees back to their southern location at the end of the honey season. Most small-scale and semi-professional beekeepers cannot tolerate the risk of stinging attacks to ruin a good location. The other aspect of elimination of African-tainted queens is the potential for decreased wintering success. I am not sure that this is actually happening, but why take the chance? Most beekeepers do not want or need to increase their problems with getting bees through the Winter in good condition.

In a wider evaluation of queens that come in package colonies and nucleus hives, beekeepers are frequently dissatisfied that these queens are suitable for the conditions in their local area. This appears to address a lack of adaptiveness or genetic fit. A queen raised in California or Georgia may have traits for New York or South Dakota, but usually only when the breeder stock that provided larvae for the grafting rooms was selected in these areas on an intentional and rigorous basis. We talk more and more about Localized Queens or Survivor Stocks. A queen found in a swarm or a bee tree may represent most anything genetically, while a line of related queens that has been carefully selected over many years may be ideal for the Sun Belt queen producer to use in packages and nuclei production.

More and more I hear of northern beekeepers and queen rearing cooperatives programs providing key breeder queens to queen and queen cell producers in Sun Belt states to provide stock for their needs.

Large commercial queen producers have other

strategies to produce genetically improved queens. In California, the work by Sue Cobey is evident in operations like Valery Strachan's Strachan Apiaries in Yuba City. Valarie produces 200 instrumentally-inseminated breeder queens every June for her evaluation. Half of the queens are used as grafting mothers in her operation the following year, while the remaining queens are sold. There is apparently a long list of people waiting for these queens. The stock started as New World Carniolian.

Other large queen producers have one or more lines of queens that they develop in isolation in northern locations over the summer, or, in some cases, produce under agreement with the producer of the stock. This was the basis of the old Starline program that I ran from 1976 to 1980. While that stock is no longer available, Buckfast queens are being produced in Ontario and the Olivarez Honey Bee operation is producing Italian, Carniolian and Saskatraz queens in Hawaii, Northern California and Montana. To do this, separate areas are established to maintained to provide some degree of mating isolation for the production queens.

When bees are being shaken for packages, nurse bees, drones and the queen often end up in the shaking basket. The nurse bees go through to a cage below. The queen and drones are returned to the colony by turning the basket over and dumping it on the top of the hives's frames. Or the queen may be captured and crushed on the ground, allowing for the colony to be requested the next day.

For the Saskatraz queen program (http://saskatraz.com/pages/articles.htm), an agreement was developed with the Canadian producers of the stock. Here is a section of the report of their 2015 program:

"Every year colonies are selected for honey production, overwintering ability, temperament, mite resistance and brood diseases. Selections are made from at least 1500 colonies per year at Meadow Ridge apiaries [in Saskatchewan]. In addition, selections contributed (exchange of queen cells, etc.) by other Saskatchewan beekeepers are also evaluated. Some of the selected colonies are placed in natural selection apiaries to test for mite resistance (recurrent natural selection), others are placed in separate apiaries to evaluate honey production and other traits. Breeder queens are selected after two to three year evaluations and virgin queens from selected breeders are crossed (close population mated) at natural selection apiaries to improve varroa tolerance, and at apiaries with selections for high honey production to maintain productivity. In the last few years we have set up a natural selection apiary with colonies bred for high VSH activity, and in 2015 an apiary with colonies selected to produce diverse drones from colonies selected for economic traits (honey production, wintering ability, and varroa tolerance) from 7 different Saskatraz families. This should maintain genetic diversity as well as enriching for alleles carrying beneficial traits.

"Saskatraz queens mated at these apiaries undergo preliminary evaluation (brood pattern, temperament, etc.), and are sent to Orland California in late September of each year. The progeny from these queens are screened for viruses (DWV, IAPV, and KBV) and microsporidia (Nosema apis and ceranae). This information is used to make final selections in California. In 2015 we sent 120 queens to be reselected in March 2016. They are established in colonies after dequeening resident California queens. Colonies are treated for varroa about 30 days prior to introducing Saskatraz queens. Treatments in 2015 were in August with Apivar strips.

"Over the last few years the California Tech Transfer Team, Bee informed Partnership has independently evaluated our Saskatraz breeding stock in late February early March. Evaluation included hygienic testing (uncapped, removed), colony strength (frames of brood), brood pattern (1-poor to 5-best), queen status, temperament (1- best to 5- poor), color, varroa infestation (Mites per Hundred Bees) and nosema spore count.

"In mid-March Albert Robertson does the final colony evaluations and selects approximately 10 to 20 of the best queens to graft from. Final selections include evaluations for colony strength, phoretic varroa, varroa in drone and worker brood, brood pattern, brood diseases (chalk brood etc.), and temperament. Saskatraz hybrids are produced from these breeders to distribute to Canadian beekeepers."

Requeening to obtain a desired stock

Not all packages and nuclei contain the queens you eventually want to develop new hives. Like the young employee learning how to manage an apiary, you must learn to replace a young or seemingly productive queen with the stock you want. If you are unable to smash the queen with a hive tool, you could use the queen to install into a support nucleus colony (brood factory) or use her to be the star of an observation hive.

Some young queens have problems, such as poor mating (running out of sperm in a month or two after starting to lay), were damaged during shipping by overheating, or were exposed to miticide during development. You cannot and must not continue with these queens.

If you install a queen that came in a package of bees and she dies during introduction or she never starts to lay, or if she disappears, you should contact your package bee supplier for an immediate replacement.

If you have a laying queen, you must find and remove her. In smaller colonies you can go through the combs, frame by frame. Set aside each frame so the queen cannot crawl back to frames you just inspected. Use an empty hive body for that, or set the frames, on their ends, against a hive body or secure structure so the frames cannot crush bees and the queen. Search all frames for a second queen, just in case.

When you find the queen, pinch off her head or crush her with the hive tool. Toss her body some distance away from the hive so the bees are not confused by her body's presence. Once killed, pheromone production comes to an end.

There is debate about how soon you can introduce the new queen. I do it immediately after the old queen is gone.

Two California queen cages, containing one queen and workers in each cage. These are shipped in packages or in battery boxes by overnight delivery.

Once introduced, I delay the release of the new queen for three to seven days, depending on her relatedness to the bees in the colony and cost of the queen. Unrelated and expensive queens are held in the colony for five to seven days so there is plenty of time for the queen's pheromone to mix with the bees, and for the queen's ovaries to swell and produce abundant eggs, even in the cage. With three hole and California queen cages, leave the cork in the end of the cage. You may put a piece of duct tape over the end so the bees cannot (or are slowed) chew out the cork. If you use a Jz's-Bz's queen cage, use the plastic cap on the nipple of the cage, which is filled with queen candy.

When you return, enter the colony with a minimum of smoke and gently remove the cork or plastic cap and return the queen cage to the same location for emergence. Look at the queen while you do this, as you do not want to release a queen that has been damaged by the bees. After the cap or cork are removed, return the cage and gently close the hive.

In seven to 10 days you can return to check the queen is released and laying. With mated queens this should be around 98% successful. Unfortunately, there is always the risk of losing a few queens during introduction.

Finding the queen in a large hive

If you received your package or nucleus in April, and it is now late June or July, you should have a large colony. You ask, How Do I Requeen That?

This is where many beekeepers give up on requeening, saying that the queen must be great because the colony is so large and producing honey. If this makes sense to leave the queen you have saved some work. But ask yourself – will this colony be alive next March?

If the answer is NO (based on poor experience, perhaps with Italian bees brooding up all Fall and into the Winter), then you need to find and replace the queen.

Taking a method from crews that shake bees for packages, you should shake all the bees in a hive through a queen excluder. With a little smoke, the bees will move through the excluder and leave the drones and the queen above the excluder. Keep the drones, but remove the queen and pinch her.

Reassemble the colony and introduce your new queen (kept in a cool place while all this was going on). Make sure you place her in the middle of the brood nest.

Using queen cells

During the nectar flow, many beekeepers introduce a queen cell to the honey super (no queen excluder on the hive) and let the young queen and old queen determine hive politics.

Dr. Connor is teaching queen rearing in classes this month in Clarkson, KY and Little Rock, AK. Email him for the latest information regarding class structure and registration at ***ljconnor@aol.com****. Connor plans to be at the HAS meeting in July, EAS in July-August, and WAS in Sepetember. He calls it the trifecta of regional bee meetings.* BC

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Beeyard Thoughts, Observations, and Updates

Extracting honey from cantankerous combs. Odds and Ends – Dark socks and crystallized honey.

Extracting from cold, older combs

I am so, so sorry I started this topic. Last month I boldly said that I would finish my comments on late season (or out of season) honeycomb extraction this month. That was just a bit optimistic on my part. However, I have made progress.

In the last *BC* issue, I gave you my reasons for neglecting my bees and for missing my extracting window last year. I accumulated an unextracted honey crop that was one to three years old. This was more honey than my bees could ever use and increasingly, it was heavy and in the way of routine management procedures. My choices were to discard full honeycombs or extract them. Well, any beekeeper would extract these old, propolis-embedded combs rather than toss them – right? That was my decision, too. *(Spoiler Alert – tossing these old combs now seems to be a much more appealing option.)*

What follows in a normal aspect of honey extraction

Extracting honey is always a messy task – sweet, sticky, and messy. Bees, if at all possible, are always eager to help with the process. That assistance causes all kinds of confusion so honey extracting is done inside. I've extracted honey many times before. I know what to expect, but my expectations for processing old heavy honey were low. This is one of those beekeeping tasks that no one often discusses (akin to cleaning Winter "dead outs."). True. It is satisfying to maintain the equipment and get it back into operation, but it is assuredly sticky work.

Some discussion points on honey extracting at any time (In no order of priority) (Especially applies to thick honey in heavy combs)

1. **Wear smooth-soled** shoes. Running shoes or hiking shoes have classic traction treads. These treads become jammed with wet wax and propolis. Always an enjoyable task, these globs will need to be pried from shoe soles with knives or some other pointy object. Truthfully, I frequently take a short hike outside and scuff my shoe soles on the grass. Obviously, I am not extracting in my home.
2. **Put something down to protect the floor**. Since I was expecting a heavy-duty mess, I used a blue plastic drop cloth. Many times, beekeepers use newsprint. Use whatever you want. Nothing works perfectly. Drop wet wax or propolis on anything – even the floor – and a tracking mess results. Expect the protective floor covering to stick to your shoes. *"Anytime I drop something, I will pick it up."* No you won't. You will be careful and neat for a while, but you will wear out. The droppings will start slowly and grow to a full-blown mess. What to do about this process? *(That's why we are working on this list.)*
3. In the extracting area, hot and cold water are nearly a necessity – at the very least, have cold water. While dealing with these troublesome combs, I rinsed my hands constantly. Wiping hands dry on your jeans is acceptable. You can only wear them once before washing – so use them as a towel. Otherwise, you will use rolls of paper towels. Yes, wearing a long apron helps. By washing hands frequently and scuffing my smooth shoe soles, I limit the "stickiness spread" as much as possible. This is as good a time as any to say that I hope there is a pressure washer somewhere in your life. Though this machine will give you a full-body wetting, it does a good job of cleaning floors and extracting equipment.
4. Excess propolis is a challenge. In the case of combs that are a year+ old, propolis will likely have been extensively used to encase end bar lugs, edges – everything. Clearly, it will be difficult to remove frames; and when you do get these

A typical frame of older honey.

frames out, propolis chunks will drop everywhere. *(Remember #2 above.) "Well, I will just scrape the propolis from the hive box* ***before*** *I extract."* Go for it. The box is crazy heavy. As you scrape and cut, propolis chunks are going to scatter everywhere and this tiresome process is going to take even longer. I used a heat gun to soften the bee glue, and I broke off any parts that were breakable. After I extracted the frames, I scraped them clean. The box and the frames will be much lighter. I also often ran my shop vacuum. It helped, but it's just one more thing to do. *(Now your shop vac is sticky, too.)*

5. Dead bees on (and in) the combs are a feature of this situation. Yep. Dead bees make this task just a bit even less pleasant. Some of the honey I extracted was from dead colonies that did not use it. I mean full deep frames. *"Well, I would just give that back to bees and let them use it."* I have done that for several years. Over time, I have accumulated older honey that the bees have never used. I'm sick of moving it. Plus it makes *Varroa* treatments more difficult. Of course, all honey must be filtered. Dead bees in raw honey are not uncommon, but let's keep that to ourselves.

That's enough listing – it could go on and on

My theme in this piece is a discussion of extracting difficult frames – not the much easier extracting of nice white full combs. In many instances, there is overlap between extracting normal honey frames and extracting these older, more demanding frames. The list above presents some of that overlap between new honeycombs and much older honeycombs.

It was cold when I brought it in

The honey was cold (maybe 35°F) when I brought it in. This was all discussed last month. In preparation for extracting, I knew that simply warming it up to room temperature would be too good to be true. It was. At 70°F, the cappings were miserable to uncap. Even using a fire-hot uncapping knife, I had to hack and saw to get the cappings off. It appeared that this would take all Summer. It still may yet. I knew I needed heat – lots of heat.

Do not try this at home – indeed, you probably should not try it anywhere

I'm actually more than somewhat serious. I have snowmelt pads that are obviously used to keep Winter pathways open during snow season. Last Winter, I was surprised to learn that they were operating even when the temperature was well above freezing. I thought that they would thermostatically shut down when the temperature was above freezing. They were really warm. Hmmmm – what if . . . ?

If you try something like this, please, please do not start a fire or electrocute yourself. I don't know how you could do either, but please do not try to discover a way. If you try using these devices for comb warming, know this: the manufacturer would not call or email me back when I described what I was planning to do. Clearly, they do not endorse it. Secondly, I have only used these mats a single time and I sat with the apparatus the entire time that it was hot. Why – because, I did not want to start a fire or electrocute myself. I am not recommending using such heating mats as a general procedure.

In fact, why have extractor manufacturers not already addressed this shortage. Any beekeeper with only modest experience knows that liquid honey flows better if slightly warmed. The regulated heating component should be thermostatically controlled and integrally paired with the extractor. All of you engineeringly experienced beekeepers, here is your chance.

The heated pads worked (mostly)

The pads worked – slowly – but they worked. It took about 40 minutes for the holding tank pad (pictured on the left) to warm the frames and honey to about 90°F+. I had the uncapping knife hot, and did the uncapping work with cappings and warm honey dripping all around me. These drippy frames went straight to the heated extractor. The supplemental heat made the combs considerably easier to uncap.

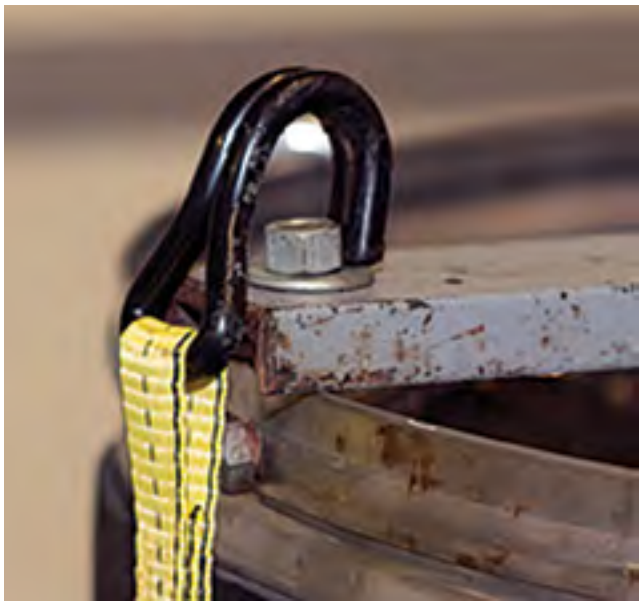
Not a fancy operation

I'm in a strange place in my beekeeping procedures and in my beekeeping life. While working for Ohio State, I had beautiful and complete extracting setups – from small to large. Now, I am a small producer with old or aging extracting equipment. Yes, I have downsized. In fact, the extractor that I have pictured on the right is a vintage A.I. Root 4-frame variable speed extractor. The hand-cranked extractor is one from Kelley that I am currently using for a heated tank. The extracting equipment worked okay – just okay. Lots of wobble upon starting the extractor, but this would happen with any extractor start up. Having a motorized extractor is nearly a necessity.

Several years ago, I used the small garden tractor referred to in the first article to pull the trailer into my shop. There I attached an extractor to the trailer bed. In the setup used here – there is no tractor. In the older setup, the tractor firmly held the lightweight trailer in place. But without the tractor ballast, the trailer/extractor was a bit bouncy. My idea was that the trailer springs would absorb some (ideally most) of the extractor vibrations. Without

A heated holding tank and a small heated extractor.

Ratchet straps being used to secure extractor to the trailer bed.



Ratchet hook binding with the nut on each side of the extractor. This upper attachment prevented the basket from striking the hook inside the extractor.

the tractor as an anchor, the trailer worked okay, but not well.

I cobbled up a quick system for attaching the extractor to the trailer. Two heavy ratchet straps around the trailer bed and two smaller ratchet straps attached to the top of the extractor and on the bottom end, attached to the lower, larger ratchet straps. You see all of this improvisation had to be quick, because I boldly told all of you that I would have this done this month. I was more than a bit optimistic.

Observations on the extracting process

Honey extracting is a typical beekeeping process – regardless of the comb age. The extracted frames always come from the extractor in wet condition. When extracting low moisture honey, the honey tends to sling out in heavy droplets that cling to the side of the extractor wall. The heat pad on the extractor greatly helped the thick honey move down the side of the extractor. But it took time. Extracting thick honey from old combs takes more time, and more honey is left in the extracted combs.

Another issue is that older honeycombs contain a significant amount of granulated honey. Initially, I hoped that the added heat, given ample time, would liquefy some of the sugared honey. It may have, but not very much. Beeswax melts at 149°F. That number could be as low as 143°F depending on other factors. The wax is soft at 100°F. Ironically 104°F is a common heat level for liquefying honey. It would be tricky to deal with sugared honey using my crude heat systems. It will be easier to address crystallization issues after the honey has been extracted.

Another oddity

At a recent meeting, the bee louse *(Braula caeca)* was a brief topic. There was mostly agreement that *Varroa* control chemicals had also killed the bee louse[1]. Well, in older honey in my apiary, the bee louse is alive and well. I wonder if the undisturbed honeycombs allowed more development time. I don't have a good answer. Actually, I don't have any answer at all.

[1]The bee louse is an apparently inconsequential colony resident. It is a wingless fly. The larval stages of this fly tunnels beneath honey cappings. Presently, it is thought that other than this cosmetic damage, no other harm is done.

Great odor – that helped a bit

One of the few enjoyable aspects of this task was the delectable smell that filled the air in the shop. Once all the heating was underway and all three devices were hot, the shop smelled as though I was the best cook in the state. At least this job does not small bad like the putridness of cleaning dead colonies.

Summary

If at all possible, extract nice white combs as soon as possible. Processing thicker honey in stronger

Thick honey drops clinging to the extractor side. Added heat helped make the honey more fluid.

combs having abundant propolis, will require supplemental heat to uncap and to extract. Contain the stickiness as much as possible and have a plan for the clean up. I wish you would not set the wet supers outside, *"for the bees to clean up."* That always turns into a wild situation.

Now my obligation to you is over. I want to finish this work and get this contraption out of my shop. Have any of you developed a practical method for securing your extractor – to something (pallet, trailer, bolted to cement floor, what?)?

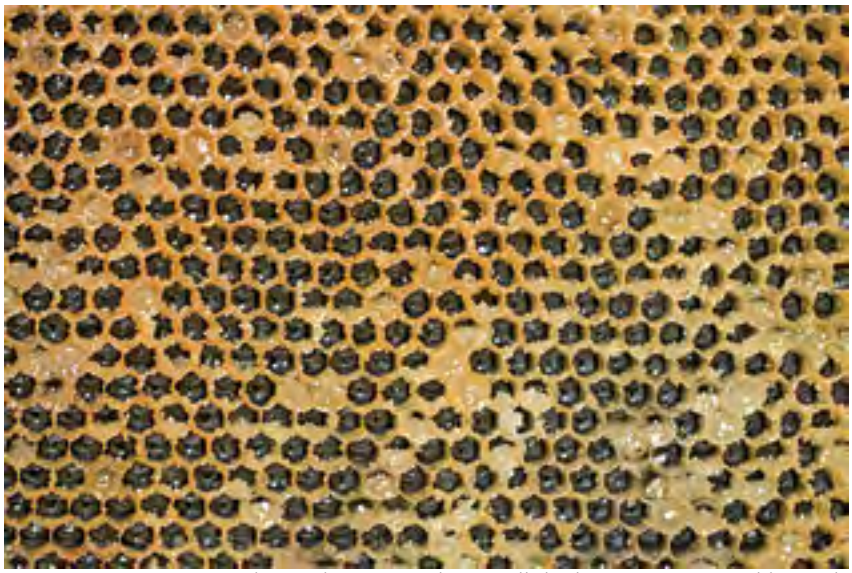
Odds and Ends

A good friend wrote me describing a procedure he used to liquefy his honey when it crystalizes. Now, mind you, this man is not a beekeeper, but is a consistent honey consumer. He lives in southern Alabama where the weather is nearly always warm/hot.

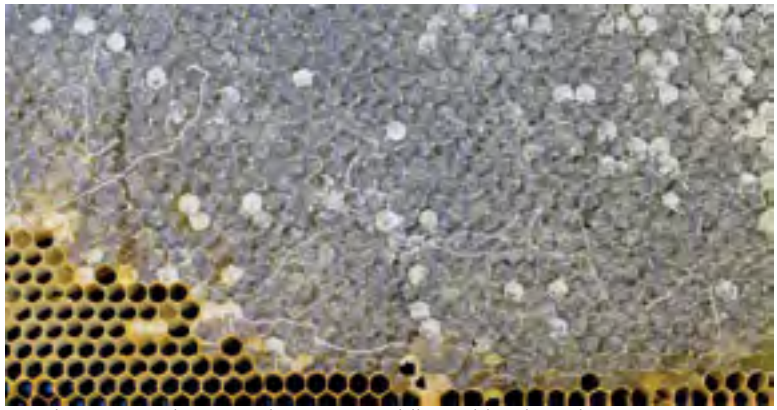
His method is to use two black socks to encase the honey jar. Loosen the cap a bit. Set the arrangement in the hot sun. Monitor and stir occasionally. Liquid honey can be derived from the sun and dark socks. For flavor's sake, don't overheat. This is a new process for me.

Other hot climate beekeepers told me that that when re-liquefying cases of honey, they loosen lids and simply put it in the trunk of their car. Close the lid and go about their business.

Using black socks and the hot Summer sun to liquefy honey.



I'm anxious to see how well the bees can restore this comb.



Bee louse tunnels appearing as a rambling white thread.

Okay. I can see how this would work. There would not be much control on the amount of heat, but the heat would be free.

Good times

Hey, Wyoming Bee School and Palm Beach County Beekeepers, thanks for a great time. My wife and I learned a lot, saw a lot, and came home pleasantly tired. Both were nicely organize meetings in interesting areas. Good memories.

Thanks for reading

Thanks for reading. When this extracting project is finished, I want to continue to revamp my apiary. I have invited some virtual visitors to my apiary in May and now I must clean up for the event. There's never a slack moment in the beekeeper's world. BC

Dr. James E. Tew, State Specialist, Beekeeping, The AL Cooperative Extension System, Auburn Univ; Emeritus Faculty, The OH State Univ. ***Tewbee2@gmail.com; http://www.onetew.com; One Tew Bee*** *RSS Feed (****www.onetew.com/feed/****);* ***http://www.facebook.com/tewbee2; @ onetewbee*** *Youtube:* ***www.youtube.com/user/onetewbee/videos***

BUILD A SALES DISPLAY

Ed **Simon**

It was time to put a little pizazz into our sales display that we use for flea markets and other events. Until now we have been using a six-foot folding table with a cloth draped over it. It worked fine and provided plenty of display space and a place underneath for extra supplies and a cash box.

However, we usually provide honey tasting for our liquid honey and our cinnamon creamed honey. Unfortunately, all it takes is a little three-year old boy shaking the tasting spoon to make everything sticky. We needed an easier way to move to the front of the display to provide the tasting and to talk to customers without a table between us. We still intend to provide a table in the back of the booth with all our items on display.

The result is a stylized bee hive with easy access and plenty of display area.

Note: We found that if we could get a family to stop to either look at the bees in our observation hive or to take a taste of honey, we could usually sell them some product about 60% of the time.

Requirements:

1) Easy movement from the back of the display to the front
2) Fit within the 10' front of our display area
3) Flexible sizing for larger or smaller display areas
4) Easy to transport and setup
5) Storage area
6) Stable but still be able to separate sections to tailor it for the current event

Parts

Deep hive bodies (3)
Medium hive bodies (1)
Queen excluders – wood bound (2)
Telescoping cover (1)
Inner cover (1)
Interlocking braces – top (12)
Interlocking braces – bottom (8)
Telescoping cover spacers (4)
Led lights – battery operated
#6 x 2" bolts
Locking hex nuts to match the bolts
Washers
Telescoping cover spacers ¾" thick (4)

The materials listed provide for one 39¼" high display with three deep hive bodies to hold the merchandise.

Construction

The building of this display was relatively easy. The hive bodies used were constructed the way we have built hundreds of other hive bodies and there was minimal attempt to beautify them. Standard commercial grade hive bodies were used to impart a more "local down-to-earth beekeepers" impression. I did varnish them as opposed to using our standard paint from the recycling center. Only the connections used to keep the boxes together required any woodworking skills.

Step 1: Construct the hive bodies required for the display (parts #1 and #2)

Step 2: Cut the hive body front openings.

Using your saw cut the middle out of the front of the three deep hive bodies (parts #1). Leave about a 2" section on each side of the front. This provides for stability and at the same time will partially

hide the LED lights should you choose to illuminate the display case from the side.

***Note**: Do not cut the front out of the medium hive body (part #2). This hive body is used for the base and provides stability for the entire display.*

***Note**: Depending on the length of the screws, nails or staples you use to assemble the hive body, you may have to change the 2" measurement so you don't cut into the fasteners.*

Step 3: Cut the interlocking braces (parts #6 and #7)

Constructing these braces is probably the most tedious step in constructing the display. Since there is a need for 20 pieces for the braces, twelve (parts #6) and eight (parts #7), you can cut them all at the same time. The cut required is a lip ⅜" x ⅝" made on the edge of a board. This is the same lip required for a frame rest in a standard Langstroth hive. Make the cut along an entire edge of an eight-foot board. Next rip a 1 ½" piece off the board that includes the lip (frame rest) you just completed.

Step 4: Separate the interlocking brace pieces

Using the long strip of the board you cut in the previous step, cut it into twenty 3 ½" pieces.

Step 5: Modify the top pieces of the interlocking brace.

Take twelve of the brace pieces you cut in the previous step and remove ⅜" from the lip. This is so the bottom of the brace fits into the hive body frame rest and can be wider; the top of the interlocking brace must fit within the bottom of a hive body which does not have a frame rest. See the accompanying drawings for further clarification

Step 6: Finish cutting the corner lips.

Match a top and a bottom piece of the interlocking brace and cut the corner ¼" lip that matches with the lips already in the braces. Use a queen excluder to position the braces to see where and how these cuts need to be made.

Caution: Be careful, the corner lips are specific to a corner. One half will be on the right of the brace and one half will be on the left of the brace

Step 7: Construct the base

This is where you find out if you cut the top of the braces correctly.

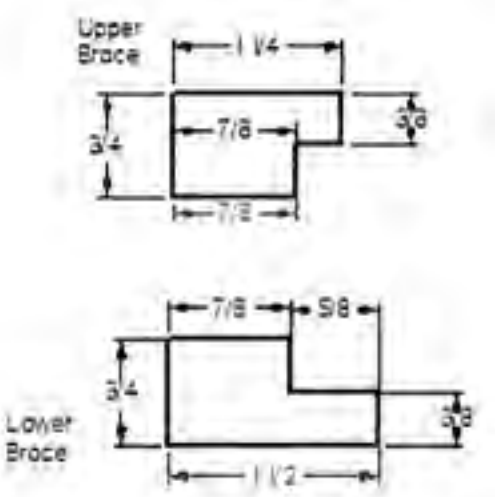
Layout the four extra top brace parts (parts #6) on the corners of an inner cover. Make sure that another hive body will fit snugly on the inner cover with the braces in the corners. Glue them in place and allow the glue to dry. To give the braces extra strength, turn the inner cover over and staple or nail the inner cover to the top braces. Now glue and nail or staple the inner cover to the top of the medium hive body.

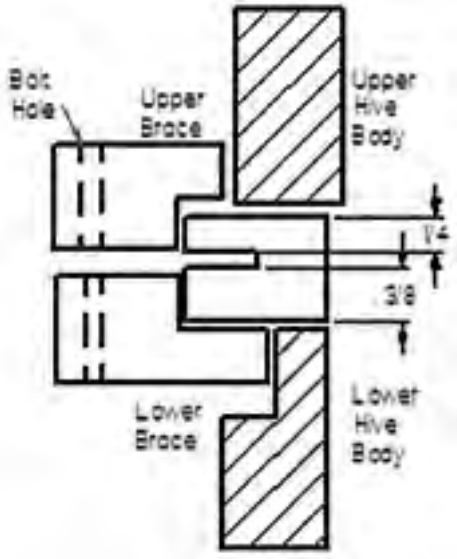
The base is now complete and a hive body (part # 1) should fit on the top of it. The top braces will hold the hive body in place.

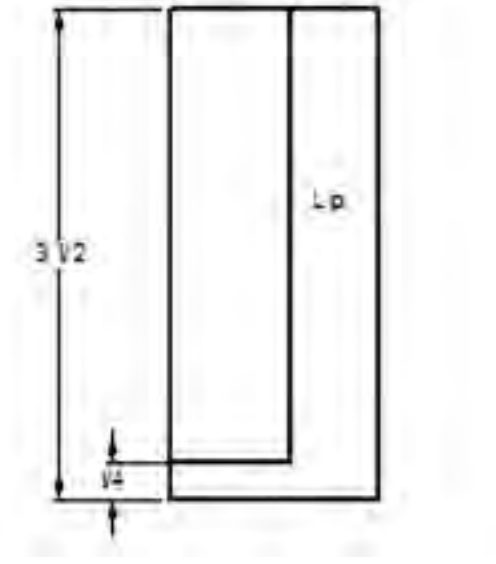
Step 8: Drill mounting holes in the remaining interlocking braces

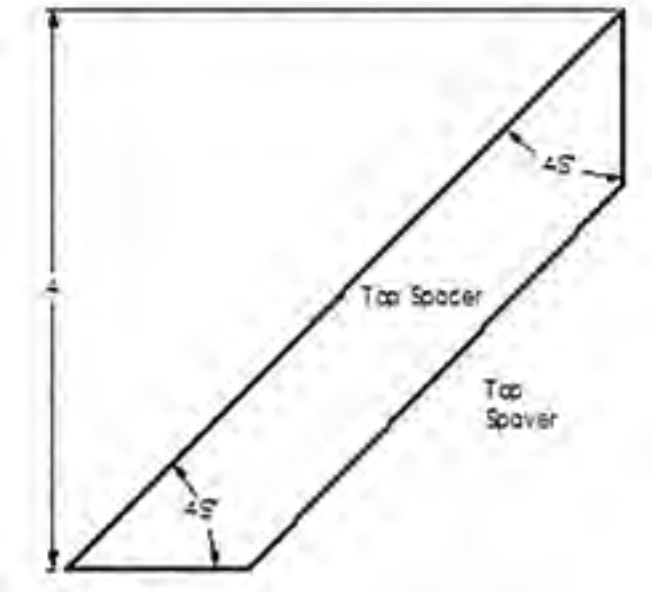
Using a queen excluder, position one lower brace piece with one upper brace piece while matching the corner lips of the interlocking braces for the bolt holes. Try to place the marks for the holes between the metal bars on the excluder. Drill larger than needed for the bolts. This will give you a little wiggle room when positioning the braces. Drill the holes when you are satisfied with their position.

Hint: Try one brace first to make sure everything is correct before committing yourself to the rest of the braces.


Upper Brace
1 1/4
3/4
7/8
3/8
7/8
7/8
5/8
3/4
3/8
Lower Brace
1 1/2


Bot Hole
Upper Brace
Upper Hive Body
1/4
3/8
Lower Brace
Lower Hive Body


Lp
3 1/2
1/4


45°
Top Spacer
Top Spacer
45°

Step 9: Mount the interlocking braces on the queen excluders

Using the bolts, nuts and washers mount the braces on the inner covers. The bolt heads should all be on the same side of the queen excluder. This will be the top of the shelf for the display.

Step 10: Cut and mount the telescoping cover spacers.

The drop down sides on the telescoping top restrict the view of the top shelf. To elevate this, glue the four spacers (parts #13) under the top corners to raise it ¾ inches. This allows for a clearer view of the merchandise on the top shelves.

Step 11: Varnish or paint the display.

Step 12: Mount the LED lights

If you want to add lighting to the display mount the lights now. I used some self-contained battery powered LED lights that were available from the hardware store. They had sticky backs and were mounted under the telescoping top.

If you wanted more light some could be mounted on the inside of the deep boxes near the front.

Conclusion

This design allows for the flexible stacking of the hive bodies. All you need to do is add or remove a queen excluder and deep hive body pair to change the height and umber of shelfs available for merchandise. BC

Get a copy of Ed Simon's book Bee Equipment Essentials with detailed drawings, construction hints and how-to-use instructions for dozens of beekeeping tools and equipment from ***www.wicwas.com***. *Ed can be contacted through* ***SimonEdwin41@gmail.com***.

Pesticide Kill Redux

It has to do with the soil, rain and location.

Bob **Brachmann**

When the first break in the weather at the end of the 2007 – 2008 Winter gave me an opportunity to check my bees here in Southwestern New York, I was troubled. Winter losses were higher than normal. As I reflected, I realized that it seemed that these losses looked to be a trend. In the preceding few years, I had made better than average Spring/Summer honey crops, but my Fall crops had been dropping and my percentage of Winter loss had been rising. While every year is different from every other year, my management had been consistent.

As I reflected, a disturbing possible explanation came to mind. 2005 was the first year that the local farms (all dairies) had planted corn whose seeds were 'treated' with systemic pesticides. Concerned with the possibility that these pesticides could be harming our honey bees, I approached both of the local farmers whose corn crops were in close proximity to our beeyards and asked if I could look at the seed bags before they planted their Spring crops. They cooperatively agreed and they both let me know when they had their seed. Both imidacloprid and clothianidin were listed as part of the seed treatments, as well as multiple fungicides. I then got online and read the 'labels' for these neonicotinoid insecticides. I'll quote from the 'label' of one of those products, Poncho 600. Let it speak for itself.

Page 2; under "Science Findings"

...Clothianidin has the potential for toxic chronic exposure to honey bees, as well as other non-target pollinators, through the translocation of clothianidin residues in nectar and pollen."

Page 15; under "Ecological Characteristics"

"Clothianidin is highly toxic to honey bees on an acute contact basis (LD 50 > 0.0439 mg/bee). It has the potential for toxic chronic exposure to honey bees, as well as other non-target pollinators, through the translocation of clothianidin residues in nectar and pollen. In honey bees, the effects of this toxic chronic exposure may include lethal and/or sub-lethal effects in the larvae and reproductive effects in the queen."

Page 17; under "Mechanism of Pesticide Action"

"... The advantage of clothianidin and other neonicotinoids over nicotine is that they are less likely to break down in the environment."

Page 18; under "Required Labeling for Treated Seed Bags"

"Treated seeds exposed on soil surface may be hazardous to wildlife. Cover or collect treated seeds spilled during loading."

Forewarned with this information, telling me that these systemic pesticides MIGHT indeed be a problem for bees and our business, I decided to watch three select bee yards very closely. The first was our home yard (Y1). That year it was to be surrounded on all four sides by the corn grown from the seed I had investigated. Second and third yards (Y2 and Y3) were in close proximity to fields of corn grown from the same seed.

(The corn pollen that I've observed has been a whitish-yellow color. The pollen 'wheels' brought into the colonies by the foragers are 'looser' than other pollen wheels I've seen, barely holding together; they disintegrate with the slightest handling. When one of these 'wheels' is pressed between one's forefinger and thumb and 'ground' with a pressing, rotating motion, it feels a little granular but at the same time is VERY slick, similar to graphite. In my locale there's an 'early' variety of goldenrod that provides a yellow pollen at roughly the same time as corn pollen is available. It is a deeper yellow color. If you are uncertain as to which pollen your bees are foraging, there are magnified images of individual pollen grains available and, with the aid of a good microscope, one can take samples from the field and verify the source of bee pollen.)

As corn began to tassel, I observed the pollen wheels coming into the colonies in those three yards regularly (not daily but nearly so). As 'tasseling' commenced, I noted an increase in the amount of corn pollen coming into the hives. There was a short-lived 'surge' in Yard 1 but this was quickly, and almost completely, displaced by knapweed pollen (a pale tan, creamy color). These bees traveled a mile away to a large field (60 acres?), which was full of it. Yard 2 brought in an initial surge of

primarily corn pollen but then backed off on it and, for two to three weeks gathered a roughly equal mix of corn and knapweed pollen. Yard 3 brought in a surge of corn pollen, backed off it some, but continued to bring in predominately corn pollen for the longest time, a good three weeks. I observed no unusual number of dead adult bees around any of these hives throughout this tasseling period and when the period of corn pollen availability ended (no more coming in) the near daily observations ended as well.

In the Southern Tier of New York State, beekeepers can often harvest a good crop of fall honey. All of my hives are well supered by mid-August in preparation for this flow. During the first week in September I make the rounds to add additional suppers as needed. The home yard, Y1, needed some additional supers. So did some hives in every other yard, except yards 2 and 3. Populations in yards 2 and 3 were down. The bees looked greasy; indicative of old or sick bees. By mid-October the colonies in Yard 2 were a sad bunch, some dead and none in any shape to make it through our zone 4 Winters. The Yard 3 colony condition was worse. All of Yard 3 was hauled into storage by November 1st, already a wipeout. I did prep a few colonies from Yard 2 for Winter but none survived that Winter. Though I don't record these wintering numbers, Yard 1 wintered 'normally'.

Now I had further concern; are the combs from the dead hives safe for use or are they contaminated and unusable. Inspection of these 'dead outs' showed that almost all of the corn pollen was gone, probably used up killing or damaging developing larvae. There was at that time an arrangement through Penn State University wherein a beekeeper could send samples of bees, pollen, honey or wax to a National Science Laboratory to have it screened for pesticide contamination under a cost shared arrangement. In December of 2008, I sent composite comb samples from likely pollen storage frames to be screened for 169 agricultural chemicals. Clothianidin and imidacloprid were not detected, or were below the LOD (limit of detection). (Four chemicals were detected at low levels, except perhaps for enaminone, a fungicide, at 138 parts per billion. But what constitutes a 'low level' '?' I know that research has demonstrated that imidacloprid, listed alongside clothianidin as one of the active ingredients in the corn seed planted by my neighbors, affects larval development at 4 parts per billion.)

My response to these events was to find several new beeyards. I sought especially locations without corn but also places with knapweed nearby. It did not take long, however, for fields of corn to turn up near these new beeyards. In many cases these corn crops were planted in places that had not had field crops planted for decades. As my home yard was protected in 2008 by the presence of knapweed and the bees' preference for that pollen over corn pollen, the new yards also exhibited no obvious severe symptoms – until 2016. Each year, if there was corn planted nearby, our honey bees would bring in a brief surge of corn pollen when the corn first 'tasseled' but would soon transfer most of their pollen gathering attention to knapweed.

In 2016 I planned so that the last queens we raised would all be mated by July 18th at the latest. As we try to make them up rather weak, and we end the last round of three-ways and four-ways by leaving one queen in each and combining the three or four mating nucs, providing for a strong 'nuc mother' heading into Winter, we often let this last round run as long as 35 days before we catch the last 'extra' queens and combine the three-ways and four-ways into a single colony.

On August 1st of last year we made the rounds of several bee yards to take an 'overview,' just observe what was happening in our colonies. The largest of our two mating yards was our first stop. I fired up a smoker and Carra and I pulled some frames from a three-way. My first thoughts to what I was seeing were "They're still bringing in corn pollen. That means they've been bringing it in for weeks." We drove to where, close by, there is plenty of knapweed. Very little bloom was showing.

What was different about 2016? It was a dry, hot summer here. I had noted in July that the corn had bolted in the dry hot Summer. Much of it was not as tall as it usually was when it tasseled but tassel it did, and earlier in the season than usual. The knapweed, on the other hand, had a greatly reduced bloom under these drought conditions. Honey bees know what they need in terms of nutrition and corn pollen is NOT a favorite, as it is missing most of the important amino acids that they need. Thus, they have a preference for knapweed. However, their foraging decisions are also influenced by the quantity available. The sparse knapweed bloom last year was just not enough to ellicit appreciable interest.

Another thing that was unusual about 2016 was a late July and early August honey flow. Other than making some honey on basswood about once every ten years, from mid-July to mid-August is usually a time of extreme dearth for the bees in my area. Our bees usually curtail or completely stop brood rearing in the second half of July and in early August. Correspondingly, they also greatly curtail pollen gathering. But in late July of 2016 I noted the bees were bringing in a surplus, filling supers with a honey whose taste I was not familiar with. With frame of honey in hand, and a question in my thoughts, I turned to see an Aronia bush (Choke Berry) whose blossoms were thick with honey bees intently working the blossoms, and so it was in all of my yards. Aronia is common but is not listed as a honey bee nectar source in either Frank Pellet's or Harvey Lovell's extensive compendiums of same. For the last 24 years my beekeeping has been focused here in Western New York and I've never before seen honey bees fuss over Aronia. It was nice to get this honey but the bees probably would have been better off hungry. Instead of curtailing brood rearing our hard working bees shortened their lives nursing bees which, raised on royal jelly 'produced' from poison pollen, if they emerged at all, were useless to their colony.

Symptoms in The Hive

Personally, I've not seen symptoms in adult honey bees from the dust incidents associated with the planting of seed treated crops that have been reported by others. What I have seen is colony devastating symptoms in the brood. These symptoms don't begin until almost three weeks after corn pollen is utilized to produce royal jelly (brood food). If you observe carefully you begin to see dead pupae being uncapped and removed from their hive. The colony still has an age balanced population; i.e., it has regulated itself to have what it deems an appropriate balance between young and old bees. There are plenty of young house cleaning bees.

Bees that develop on royal jelly derived from corn pollen sometimes fail to emerge. When there are plenty of young house cleaners present, these dead pupae (seem to be all purple eye stage pupae or older) are quickly uncapped and removed. Those that do emerge often appear indolent, or aimless. As time passes, colony population slowly diminishes. There is an absence of young bees. Dead pupae are often uncapped but not removed. Colonies seem to react by trying desperately to rebuild populations but are eventually unable to maintain the brood nest. At this point brood is dying because it's not covered or fed. At the end there can be a tiny handful of bees, often tending to a queen. Last year some of my production colonies died this way by late August. Some of these dead colonies still had corn pollen stored in the bottom brood box. Other colonies used up the corn pollen and still had sufficient strength to continue to raise brood on other pollens. By September 12th I was seeing the first positive signs of recovery. And populations did eventually bounce back in many colonies, if not to normal, full size for Winter, they looked 'passable.'

The challenge that they faced with Winter though was enormous. The bees in those Fall clusters were raised by old bees rather than young bees most suited to the task. Additionally, during this Fall recovery period is was 'all hands on deck' with brood rearing as they tried to rebuild their population. Bees that raise brood are not 'Winter bees'. For purposes of longevity, they are old bees. They did not have sufficient 'Winter bees'.

Noted Differences in Regions/ Soils

Problems from the translocation of neonicotinoids to brood from pollen seems to be high in the acid soil areas of the northeast while, at least to date, seems to be less of a problem in those areas with sweeter soil (higher pH). I suspect this is due to the presence of lots of legumes where the soil has a high pH. High pH soils favor the growth and natural reseeding of clovers and other legumes and these provide some of the most nutritionally rich pollens for honey bees.

Unfortunately, for those New York State beekeepers in the areas with sweeter soil, some of that ground is where the 2016 Summer drought was most severe. Aside from the drought's negative impact on honey flows in those areas, it also affected the availability of pollen: those rich clover pollens, especially in the central state, may have been drastically reduced, possibly driving those bees also into collecting corn pollen. As I write this it is mid-March and losses reported in NYS are already extremely high. For me, it's time once again to try to find new locations far from corn crops, a tall order in these parts but it appears as though I've little choice if I want to protect our honey bees, and our livelihood. BC

Bob Brachmann raises Russian Honey Bees in Little Valley, NY.

Experiences With A Top Bar Hive

If you're going to manage your top bar hive for honey production – you're going to have problems

David **Dawson**

Introduction. Keeping bees has been my passion for close to 60 years partly as a hobbyist and partly as a small-scale commercial beekeeper. Although reluctantly at first, in 2014 a fellow beekeeper and I decided to experiment with keeping bees in a Top Bar Hive (TBH). We read a book on the subject from which I latched onto two *possible* positive features. These were, firstly, since the bees make all their own natural comb one does not use manufactured foundation that could include accumulated agricultural chemicals. And secondly, the natural cell size is 4.9mm as opposed to the 5.3mm commonly used by commercial foundation manufacturers. The 4.9mm cell size is said to shorten the time from egg to emergence by a few hours and also to hinder the development of *Varroa* mites. (This proved to be totally untrue, as you will read below). We decided to make a TBH so that we could test it out together.

Design. In this prairie region of Canada honey crops of 200 pounds per hive is considered normal and 250 – 300 quite common. My own record was 516 pounds average so we deemed it necessary to allow for supers to be added. Many years ago I had a hive on a scale and weighed it every day after the bees had stopped flying in the evening. On one occasion the daily gain was 29 pounds with 106 pounds for the week.

Unlike Langstroth hives there is no standard TBH size or design. You can find many different shapes and sizes on the internet/YouTube but none of those seemed to fit my ideas. Considering brood area, possible honey crops and many other factors I came up with what could be called a hybrid design. Essentially I made the length of the TBH to be the same as two Langstroth honey supers side-by side and the width to be the same as the length of a Langstroth super. Thus if we had a big honey flow (highly likely) two queen excluders and two supers would fit perfectly on top of the TBH. This necessitated making the top bars themselves narrower in the middle so the bees could get up into the supers. The narrow top bars then needed an inner cover under the roof, and a piece of canvas worked admirably.

The sidewalls of the hive body itself were at 15 degrees (said to be more than adequate) and the depth of the hive calculated such that each TBH comb when drawn down was equivalent to one Langstroth brood comb. There was space for 21 bars as well as a half-bar at each end. The idea for the half-bar was that it could be easily removed to facilitate getting the first comb out. I made three entrances – one at each end and one in the middle. I also made two division boards so in theory it would be possible to have three separate colonies, each flying out of a separate entrance. And I made a vertical queen excluder.

I decided to have short legs on the hive so that it could be lowered to the ground for easier protection during our cold Canadian winters, though in the end I modified a regular Langstroth hive body to fit the Top Bar combs and wintered them as a normal Langstroth hive. Temperatures in December and January can go down to minus 40 degrees so some kind of insulation is essential.

Installing the bees into the TBH was another problem. One option was an imported package but we had enough colonies already. Another option was to wait for a natural swarm, but again we were too impatient for that. So we opted for a 'shook' swarm. First I modified a couple of the top bars with some 15-degree pieces of wood that would fit into a regular Langstroth brood box. I attached strips of foundation made from my own old cappings wax and put them in the brood box of a regular hive. When these were drawn out and filled with brood, we removed the pieces of 15-degree wood and transferred the combs to the TBH. Then we shook in the rest of the bees in and closed up. Over the next few days, as they had lost all their stores, I gave them a gallon of syrup to encourage them to draw down new combs, which they did very well with lots of worker cells but also lots of drone cells.

Manipulating. Inspecting the TBH is very difficult. One has to work from the side leaning over to pick up the other side of the top bar, and then it is only possible to look at one side. To look at the other side it was necessary to put the comb back in the hive and switch hands. You

cannot turn the comb over – at least not with newly made wax and heavy with honey and brood.

Checking for queen cells to stop them swarming was almost impossible because one cannot shake the bees off the combs to get a decent look. Even with two people checking, one on each side, we must have missed some queen cells because the colony swarmed. Common manipulations such as an artificial swarm or hiving the swarm on the parent stand seemed impossible. Nevertheless we made a small nucleus colony flying from the back end of the TBH using a comb of brood with a queen cell, and both units soon had a laying queen.

Performance. In spite of what the books say about the combs not being stuck to the sidewalls, they do, and had to be cut free at every inspection. Compared with other colonies in the same apiary the colony seemed to be progressing well, especially bearing in mind they had a major setback when they lost the majority of their brood. Then they lost the swarm.

The vertical queen excluder was a complete waste of time and unnecessary – at least in the TBH itself. The bees tended to have all their brood at the front and the honey at the back without the need for a queen excluder. The colony did not build up sufficiently to put queen excluders and Langstroth supers on top and this lack of build up may have been due to developing horizontally instead of vertically.

The bees drew out the brood combs perfectly but the honey combs were a mess. Some were two inches thick whilst others only one inch and all stuck together with brace comb. This may have been because we put new top bars between partly drawn older ones instead of at the end of the occupied combs. The thinking was that if they had to build new combs between two existing ones they would at least be straight, but it didn't work that way.

As for the apparent advantage of the natural cell size being 4.9mm this was not true. Measurements of a number of cells showed them to be the standard 5.3mm. Any advantage there might have been for fewer mites in 4.9mm cell size was negated by there being lots more drone comb than one normally sees when full sheets of commercial foundation are used. Note: new research has shown that with Africanized bees and 4.9 cells there are fewer *Varroa* mites but with our European bees and 4.9 cell size there are MORE mites.

Year 2

These are my experiences in year two including my successes and failures – the good, the bad and the ugly.

Although I strongly believed that a TBH is inferior to a regular hive such as a Langstroth, and I would not recommend it at all, I decided to have another year with it because I wanted to see if it was possible for a one-hive TBH hobbyist to raise queens without making the colony queenless - and I wanted to give it a fair trial as far as honey production was concerned.

As I have already said, manipulating and inspecting the frameless combs is very difficult because, contrary to popular myth, the bees always stick them to the sides, and secondly the combs break off the top bar at the slightest

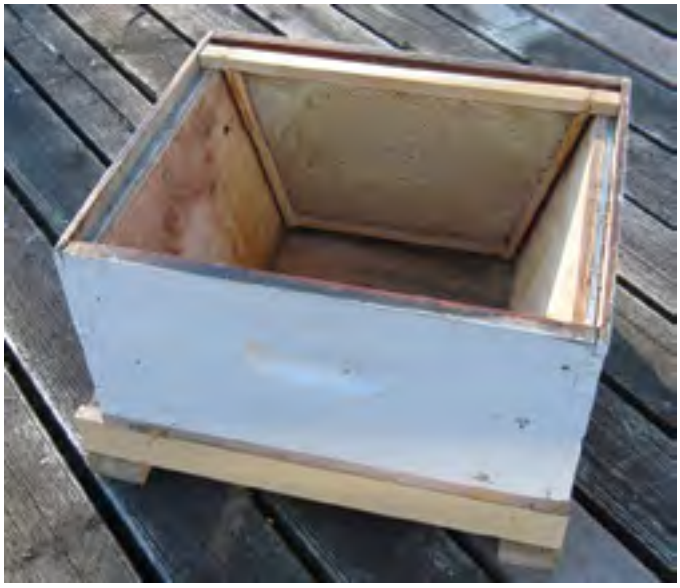
Checking For Swarm Cells Is Almost Impossible

provocation. To overcome these two difficulties I decided to make a set of special rhomboid shaped frames that I wired with two horizontal wires and fitted with some old Dadant size foundation that was pre-*Varroa*, and thus pre all the *Varroa* chemicals. At first I only made about 14 frames but they were so successful that I set to and made another batch to give me a few spares.

In Spring I had two colonies from the previous year in modified Langstroth brood boxes, one of which I sold and the other I did a transfer onto new combs, in this case transferring onto my new TBH frames in another modified Langstroth brood box.

As soon as the queen was laying in the TBH frames I put a queen excluder between the two boxes. After three weeks all the brood had emerged in the combs below the excluder so I transferred all the TBH frames + bees to the TB hive itself. As Spring progressed towards Summer and the bees expanded, I kept adding new frames with foundation. They tended to put the honey at the back furthest from the entrance so I slipped the new combs between the honey and the brood as I didn't think that the queen would cross three or four combs solid with honey. With about 15 combs occupied the bees didn't seem to want to go horizontally any more and started plugging the brood area with honey. So I added a Langstroth queen excluder and super at the end above the brood. At the other end I covered the tops of the frames with a canvas cloth and an empty super to make both ends equal height for the roof to fit on.

Queen rearing. All was going well; the super was filling up so I decided to try raising some queens using my special method that does not require making the colony queenless. First I prepared a top bar with queen cups and then went through the brood until I found a frame with eggs and very young brood. After shaking/brushing off all the bees I closed up the brood area and replaced the excluder and super on top. Then I grafted the smallest larvae into my queen cups and returned the comb of brood together with the grafted queen cups behind three solid honey combs with one partial full honey frame at the end before the dummy board.



From what I said in the previous paragraph you will understand that the queen rearing was going on at the back, under the canvas cover cloth, so it was easy to check them without removing the super or disturbing the queen and brood at the front end under the super. After 48 hours I had a quick look. Eight of my eleven queen cells were being nicely drawn down so I envisioned plenty of new queens and proof that one could raise queens in a horizontal hive. However it was not to be . . . A couple of days before the new queens were due to emerge I was all ready to make up my nucs and insert the ripe queen cells, but when I went to check, there was the old queen destroying all the cells. Thus it goes to show that the queen will cross three solid combs of honey and a queen excluder is necessary.

Back in the workshop I made another vertical queen excluder from an old zinc one, re-enforced and riveted all around, that fitted tight against the sidewalls, bottom and top.

With the new queen excluder in front of four solid combs of honey, I grafted another batch of larvae into another set of queen cups and this time I got 100% acceptance: 11 out of 11. As previously, a couple of days before the virgins were due to emerge I made up three nucs with a frame of hatching brood, a shake of extra bees and a ripe queen cell. At the same time I put the old queen from the main colony with the comb she was on plus a frame of honey in a nuc box and gave the main colony a queen cell in a queen cell protector cage.

After three days I checked the nucs (not the main colony) to make sure the virgins had emerged, and yes they had. Then I waited for a week and checked for eggs.

No eggs. Give them a few more days and check again. Yes, eggs in all three nucs. Here is where patience is required and my stupidity started! I didn't have enough patience. I've been raising queens for years and years and should have known better. Now that I had three new queens (and likely a fourth in the main colony) I didn't need the old queen as a reserve so I killed it and put the comb of brood that it was on into one of the nucs that was short of bees. I then turned another of the nucs about 30 degrees to pick up the flyers. Bad move, as both of my nice new queens were killed. After that bad experience I united through newspaper one of the now queenless nucs to the nuc with the last remaining newly mated queen. At least that one survived.

Since I hadn't meddled with the main colony I thought they must be OK, but at 5 o'clock one hot evening they swarmed (!!), settling at the top of a very tall spindly tree and totally impossible to catch. But . . . there was quite a bit of activity around my bait hive and the next day a swarm went in. Whether this was the swarm up in the

top of the tree or a second swarm, I'm not sure as I would have expected the main swarm to be a lot bigger than the one that went into the bait hive. The reason I had not checked the main hive was because it had two heavy deep Langstroth supers, both full, and with my bad back they were too heavy to lift. Fortunately a beekeeper friend came to visit and he kindly helped me with the supers and went through the brood with me. We found that my original queen cell in the protector cage appeared to have emerged as expected, but there were lots of emergency queen cells as well. I'll never know exactly what happened but I would guess that the prime swarm was from the first emergency virgin to emerge. We opened one of the emergency queen cells to see how advanced they were and the virgin ran out, so because my friend was in a hurry we closed up and left them to sort themselves out. Another mistake – I should have removed all the other queen cells so they couldn't send out a second swarm and I didn't think of it until later, so I hoped for the best, in vain it seems. At least the swarm in the bait hive got its virgin mated and laying after a few days, but on Langstroth frames instead of my special TBH frames.

Conclusions So at the end of all this what conclusions can be made:

1. Most importantly to me, I have demonstrated that it is possible to raise queens at the back of a TBH without making the colony queenless.
2. Although not a complete test, because I lost the prime swarm, it is possible to get a reasonable honey crop from a TBhive, but in this area supers are necessary.
3. Patience, patience and more patience is required when manipulating colonies with newly mated virgins.

And finally,

4. In my view the Top Bar Hive for the investment in time and money is totally unsuitable for keeping bees in the modern way because they are too difficult to manipulate. Swarm control is impractical and the loss of a swarm will usually mean the loss of the honey crop. They may be more suitable in Africa where they were originally developed as an alternative to the traditional log hives that local people could make without sophisticated tools or nicely planed boards of wood.

My advice to anyone thinking about getting a Top Bar Hive is, don't. Similarly the Warre hive: don't. If you want to have chemical free combs, spend your money on a foundation press and make your own foundation using your own cappings wax.

And you have probably been thinking that if I am going to have 21 odd shaped frames in an odd shaped hive it would be a lot easier to have 21 regular Langstroth frames in an elongated regular brood box, and you are right. That was my project for 2016. BC

A Rude Awakening

Ross **Conrad**

I have longed believed that when a colony perishes, it is given as a gift to the beekeeper in the form of a lesson learned.

My typical Winter losses over the last decade have tended to hover between 10-18%. Not ideal, but far better than what most other beekeepers have been reporting. It seems that by combining the five management techniques as I have outlined in previous articles (good genetics, screened bottom boards, breaks in the brood cycle, rotating old comb out of the hive, and culling capped drone brood) I am usually able to keep *Varroa* related stresses low enough that the bees are generally able to cope with the other stresses in their lives and survive – for the most part.

This was a tough winter for my bees here in Vermont. At 43 percent, I had to go all the way back through my records over 15 years to 2000 before finding Winter losses in my apiary that high or higher (78% loss in 1998, 72% loss in 2000, 36% loss in 2002).

I don't mean to be complaining here. According to the Bee Informed Partnership yearly surveys, losses of 30-40 percent are common these days for many beekeepers – it's just that they have not been common for me. While it appears that there is a working formula for those who don't want to treat their colonies with chemicals or drugs in these days of Colony Collapse and Neonicotinoid pesticides, apparently I became rather lax in my hive management diligence for this Winter I received a rude awakening.

I'm going to be more rigorous about removing drone comb.

Turning Lemons into Lemon-Aid

When a hive dies it is the perfect time to remove all the frames and scrape clean all the burr comb and propolis that has built up on the hive surfaces that make it difficult to manipulate the frames within the supers. Although cleaning up dead hives has got to be the least enjoyable part of beekeeping, I have dutifully applied myself to the task. In the process I have found that a lot of the combs in my hives were not as new as I had thought. Due to chronic equipment shortages I have been pushing the standard three to five year rotation rule for old comb and have apparently arrived at the point where much of my comb is in the five to eight year old range (at least in the majority of my hives that died out this Winter).

I have also been lax about the culling of drone comb to remove mites reproducing in the capped brood. I had settled on a hit or miss approach, pulling frames of drone comb as I happened to come across them rather than working in a systematic manner culling drone brood on a regular and consistent cycle. My previous overwintering success had given me a false sense of security so I never felt like it was important to take the extra time to be more intentional about my culling.

The Exception

There is a dearth of research into the kind of physical and cultural management techniques that I use to control *Varroa* mite related stress on honey bee colonies and so last year I decided to address this lack of data thanks to partial funding I received from the USDA Sustainable Agriculture Research and Education (SARE) Program. As part of this grant funded study, I set up a bee yard in which the Mite Away Quick Strip (MAQS) formic acid treatment is the only mite control used on about half the colonies. The other half of the colonies in the same bee yard are being intensively managed using the five management techniques mentioned above. It is interesting that this is the only beeyard that did well this winter with 21 out of 22 colonies surviving Winter. Conversely, my control yard located about ¾ of a mile away from the treatment yard saw only six out of 14 hives survive the Winter.

That's not to say that the hives that died this Winter all perished as a result of the mites. A number of colonies clearly went queenless and become drone layers during the Winter. However, late Summer mite counts had indicated that the level of mites in the MAQS treated colonies was very similar to the mite levels found in the colonies that received all five of the intensive management techniques. Clearly,

Old comb be gone!

adequate mite control (or should I say inadequate mite control) was an important factor in this year's winter losses here in the Champlain Valley of Vermont.

However as noted above, I have gotten a bit lackadaisical in my efforts to control mites using only management techniques. Even though I have used these management techniques for many years, it had always seemed to work previously. The big question in my mind is 'what was different about this year?'

Climate Destabilization

The only logical answer that I am able to come up with is the weather. This Winter was one of the most inconsistent Winters, in terms of weather, that I can recall in a very long time. Here in Vermont, the season started late and instead of the usual two-three day January thaw, we had a two-week thaw in January – then the really cold weather hit. Then it got warm, then cold, then warm, then cold, then warm, then the big snows finally came right at the end of winter and early spring.

Ideally for the bees, the weather would get gradually cold, and remain cold for a while, before getting gradually warm. This gives the bees time to get their cluster organized. Dramatic and rapid shifts in temperature can catch the bees off-guard and prevent them from organizing into a single cluster that maximizes their chances for survival. The best a bunch of bees can do when they get caught out of the cluster as the temperature drops is to form a second, or third cluster. The warmer-than-normal temperatures also can create a false sense of spring, leading the bees to use up a lot of resources building up their population at the wrong time of year. None of this is ideal.

Time To Up My Game

I have long believed that when your colonies die, they are giving you a gift – the opportunity to become a better beekeeper. By figuring out why the bees died and then taking appropriate steps to change one's honey bee husbandry so the same situation does not happen again, one eventually, over time, becomes a good beekeeper.

I can assure you that this year I am going to be much more diligent about getting the combs that are over five years old out of my operation. Sure there will be a reduction in my honey crop as the bees use up their honey to build new comb, but if I stay focused on the improved Winter survival I should see next year, and all the extra beeswax I will have to sell, I should be able to stay the course.

This is also the year that I am going to get serious about culling drone comb. Last year in the hives involved in the SARE trial, I culled frames that had been fitted with drone comb foundation. This was both time consuming (because it includes building the frames and fitting them with foundation several times during the season for each hive) and expensive. This year I am simply going to replace a deep frame in every brood nest with a shallow frame. During regular inspections when I catch the capped drone brood before it hatches in the drone comb the bees will build below the shallow frames, I will simply scape off the drone comb into my wax box and put the frame back in place for the bees to build more drone comb. Once again, the vision of healthier bees in Spring and the additional wax I am producing will be my focus to keep me from becoming demoralized from all the extra time my apiary inspections are going to take.

Looking to the Future

In order to get solid data for this SARE study, I plan on running the trial for a full three years. This will not only provide the opportunity for me to be able to see if the results are reproducible, but will allow me to evaluate the long-term survival of hives that are not treated but instead intensively managed for *Varroa*. I hope to be able to report on the future results in these pages. BC

Bill Sheppard Jr

As Good As It Gets For Bees & Beekeepers In NC

Lane **Kreitlow**

William ("Bill") H. Sheppard, Jr.

North Carolina beekeepers suffered an enormous loss recently: the passing of one of our most influential and tireless honey bee advocates, Mr. William ("Bill") H. Sheppard, Jr. on Dec. 2nd, 2016. The grief over Bill's death is far-reaching. His family lost a loving, loyal patriarch, and the beekeeping community lost a great friend, mentor, and faithful bee supporter. If ever there was true champion of honey bees, it was Bill.

Bill Sheppard was practically synonymous with North Carolina beekeeping. One would be hard-pressed to become a beekeeper in our state without hearing his name, or if you were really lucky, meeting him in person. A few moments of speaking with Bill and you would be hooked. Much like that mysterious force that draws us into beekeeping in the first place so too was Bill Sheppard a force to be reckoned with. But with Bill, there was no mystery. He was a man who devoted his entire life to bees and to the betterment of beekeeping in North Carolina. His influence reached far beyond the boundary lines of our state, and will continue to enlighten beekeepers and bee lovers for a very, very long time.

Bill was a helluva guy to know, a true character. I first met Bill when I was a beekeeping student at NCSU almost 20 years ago. He was instantly one of my favorites with his upbeat, endearingly quirky personality and indelible laughter, the kind that sticks in your brain and makes you smile. Such was Bill, always spreading light wherever he went. Bill was the kind of guy that was always helping somebody, always sharing his gift of wit and wisdom. Two decades later, he still had the same, positive energy and unwavering devotion to bees that was clearly ingrained in his spirit.

14-year-old Bill with his father, William H. Sheppard, Sr. in 1954.

You might say Bill was born with beekeeping in his blood, literally, when his mother was stung by a bee when only a few months pregnant with him. Given the fact that he was from a long line of beekeepers, that single moment seemed to seal his apiarist fate, not to mention the fate of North Carolina beekeeping. The second oldest of seven children, Bill was the only one to follow in his father's beekeeping footsteps. As a 6th generation beekeeper, Bill recited his ancestral ties to bees with precision and authority.

"My great, great, great grandfather Noah had 140 hives listed on the tax books in 1836," Bill reflected fondly when I spoke with him recently. "There were no records prior to Noah, so there could have been more before him."

All of the generations of Sheppards that followed continued in beekeeping, either as a supplement to farming or as a sole profession.

Bill's grandfather, Frank, was a commercial beekeeper, and passed on the trade to his son, William H. Sheppard Sr., Bill's father, who also made his living as a professional beekeeper. Bill's son, William H. Sheppard III (Winky), carries the torch for the 7th generation of beekeeping Sheppards.

The apple didn't fall far from the tree. Bill was merely two years old when he stepped into an apiary with his father for the first time, and remained a constant presence in the beekeeping community his entire life. His childhood

was rife with beekeeping experiences that rival the best of them. Bill started queen grafting at the age of five, and by 16, partnered with his father in their commercial beekeeping business, when he took on a lot of the major responsibilities after his father had a heart attack.

Bill's long history of serving the North Carolina State Beekeepers Association (NCSBA) began when he was asked at age six to serve as a youth representative for the organization. (I can't help but smile when I conjure up the image of a six-year-old Bill.) Youth membership dues at the time were 25 cents, but once he reached the ripe old age of 16, he had to pay $1 dues like everybody else!

Bill was an active member of the 4-H club, and proudly won the state beekeeping contest for his requeening demonstration in 1957. For the next 20 years, Bill helped with the bee exhibit at the North Carolina State fair, giving live bee demonstrations for over 10 of those years. In 1975 Bill helped design, build and maintain a new exhibit that would be used for over 30 years.

By the mid-1970s, Bill was awarded lifetime membership for his years of service to the NCSBA.

Bill's contributions to the NCSBA didn't stop there – far from it. He went on to serve on the Board and as President, Vice President, Director, and on countless committees and other roles from 1975 until about 2008. Bill, along with Dr. John Ambrose and Mr. Irvin Rackley, started the Zoo Committee, which led the NCSBA in a successful fundraising campaign that went on to raise enough funds to build a permanent honey bee exhibit at the North Carolina Zoological Park in Asheboro. At roughly $160,000, this was no small feat! Bill and his wife Sandra also started the "Cooking with Honey" Program, a crowd favorite at state meetings and the state fair.

In 1977, Bill's service to NC beekeeping took on a more formal role when he was hired on a two-year Coastal Plains grant to work as a state apiary inspector. Two years later, he became a permanent employee of the North Carolina Department of Agriculture and Consumer Services (NCDA&CS), where he would spend the next 32 years inspecting hives all throughout southwestern North Carolina, spreading his vast amount of knowledge and telling a lot of corny jokes along the way.

Bill's many awards and honors are a testament to his long list of contributions to beekeeping: NCSBA Person of the Year, Life Membership, McIver-Hass Lifetime Achievement Award, Person of the Decade, President Emeritus, and nine different presidential awards. Bill helped start beekeeping chapters for at least 11 counties in North Carolina- many on his own- including Moore, Montgomery, and Chatham Counties, to name a few. Bill has also received at least 15 awards from various county chapters for his accomplishments. Ever the educator, Bill taught beekeeping at nine different community colleges for seven years, and taught a full credit-course at Montgomery Tech for a year.

Bill was married to his wife Sandra for 56 years! Together they had five children: William H. III (Winky), George Randolph (Randy), Donna Marie, and twins Wesley Eric and Abbey. They also have six grandchildren and five great-grandchildren.

Bill's accomplishments didn't end in the beeyard. He was a superintendent of Sunday school for Page Memorial Methodist Church in Aberdeen, NC for 12 years, and a Sunday school teacher for 20 years. He was the president of the PTA, earned the rank of Eagle Scout, was a Scout Master for seven years, and was a member of the Order of the Arrow, a prestigious Boy Scout honorary organization.

Bill Sheppard, Lane Kreitlow, and Mr. Irvin Rackley at the ribbon cutting ceremony for the Honey Bee Exhibit at the NC Zoo in 2009.

Born in 1940, Bill was quite possibly the longest standing member of the NCSBA, with over 70 years under his belt. In recent years, Bill became virtually blind, but that didn't stop him from perpetuating his legacy of contributions to North Carolina beekeeping. Bill continued to participate in speaking engagements at meetings all over the state, made possible by his devoted wife Sandra. When not interacting with other beekeepers, he spent much of his free time in his workshop, where he built various woodenware including miniature beehives and hexagon puzzles that he sold at state meetings, with proceeds benefiting the apiculture lab at North Carolina State University.

Bill was an avid photographer for most of his life, earning an honorary membership to the Sandhills Photography Club for over 35 years. Throughout his tenure as a state apiary inspector, Bill took over 140,000 photos, documenting his hive inspections. If anyone has seen it all inside a beehive it was Bill, and there is a good chance there is a photo of it somewhere. Bill donated a subset of his collection of over 4,000 personal photographs of bee plants to the NCSBA for use by its members.

I can't say enough about Bill Sheppard. He contributed more to beekeeping in North Carolina than seems fathomable by a single person, and yet he never seemed to tire of it or run out of great stories. We are truly fortunate to have known him. Bill's legacy will live on though his family and the many lives he touched, the countless beekeepers he inspired, and the untold number of bees that will be saved as the result of the unfaltering advocacy to which Bill devoted his life. Beekeeping, and indeed North Carolina, will never be the same without him. BC

This article is adapted from an article published in the fall 2016 issue of the NCSBA newsletter, the Bee Buzz.

What's Going On?

Ann **Harman**

"And what is so rare as a day in June? Then, if ever, come perfect days." James Russell Lowell, American poet, certainly said that right. Now take one or lots more of those perfect days and go out to your beeyard. Wear your veil (always) because you are going to have some fun and learn something at the same time. Learning from bees actually does happen every time you go to your hives but this time you are going to do some different things besides checking brood and queens. You will certainly need more than one day, but not necessarily very much time.

Make use of the whole month or more. Include sunny days, cloudy days, cool ones, hot ones and even rainy ones. Your assorted investigations will take place at various times from very early morning until nightfall, perhaps one even after nightfall. If there is a possibility of a thundershower, that time can be included, but not during any lightning. In some areas of the U.S. June is honey flow time and supers will be on hives. So a few of your investigations may need to be held at another time, after supers have come off or in the weeks or months before supers need to be put on. That's fine. Actually you can do all or some of these projects any time during your bee season. In the areas with cold Winters wait for the sunny warm day when bees are taking cleansing flights to add to your observations.

Each colony of bees has its own 'personality.' However, that can change with a replacement of its queen. It would be nice if you select two or three of your hives for various observations. A comparison of activities should be interesting. For some of the activities you will need more than one hive but if one is all you have at the moment, you can still make good observations.

Let's start with observations at the entrance. These are best done when you are not going to open up your hives until later or on another day. Pull up a chair if you wish but don't get in front of the entrance. Your bees are just having a normal day. Think about their normal activities from sunup until dark. Some bees will be returning as scouts as well as foragers for nectar and water. These returning bees will appear as if they are bringing in nothing so you really do not have any idea what their purpose was when they left the hive. You can certainly notice pollen foragers and, look closely, perhaps a few carrying propolis in their pollen baskets. Pollen looks colorful and is not shiny. Propolis generally looks somewhat shiny and brownish.

You will be making quite a number of visits to the entrance. You want to watch at different times of day. Choose those different times from dawn to nightfall – such as mid-morning late morning, early afternoon, mid-afternoon, late, at dusk. The middle of the day, when your sun is directly overhead and your shadow is right under your feet, is supposed to be the time when daytime foraging flight may be less. See what you notice at the entrance. Start with focusing on bees leaving and entering. You may wish to note the weather – sun, cloudy, cool, warm. Compare same times in different weather conditions. In the evening when do you see bees returning but not leaving? If you are fortunate to know of an approaching thunderstorm, make some quick observations to see if bees are returning but almost none leaving. Stay safe! Lightning is not to be trusted!

Are bees always good pilots? Choose a time when flight activity seems to be fast and furious. Are all the bees managing their take-offs and landings gracefully and under control? Any crashes? Tumbles? Is there traffic congestion just inside the entrance? Put on your rain gear and see what activity you see in fog, mist and light rain. If flight activity is negligible do you see any bees waiting just inside the entrance? These could be guard bees but maybe other bees are waiting for the rain to stop.

Now it is time to focus on the

Watch the landing board.

Forager bringing home the pollen.

pollen foragers when they are returning with full pollen baskets. Unfortunately many pollens are yellowish, tannish, pale orangish in color and can be hard to distinguish. You can try to capture a bee to have a better look but you do not want to interfere too much with their normal activity. Select a mid-morning time and a mid-afternoon time to make a comparison of colors and numbers of bees returning with pollen. Make those pollen observations at least once a week for several weeks. You may notice differences in colors and in numbers of foragers.

During your entrance-watching you may see undertaker bees working very hard to drag a dead bee out. Watch what happens to the dead one. Does it get shoved over the edge of the landing board? Sometimes it may be picked up by one bee and flown a short distance away before being dropped. Note where the dead bee finally landed. Come back the next day and see if it is still there. Scavengers are very efficient. Tear a few small scraps of colorful paper and drop them into a hive through the hole in the inner cover. Sometimes the bees remove the scraps quickly and you can see them at work getting them through the entrance.

Next you are going to focus your attention on the flight paths. Here is a good opportunity to make comparisons using different hives. Select one hive and find the direction of flight for bees leaving. Now walk to another hive. Same direction or somewhat different direction or really different one? If you have several hives go ahead and notice the directions of each one. Do comparisons mid-morning and repeat in mid-afternoon. Wait a few days and repeat. Then wait a couple of weeks and repeat. Wind and nearby foliage can affect flight directions. Do you know of a rich nectar or pollen source reasonably nearby, perhaps your own flower or vegetable garden? Those can be a part of another set of observations.

For some of your projects you need a set of queen marking pens. No, queens will not be marked for your observations but you will have learned how to do it by marking drones. You might also wish to buy a small jar of paint used for painting model trains and other models. It will be easier to use this jar than using the marking pens in one of your investigations. Just before using the pens shake them very well. Then shake them again. You will also need to shake the jar of paint.

First, here is a brief review of drone behavior. Remember – drones do not sting! They have no stinging apparatus. So do not use gloves. You really do not want to harm them. Physically they are larger than workers and have big eyes that meet on the top of the head. When adult drones emerge from their cells they will not leave the hive for mating trips for about a week. They need that time to become sexually mature. The drones you are going to use for your project will be not be caught inside the hive. You will catch drones either leaving or returning on the landing at the entrance. Perhaps in your observations at the entrance you have discovered that drone flight takes place late morning to mid-afternoon.

To mark drones (also queens and workers) you want to put a dot of paint on the top of the thorax. It does not take much paint. You do *not* want to get paint on the head or abdomen or wings. Before attempting to mark a drone, practice handling them gently and getting them in position to be marked. You can, of course, use one of the queen-marking cages available from equipment suppliers.

Drone.

Now for some fun. Assign a different color to each hive you are going to use for marked drones. You can catch and mark as many drones as you wish, but try to do at least six or seven per hive. Hold the drone for a short time right after you put a dot on to let the paint dry. We know that drones drift from hive to hive, and some workers do too. You will be watching at the entrances for marked drones either leaving or entering. See if you find any 'mixed-up drones,' marked ones flying to or from other than their original hive.

When you have been watching activity at the entrance did you notice any guard bees? Only a small percent of bees approaching foraging age become guard bees. These can be recognized by their behavior. Sometimes they will hide just barely inside the entrance. But you can also see them on the landing area of the bottom board. They either stand, looking quite alert, with forelegs raised, or may walk around and stop and go on alert again. Perhaps you will see a guard encounter an incoming bee and examine her with antenna and forelegs. It is always interesting to see an incoming bee passing the 'sniff test' and then being allowed into the hive.

In late Summer when yellowjacket colonies have declined these workers may attempt to enter honey bee hives hoping for a meal. If you are lucky you might see several guard bees accost the yellowjacket. Various insects can pay a visit to the landing board during the warm months. So make your entrance observations throughout your bee season and see guard bees at work. They are on duty at night and will respond to your tapping a stick on the landing area. However, if you take a flashlight out so you can see, bees can indeed fly out but will drop to the ground and crawl – probably up your legs. They are not happy about being disturbed at night. If you have some red transparent film you can cover the lens of a flashlight. You will be able to see but the bees cannot.

Do you have a flower garden and a vegetable garden with flowers that bees like to visit? Here is where you

Guard bees.

will use that little jar of model paint. You will want a very tiny brush or a toothpick.

Find a flower that bees are enthusiastically visiting. Some of these bees are probably from your hives but a few may have their home elsewhere. It does not matter. You are going to try to get a dot of paint on the thorax of some foragers. Your dot may end up as a streak. That is better than getting a large messy drop. Mark as many as you wish. Try to find the flight path of the foragers to see if they are going in the direction of your hives. Then return to your hives and look at returning and leaving foragers and see if any are marked. You can briefly watch at the entrances for several days when foragers are actively flying.

Bees recognize many kinds of odors in their own hive. Although your sense of smell is not as sensitive as the bees' sense you can put on your veil and find out if you can detect any differences in hive odors. Pick a day when no honey supers are on as well as one that would be keeping foragers busy and also keeping the hive bees happy. Yes, a veil is absolutely necessary! Also, no smoke! Quietly remove the telescoping cover exposing the hole in the inner cover. Now bend over and take some slow deep breaths through that hole. Yes, you will have a mixture of wax, bees, honey combined. Now go and smell another hive – same or different? Just a few slow deep breaths before your sense of smell deadens. Now wait a month then smell again. Do you note any different smells? Perhaps the nectar source is different. Try to sense the smells during your bee season.

Speaking about bees' sense of smell, you can have some fun with that if your beeyard is reasonably close by your house. You need a nice warm day with busy foragers, a small saucer, a watch and some time to sit quietly on your deck or patio and read a bee magazine. Put a couple of spoonfuls of honey in the saucer. This honey *must not* be any commercial honey that could contain American foulbrood spores. Take the saucer of honey out to your picnic table, sit down and note the time. Then note the time a bee appears and takes a sip of honey. Wait. Note the time the next bee appears and if more than one bee. That first bee was probably a scout bee that smelled the honey. She reported back to her hive and, dancing, told the others where to find the honey. You, sitting nearby, probably did not smell it at all.

Enjoy your bees and learn from them at the same time! BC

Ann Harman enjoys her bees, horses, dogs and cats in Flint Hill, Virginia. You have the change to meet her in person at Bee Culture's *Annual Event – Voices of* Bee Culture. *Register now at* ***www.beeculture.com***.

BIGGER PICTURE

Jessica **Louque**

The Necessity of Morel-ity

If you ever ask Bobby what his favorite _____ is, he will say "free" for his answer. When we were first dating (although I think I was the only one who knew that was happening) we bonded over our love of plants. We were both excited to realize we had doubles of a lot of books, sharing interests in things like Foxfire, Euell Gibbons, and natural history. Our interests have led us to a lot of experiences that are exciting to us, but not to everyone. For example, it's really fun for us to forage, and not just because it's "free" food. We get to go walking through the woods, see lots of cool things, and find plants and animals (or remnants) that we wouldn't normally see. We once stumbled onto our best chanterelle spot to date completely by accident. Let me tell you, those were the best sloppy joe sandwiches ever!

Besides having the bees to produce honey, it is kinda cool to be able to augment your meals with self-sourced food. It can also be a completely different flavor profile than what you can buy, and it's satisfying to add some things in a non-conventional manner. I also like the hunting aspect of searching for hidden things and being able to find them. Recently, we've been running wild in the woods hunting down morels.

The chanterelle haul.

I was surprised to see how many of my friends didn't know what morels were. For those of you who have not had the pleasure of being enlightened to the awesomeness that is the morel, it is a mushroom that pops out with night temperatures in the 40s and day temps in the 60s. It's usually the first mushroom out, and it is highly sought after by foraging aficionados across the world. Most people consider it to be the best tasting mushroom out there, while also being distinct enough to safely identify it. We've had some that were as small as a joint in your finger, and some the size of a hand. There's a few different species available in the U.S. but they can be found in other countries as well.

Now that you are SO excited and ready to go eat morels, where do you start? Based on information from some of our books, some websites, and our own personal experience, I can give you some details on how you can go find your own mushrooms. Up front, you need to know that nobody will tell you where their mushroom hunting spots are. It doesn't matter if it's your best friend, your cousin, or your co-worker, they will keep that under lock and key. You might think that you would be less of a threat since you're a newbie, but you would be a potential future threat once you have a taste of delicious morels. You can pay people to take you out and give you advice, but be prepared to pay dearly for it.

An important part of any foraging is being prepared. Have your sunscreen and bug spray on, good hiking boots with socks that don't give you blisters, comfortable pants, and a long-sleeved shirt if you are predisposed to walking into poison ivy or branches (I do both. Often). A hat is not a bad idea, and maybe a walking stick. At least one of us usually has a gun, although that's mostly because we have a huge population of coyotes in the area. It's good to have a phone with you at all times in case of emergencies, but also to take photos of your spots to find patterns in where you see morels. A pocket knife is useful for some people to cut the mushrooms, although I'm usually too impatient for that. You also need something to carry your bounty in, which should be a mesh bag. One of the biggest reasons for declining morels is that foragers are collecting them in bags or buckets and the spores aren't able to fall to the ground. Some people reuse orange bags, or buy specific mushroom hunting bags. We use lingerie bags for the washing machine and a carabiner to hook it to a belt loop. It's a little abrasive on the mushrooms, but not so much to make a difference.

Morels are only really around in the springtime each year. Based on the massive hauls on my social media feeds, I'd say that Indiana and Minnesota are the biggest hotspots in the U.S. of people who also post online. Some of these people are covering their truck beds with their morels. I've never seen anything like that in NC, but I'm hoping to find that one day. The first thing you need to do is understand what the general season is in your area. It's different in every climate, and won't be quite the same from year to year, but the rule of thumb is looking for morels once the temperatures don't drop below 40 at night and you have a few good rains. It doesn't have to get particularly warm, or be sunny for them to grow, but they do need rain and a somewhat thawed ground to emerge. They come in a few different colors and sizes, but most of them will be the length of your finger or smaller. The last species that emerges can be fairly large, but they are easier to see and you might have some competition finding them. For the most part, they

Morel mushrooms cleaned and cut in half.

Morels cooking in bacon.

are yellowish, or whitish-yellow with a gray honeycomb cap.

Since these are the fruiting bodies, it's a good idea to look around the area once you find one because the spores that created that one should have been able to successfully reproduce in other places nearby. These sorts of areas are likely to be in an old ravine or creek bed where rain runoff has spread the spores downhill. Most of the time you'll find several in one spot. A potentially sunny south-ish facing slope will likely be the first place you will find them because it heats up a bit faster. They usually can be found near hardwood trees in the woods where there's enough space in the canopy for light. Elms and Sycamores are fan favorites to identify a good hunting spot, but we've had all of our success near tulip poplars here. That doesn't mean we've found morels at every tulip poplar, but all the morels we've found were pretty close to them. Decaying trees are also a great place to look, but only if the bark hasn't completely fallen off the trunk yet. Stumps and such can also feed mushrooms. One of our better places has the unfortunate side effect that there are sweet gum spikes, balls from the sycamores, catkins, and dried tulips from the poplars all over the ground. I promise you, all of these can easily be mistaken for a mushroom. They do help point out the types of trees to look for in the woods as good foraging spots.

Although it's pretty easy to tell a morel because of the honeycomb-like pattern in the cap and completely hollow interior, there are some imposters out there. If you're truly not sure, don't eat it. The side effects can be pretty nasty if you eat the wrong mushroom, although most mushrooms raw are not so good for you. Keep a watch out for the false morel and the beefsteak mushroom. False morels look somewhat similar, but they are not hollow on the inside and it looks more fibrous through the stalk. I don't really think they look that similar, but they do look a bit like one of the species of morels that is edible. The beefsteak mushroom looks like a dried brain on a stem, and not really at all like a morel to me. These imposter mushrooms can cause dizziness, nausea, stomach cramps, and a few other nasty side effects if you eat them. I can't honestly imagine that it would be easy to confuse them, but please take the time to buy a few good mushroom books and check up on the morel websites to get a good visual of the mushrooms that might be out while you are foraging.

When you bring them home, make sure you wash them out in a bowl of water. They are hollow, after all, and lots of things think they make great houses. You don't want to eat those slugs and beetles. When you finish washing them, try to dump the water in a place that might be productive for spores. It doesn't mean morels will come up in that area, but you might get lucky. Cooking them is not at all difficult either. My favorite is to fry them with bacon. You can't go wrong with bacon! Sometimes, they taste a little like popcorn shrimp or better-than-normal clam strips when they are battered and fried. They are also great in pasta dishes, like a nice shrimp alfredo with morels. A lot of people will go turkey hunt and come home with morels because they are about the same season. You can always cook up your turkey breast with morels and some nice foraged greens for a wild meal.

I hope everyone gets a chance to go out in the woods and see what they can find. Even if you miss the morel season, there's still other edible mushrooms if you can learn enough to find the tasty ones (like the chanterelles) and avoid the toxic ones. Make sure you take pictures to make your friends jealous of your foraging prowess! BC

Jessica Louque lives, keeps bees and hunts treasures with her family in North Carolina.

A morel hiding in plain sight.

XENOPHOBIA

Benjamin **Eichorn**

What honey bees have taught me.

My dad, Peter, has been keeping honey bees along the central coast of California since the 1960s. Since I learned to walk, I've been helping him with his bees on our family's farm in Palo Colorado Canyon, between Carmel and Big Sur. Keeping bees with my dad over the years has been nothing short of a series of adventures. Of these adventures, capturing swarms from trees, moving ornery colonies in the dark of night without adequate bee suits or flashlights, and driving down the coast with bees swirling around inside the old Volvo station wagon rank among the most memorable, though there are many, many more.

In the Winter we clean, maintain and build new equipment. In the Spring, we add boxes, or "supers," to the colonies during the "honey flow" – those few weeks, normally in April in our area, when honey production is at its annual peak. Summertime heralds the honey extraction process, which is the heaviest, sweatiest, stickiest, and yes, most delicious, task of all. In the Fall we monitor the colonies for pests and remove extra supers in order to keep the bees warm during the Winter.

My dad loves his bees almost as much as he loves his own children, though he consumes very little of the honey they produce. He loves the work too, though it is not always easy, especially when you're over 70. And yet, year after year, he continues to invest in his bees. He reads the latest research on natural beekeeping, honing and adjusting his methods. He finds new "bee spots" to place them for the season. He feeds them throughout Winter with different concoctions of natural sugars, proteins and essential oils. He builds, repairs and cleans his tools and equipment by hand – all in order to have honey to share with family, friends and our local community. He makes beeswax candles in the Winter time. I've done the math and I'm pretty sure my dad makes less than $1 per hour investing in his bees. His truly is a labor of love.

For years, I have been trying to convince my dad to keep fewer colonies (he currently keeps around 20). I've argued that it's too much work for too little reward and, more emphatically, that honey bees, as a non-native species, are invasive and potentially damaging to the pristine ecology of the Big Sur coast. My dad is sincerely committed to preserving the ecological integrity of our community, and yet he has stuck to his bees through thick and thin despite my various attempts to persuade him to give them up.

These days, I make my living teaching kids, and the adults who teach them, about the food system in the San Francisco Bay Area. The essence of my work is to help people discover the basics of how to grow and cook food, as well as how to uncover the story behind each bite of food that we eat. Recently, I learned that the word selected as "word of the year" for 2016 by Dictionary.com was *xenophobia*, a "fear or hatred of foreigners, people from different cultures, or strangers." Learning this prompted me to ask myself if xenophobic bias has in any way underpinned the way in which I teach about food and food systems or how I approach working on our family farm. If it had, I told myself, I wanted to dig that xenophobia out by the roots and trash it (or perhaps compost it)! What I found on this inner journey was not what I sought, but it did lead me back to my home and gave me a new perspective on my dad's honey bees.

As expected, the topics of bees and pollination naturally arise when unveiling the story of food. And for over a decade, despite having been raised by a beekeeper, I realize that I have been promoting a perspective that is anti-foreigner. I've been known to say things to my students like "honey bees are not a native species," and "we should really be paying more attention to the plight of our native bees." While these statements are both true, they are problematic because they can easily be interpreted to mean that something is bad because it is not native. Yes, the perspective I have maintained for years can even be interpreted as xenophobic!

This anti-honey bee perspective I've held for years was in fact too simplistic. Yes, "native" species should be preserved and protected, and "invasive" and "exotic" species should be vetted and carefully monitored, but we have to be aware of the messages we send to our younger generations when we promote an agenda that asserts that natives are inherently better or more valuable than foreigners. The issues confronting our food systems and our global economy are much too nuanced these days for such simple statements to be thrown around so casually, regardless of whether we're talking about plants, insects, animals or entire groups of people.

Eucalyptus

Cause for further concern, and the justification for my past anti-honey bee sentiments, is that we have been duped into believing that honey bees, as a species, are at risk. Ask any relatively well-informed person what they know about bees and they will reply, "Uh, they're dying?" Just try it. In fact, the European honey bee, *Apis mellifera*, is not endangered. Honey bees that are managed for commercial agriculture, however, are dying in disproportionate numbers when compared to wild honey bees. According to Dennis vanEngelsdorp, one of the nation's preeminent bee researchers and director of the Honey Bee Lab at the University of Maryland: "feral bee colonies are doing fairly well." So yes, bees are at risk, but not in the way most of us have been led to believe.

What *is* at risk, and what we should really be concerned about when it comes to the plight of honey bees, is the price of foods that are grown in a system that depends heavily on them for pollination. The widespread bee-plaguing phenomenon known as Colony Collapse Disorder ("CCD"), was originally thought to be caused by influences as obscure (and unscientific) as exposure to cell phone signals or a switching of the Earth's magnetic field. What this turned out to be due to parasitic mites, viruses the mites transmit, neonicotinoid pesticide exposure, and other stressors that are exacerbated by the way in which most of them are trucked around the nation without access to the diverse array of pollens and nectars, which would otherwise help their immunity (EPA.gov). Nothing is wrong with the bees. Something is wrong, however, with the way we are attempting to bend nature to our will; something is wrong with our industrialized agricultural model, and the honey bees are the literal "canary in the coal mine."

As the honey bees continue to suffer, their demise threatens the structural integrity of the food system itself. A buckling industrial farming model demands that we be prepared for the price of bee-pollinated foods to rise, and the *accessibility* of these foods to people of all income levels, to diminish. The price of apples and pears, stone fruit and nut crops (almonds in particular), berries and citrus, will rise as the bees continue to say "no" to the way in which they are being treated.

It is time we begin to treat honey bees, and human beings, with the respect they deserve. It is also time we condemn the sentiment that something or someone is inherently bad if it is somehow not "native." As American citizens, we are all intrinsically connected by one sad and simple fact: very few of us are truly "native" to a place anymore. Every day, human, animal, insect, plant, and microbial immigrants arrive here – by land, by sea, by air – from literally every continent. This flow cannot be stopped, and we would be foolish and uninformed to think it could be. And every day, cross-pollination and hybridization create new genetic combinations of the species represented on this great blue planet. As potentially threatening as they may seem, each "new" arrival makes a unique contribution to the continuously emerging tapestry that is our collective national (and international) cultural and agroecological fabric. The heterogeneity of this fabric will at times lead to conflict and competition, but it is from the combination and intermingling of species and genes, cultures and religions, not their segregation and isolation, that the resilience and healing of both people and planet will rise.

Our only hope is for tolerance. The resilience of generations to come will depend on our ability to encourage and celebrate diversity. And in order to be the stewards of thriving ecological communities, we must learn to preserve and protect the "natives" in our communities while not being afraid of the "exotics" merely because of their "other-ness." The American democratic experiment, the survival of our species and the species with whom we co-exist, the survival of the planet Earth as we know it, may indeed depend on our ability to overcome our fear of foreigners.

After spending years not keeping honey bees of my own, I'm setting up my own hive near a big stand of Winter-blooming, non-native, eucalyptus in San Francisco this season and "composting" my past sentiments about these humble and remarkable creatures. BC

Benjamin ("Farmer Ben") Eichorn is an internationally – renowned expert on the topics of edible gardening and food literacy education. He is the author of Edible Gardening: Ten Essential Practices for Growing Your Own Food. *Ben grew up on Country Flat Farm in Big Sur, CA where his family grows certified organic Meyer lemons, diverse vegetable and fruit crops, and keeps honey bees. In 2010, he founded Grow Your Lunch (**www.growyourlunch.com**), after teaching for four years at the Edible Schoolyard Project in Berkeley, CA. The mission of Grow Your Lunch is "to inspire a revolution in public health and well-being by empowering communities and individuals to grow their own food." He lives in San Francisco, CA.*

No Lifting!

Something Old Is New In America

Brian **Drebber**

Slovenian or AZ hives have been around as long as the more common Langstroth hive design and others, but in America they are just gaining a foothold among a growing group devoted to their use.

Why?

At the top of a long list of advantages is no lifting. Once the "bee cabinet" is put in place, the heaviest thing a beekeeper has to handle is a frame of honey – about 7-8 pounds. If that idea appeals to you, then maybe you should consider a life changing beekeeping experience.

As a beginning beekeeper in 2010, the excitement and fascination of my new found hobby masked the realization that there was a lot of sweaty work involved. Dressed in my "moon suit" I happily endured the hot and heavy labor, assuming that it was the price of admission to the coolest thing I had experienced in the second half of my life at least, until . . .

At the 2013 Fall meeting and holiday dinner of the Cherokee County (Georgia) bee club, I was asked to help carry in something from the parking lot. Approaching the pickup truck, my little eye spied an unfamiliar looking box – which at first glance resembled a beehive but unlike one I had ever seen.

It took about four seconds to realize that I was looking at my future – as a beekeeper.

Sliding the frames out horizontally from the back sure seemed easier. Being able to remove brood frames without disturbing the honey chamber above made perfect sense. Opening the back door, then seeing, hearing, and smelling the bees at work without their being able to get at me had tremendous appeal – and the list goes on.

Simply put, an AZ hive resembles the cabinets in your kitchen. Imagine those cabinets protruding through the outside wall – where the bees come and go while you're indoors. Open the cabinet door and there are screened windows with your bees happily busy on the other side. Blow gently on them through the screen and they move aside revealing the comb that can be illuminated with a small flashlight to see if it is drawn or capped. It's easy to tell how many frames of bees are present and where in the hive they are located – without suiting up or lighting a smoker.

If a closer look is desired, put on a veil and puff a little smoke through the screen and remove the window covering the chamber you wish to inspect. The frames can be easily removed from the brood chamber(s) without disturbing the workers in the honey 'super' at all. Likewise, honey frames can be removed individually and replaced with empty ones as desired – independent of those below.

The frames, hollowed out and resting on metal rods, remain loose – even after months without being disturbed. The small points of contact don't interest the bees enough to glue them in place. The small contact point where the frames meet the sheet metal spacers that hold them vertically also stay remarkably free of propolis.

The hollowed out bottom also gives the bees a place to 'duck' and not get rolled as you slide the frame out for a peek. A folding floor stand provides a place to rest as many as 10 frames while you clean or perform whatever maintenance is needed. The frames are reversible top-to-bottom and completely interchangeable from

one chamber to the next because they are all the same size.

Much as Reverend Langstroth and Anton Žnideršič (whose initials AZ give the hive its name) diverged in their designs a century ago, so too did we at Drebbieville Hives decide to make some changes in our version of this concept. Bringing the frame dimensions in line with Langstroth deeps allowed the use of foundation commonly available here and extractors designed to handle those frames. The larger Slovenian frames don't fit in any but the largest radial extractors – a fact discovered when trying to buy a used one.

We constructed a building specifically for the purpose of housing our hives but simpler shelters are applicable as well. An existing garden shed, or those available from home improvement stores can be altered for the purpose. Remove a window in your garage and place them – it's been done. Even something as crude as a sheet of roofing tin weighted down with bricks will suffice temporarily but the bee cabinets are much more functional if properly housed.

They can also be built into a trailer, truck or container and easily transported. Instead of a forklift, straps, and pallets – just close the entrances, open the vent flaps in the rear doors and drive away. Again… no lifting.

If a bee house is to be constructed, one key element is a large overhang above the hives. A Google search for "Slovenian AZ beekeeping" will bring up many images – including ours. This overhang serves not only to shelter them but performs a useful function related to helping the bees "dry" the honey. Users of AZ hives in such a bee house can expect up to 2% less moisture in their honey. The gracefully curved roof lines common in Slovenia are to help prevent swallows from building their nests underneath.

The Beekeepers of Gilmer County Georgia operate a public apiary in which both Langstroth and our American AZ hives are placed side-by-side. Honey extracted from the Lang boxes tested at 17.4 % moisture. Compare that to 15.4% from the AZ hives. Both were processed at the same time, effectively eliminating any other variables that may be implied.

Again, why?

It seems the warm air rising in front of the hives encounters the overhang and is 'kicked out' meeting cooler air falling further out from the building. What begins is a circular airflow on even the calmest days – instantly evacuating the hot moist air being forced out of the hives by bees curing their honey. It allows them to finish it with much less effort. The already stable temperature conditions are enhanced by this "attic fan" effect and the results are dramatic.

Even without the benefit of this explanation, we noticed from the very first extraction at our bee house that the honey was noticeably thicker. We now heat our extractor as a regular part of the honey processing – not to make it *easier* but to make it *possible* for the honey to sling out!

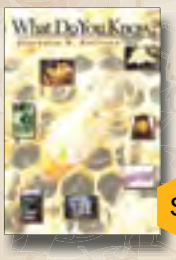
So . . . no lifting, working indoors, less invasive inspection, and thicker honey all come to mind among the many advantages to this system of beekeeping that has been around for a more than a century. It may be some time before it is infused into our bee culture, but there are some of us who have already embraced it with no looking back. BC

2018 Bee Culture Calendar Contest

BEEYARDS AT SUNSET!

Look for shadows, look at seasons, look at your hives from the other side, from your neighbor's place, from upstairs. See your 2017 Calendar for contact and instructions.

Bee Culture's
BOOK STORE



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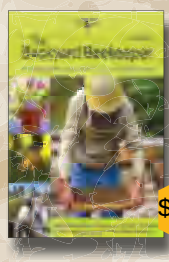

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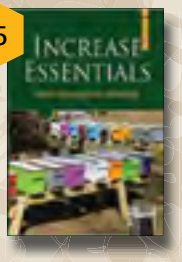

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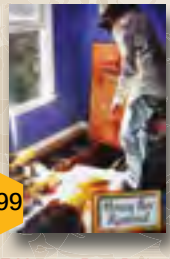

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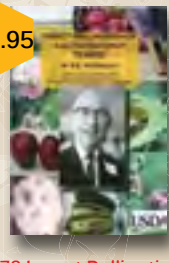

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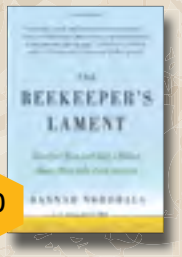

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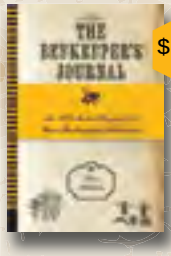

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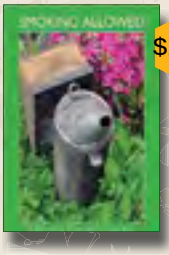

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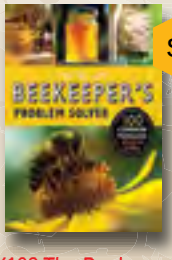

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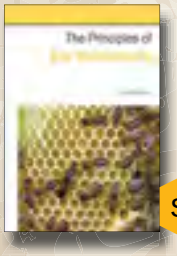

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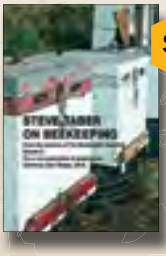

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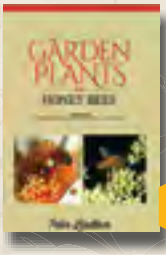

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GLEANINGS

JUNE 2017 • ALL THE NEWS THAT FITS

SOUTH AFRICANS DEVELOP QUICK HONEY TEST

South African researchers have found a quick and user-friendly way to combat honey fraud by producers who dilute their product with watered-down honey or sugar.

Stellenbosch University Prof. Marena Manley of the university's department of food science, says existing methods of testing honey are expensive, time-consuming and in most cases destroy the sample used.

"There was a need for a fast, non-destructive, easy-to-use and low-cost classification method to detect if there is adulteration in South African honey," she says.

The South African research team, working with Italy's Sapienza University, decided to use near-infrared spectroscopy (NIR) because the technique has been previously used to determine the geographic or botanical origin of honey.

Laboratory and portable NIR instruments were calibrated specifically with South African honey in mind.

Calibrated by Dr. Anita Guelpa, who worked on the project with Manley, the machine interprets the information to tell whether the honey is from South Africa or is adulterated.

The technique measures light reflected from a halogen beam trained on the honey, allowing the measurement of a spectroscopic fingerprint.

"Authentic South African samples, despite coming from diverse regions and having been made from pollen from different types of flowers, share specific spectroscopic characteristics that help to differentiate them from imported and adulterated honeys," Manley says.

The researchers report in the journal Food Control that because portable and mobile NIR instruments are available on the market, it would be possible to perform the tests on site at, for instance, a honey producer or distribution plant.

The South African beekeeping industry produces about 1,500 tons of honey a year, only about half consumer demand, and about the same volume is imported every year.

The researchers say while honey is a target for adulteration using cheap sugar syrups in many parts of the world, it is not known if this food fraud occurs in South Africa.

Another form of food fraud occurs when honey is labeled as being produced locally, but in reality, it has been imported or diluted with imported honey.

"Not only will the consumer be misled in the process, but it means that the local producers cannot compete with the low pricing of these adulterated honeys," Manley says.

"There was, therefore, a need for a fast, non-destructive, easy to use and low-cost classification method to detect potential adulteration in South African honey."

Current methods to detect adulterated honey, such as the use of stable carbon isotopic ratio mass spectrometry or thermal analysis.

By developing calibrations using the spectral information of honey of South African origin, it was possible for Guelpa to verify whether samples are indeed produced by South African bees.

The test can also pick up whether any sugars (such as glucose or fructose) or non-South African honey are added to a sample. This is possible even in cases where only a small amount of sugar has been added.

A sample of honey is placed in an NIR spectrophotometer and no prior preparation is needed.

A simple halogen light beam emits a harmless light, including the NIR region, and hits the sample. The light beam loses energy because it is partially absorbed by the sample. The amount of light being absorbed depends on the physical and chemical composition of each sample.

The spectrophotometer measures the remaining light that is reflected. The absorbed light is seen as unique spectral information which is specific to a sample. Each type of sample has its own spectral information.

The spectral images of South African honey look the same at first glance. However, with the help of already developed calibrations it is possible to differentiate between honey that is from South African and honey that is not.

"Authentic South African samples, despite coming from diverse regions and having been made from pollen from different types of flowers, share specific spectroscopic characteristics that help to differentiate them from imported and adulterated honeys," Manley says.

She says the technique could potentially also be used to distinguish between different types of South African honey, for instance, blue gum of fynbos.

Other advantages are that NIR measurements can be done quickly, the test is non-invasive and is easy to perform. Because the samples tested are not destroyed in the process, they can be stored as evidence in further investigations. – *Alan Harman*

Hive with AFB. (HDOA photo) submitted by Alan Harman

AFB RE-EMERGES IN HAWAII

The destructive bee disease American Foulbrood (AFB), which wiped out much of Hawaii's honey bee population in the 1930s, has been found again.

The HI Dept of Ag (HDOA) is sending out an alert to HI beekeepers after a beekeeper detected the disease in a bee hive in Kula, Maui.

Several hives on Oahu and Hawaii Island were affected by AFB in February and October last year.

The AFB bacterium, which is found worldwide, kills bee larvae and is highly infectious to bee brood. Once a colony is infected, it almost always results in the death of the colony and spores of the disease may live more than 50 years.

"Beekeepers around the state should be vigilant in inspecting their hives for signs of this disease," says John McHugh, administrator of HDOA's Plant Industry Division. "Since the spores will always be present, the best strategy for disease control is early detection."

Symptoms of AFB include honey bee cells that are moist, dark in color, and often smell of decaying animals. The dying larva inside the cells shrink and the normal convex capping becomes concave. The pattern on an infected bee brood frame will look spotty because of a mixture of disease and healthy brood cells.

The bacterium that causes the disease is resistant to most antibiotics, heat, and disinfectants – the treatments normally used to kill bacteria.

There is an antibiotic that may be used to help prevent AFB; however, because most strains of AFB have become resistance to treatment, HDOA says the most effective way to control an existing AFB infection is to burn and destroy the hive.

Beekeepers are also encouraged to report abandoned hives that may be a reservoir for the disease which is easily spread by bees moving from hive to hive.

Because of this and other bee diseases, it is illegal to import used beekeeping equipment into Hawaii or to transport it interisland without an inspection and permit from HDOA.

CALENDAR

♦INTERNATIONAL♦

45th Apimondia International Congress will be held September 29 to October 4 in Istanbul, Turkey.

For more information visit **www.apimondia2017.org**.

♦CALIFORNIA♦

Western Apicultural Society (WAS) will held at the University of Davis September 5-8.

Dr. Norm Gary will be participating. Other speakers include Eric Mussen, Brian Johnson, Elina Niño, Serge Labesque.

Watch the web page for updates, details and registration, **www.westernapiculturalsociety.org**.

♦COLORADO♦

The CO State Beekeeping AssociationSummer Bee College will be June 10 at the Garfield County Fairgrounds in Rifle. Friday night June 9 there will be a cookout at Colby Farm.

Speakers include Katie Lee, Marla Spivak's protege on selecting for hygienic behavior.

For more information visit **www.coloradobeekeepers.org** or contact **president@coloradobeekeepers.org**.

♦CONNECTICUT♦

Back Yard Beekeepers Association 2017 speaker schedule – September 26, Tom Seeley; October 31, Kirk Webster; November 14, Jennifer Berry.

For information visit **www.backyardbeekeepers.com.**

♦DELAWARE♦

EAS 2017 - University of DE Newark, July 31 - August 4.

Speakers include Larry Connor, Kim Flottum, Mike Embrey, Maryann Frazier, Clarence Collison, Allen Hayes.

For information and to register visit **www.easternapiculture.org**.

♦ILLINOIS♦

IL State Beekeepers Association will hold their Summer meeting June 10 at the Quality Inn conference Center in Quincy.

Registration is $70/members and $85/non-members. Larry Connor, Robert Sears and Scott Martin are the speakers.

For details and registration visit **www.ilsba.com**.

♦INDIANA♦

Southern Indiana Honey Bee Field Day will be July 29 at Perry County 4-H Fairgrounds in Perry County.

Featured speakers include Phil Craft and Kathleen Prough. The cost is $15/person or $25/family by July 14.

For more information call 812.547.7084 or visit **www.perrycountybeekeepers.wordpress.com/**.

Heartland Apicultural Society will hold their annual conference July 13-15 at the University of Southern IN.

Speakers include Ernesto Guzman, Jeff Harris, Dan O'Hanlon and more.

For more information visit **www.heartlandbees.org** or email **www.heartland.apiculture@yahoo.com** or 317.432.9578.

♦IOWA♦

IA Honey Producers Association will hold their Summer meeting July 15 at Wickiuphill Learning Center, Cedar Rapids.

Speakers include Dale Hill and Andy Joseph. The cost is $35/members and $40/non-members.

For more information contact Eve Vanden Broek **mrstheo@iowatelecom.net** or 515.491.6760.

♦MARYLAND♦

MD State Beekeepers Association will hold their Spring meeting June 17 at the University of MD/College Park, Plant Sciences Building Auditorium.

For details visit **www.mdbeekeepers.org**.

♦MISSOURI♦

Three Rivers Beekeepers will host Master Beekeeper David Burns July 22 for an Advanced Beekeeping Seminar.

The cost is $85/person, includes lunch. Bring your veil.

For more information contact Jerry Styczynski at 314.420.0264.

♦NEW YORK♦

Ny Bee Wellness Workshop - Disease & Management will be July 7-9 at Morrisville State College, Morrisville. Medhat Nasr is the featured instructor.

July 7, 7-9pm, presentation open to all, $20.

July 8, 9-5pm, lecture and demo, open to all, $50

Special 2-day session, July 8-9, field and lab session, 9-5pm, workshop limited to 24, participants must meet requirements and attend the Saturday session, $150. Add Friday evening for $20.

For more information and to register **www.eventbrite.com/e/ny-bee-wellness-workshop-honeybee-disease-management-tickets-33005508364** or contact Pat Bono, **workshop@nybeewellness.org**, 585.820.6619.

♦OHIO♦

The Ohio State University Bee Lab Webinars are held the third Wednesday of the month at 9:00 a.m. EST.

June 21: A Lot About Drones – Kim Flottum.

To join a webinar follow the link and log in about 8:55 a.m. – http://go.osu.edu/theOSUbuzz.

♦TEXAS♦

Texas Beekeepers Association will hold their 2017 Summer Clinic, June 10 at University of TX, Arlington.

Randy Oliver is the keynote speaker. The cost is $50/member, $60/non-member and $25/child. Lunch included.

For additional information and to register visit **www.texasbeekeepers.org**.

♦VIRGNIA♦

Sustainable/Biodynamic Beekeeper Training June 15-17, Floyd, VA. with Gunther Hauk, Alex Tuchman and Vivian Struve-Hauk.

One Week of Sanctuary Beekeeping & Gardening, July 10-14, Floyd, VA with Gunther Hauk, Alex Tuchman and Vivian Struve-Hauk.

For more information on both events visit **www.spikenardfarm.org or contact info@spikenardfarm.org, 540.745.2153**.

♦WASHINGTON♦

The NW District Beekeepers Association will host Randy Oliver, September 9 at Everett PUD Auditorium, 2320 California Street, Everett, from 1-5;pm.

The cost is $25 and seating is limited. Tickets can be purchased at **www.brownpapertickets.com** by searching for Randy Oliver.

For more information contact Mike Kossian, **Mike-Kossian@hotmail.com**.

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Miracles

Ed **Colby**

A hive of bees can yield more goodness than just a pail of honey. Our little darlings produce miracles beyond miracles. But which ones are real? It depends on who you ask.

On our 2013 trip to Ukraine for the Apimondia bee conference, my gal Marilyn and I met Gromovyy Vasyl M. – "Dr. Bee" – who looks like Nikita Khrushchev. We sampled his cocktail of pulverized wax moth and honey. Dr. Bee advocates the application of wax moth, as well as bee bread, royal jelly, propolis, honey cappings, honey and pollen, to cure a plethora of human complaints, including, but not limited to, hepatitis, tuberculosis, cataracts, glaucoma, bronchitis, pneumonia, whooping cough, sinusitis, burns, asthma, high and low blood pressure, varicose veins, stroke, bleeding ulcers, infertility, impotence, mastitis, uterine cancer, hypothyroidism, psoriasis, and lupus. You get the idea.

I met *Bee Culture's* own Ann Harman at Apimondia. She knows Ukraine. She explained that under the Soviet Union, Ukrainians got rudimentary medical care at best, so naturopathic remedies filled a void.

I fed bee pollen to a couple of dogs to relieve their seasonal allergies. When I told my then-wife Linda we might give Spot some comfort by stuffing pollen into little hamburger balls, she protested mightily, reminding me that I'd already sent two human beings to the hospital with allergic reactions to my pollen. I told her I'd keep a close eye on Spot, but she remained adamant. I had to treat the dear boy on the sly. His relief from biting and scratching proved so dramatic that my good wife pronounced Spot's recovery "a miracle."

Marilyn's blue heeler Pepper broke out in agonizing belly rashes, until we started serving him pollen with every meal, mixed in with his raw egg. He's all better now. This would appear to be "a miracle."

Both Marilyn and I eat pollen to curb our own seasonal allergic outbursts.

Insomnia inexplicably crept into my Golden Years. I unconsciously choose the wee hours to solve my problems, and the world's. But a couple of spoonfuls of honey helps me sleep. I got the idea from Dr. Ron Fessenden, author of "The Honey Revolution." Dr. Fessenden argues that honey is unlike other sugars, in that its nearly 1-1 ratio of fructose and glucose activates the conversion of glucose to glycogen in the liver. Glycogen feeds the brain during our nighttime fast, diverting the wandering thoughts that keep us awake.

So I sleep better with a couple of dollops of honey before bed. I try to remember before bedtime. I always awaken in the night to nature's call. After I get up, and then start to fret, I tell myself, "Ed, sort it out in the morning. Take a deep breath. Now sleep." I throw my arm around Marilyn and rest easy. Psychosomatic cure? What difference does it make? I'm not a sleep scientist. I'm an insomniac. I only care about results.

When Marilyn got diagnosed with a melanoma on her arm, the docs cut it out, leaving a two-inch gash. Marilyn threw away the antibiotic cream the nurse gave her and treated her wound with a 1-1 mix of honey and Aquaphor. She healed nicely, thank you. We learned about this honey ointment at the Western Apiculture Society meeting in 2013. Rhode Island physician Dr. Allen Dennison showed us how to make our own. Now Marilyn and I never leave home without it.

My dermatologist likes me to come in for periodic "blue light" radiation treatments of pre-cancerous lesions on my bald pate. But I learned that when I rub honey ointment on my head, these growths gradually disappear, without the blue light.

Some of our neighbors across the Pacific eat drone brood to treat the old man's curse. I can tell you that I have eaten it. I sampled rich and buttery drone brood in the bee yard only last week. That's all I have to say about that!

I paid a visit to the emergency room for atrial fibrillation the other day. First time in a decade. It's pretty unnerving when your heart goes crazy. The doctor administered a drug to slow my heart rate, and I converted back to a regular heart rhythm, right there in the ER. Lucky me! They didn't have to put me under and shock me, like they did the first time I had a-fib.

Valley View Hospital is reportedly one of the priciest in Colorado. I'm a do-it-yourself guy, and I have qualms about running up astronomical medical bills, even if I don't have to pay them myself. My ER doc and I used to work together on the ski patrol in Aspen. I remember when he went off to medical school. I said, "Charley, I have this solar electric fence around my beeyard, to keep out hungry bears. I was thinking, if I dropped my right knee to the ground and grabbed hold of the fence with my left hand, I ought to get a good blast down my arm, right through my heart, and out my knee.

"But what if I killed myself, or put my heart into some even more bizarre rhythm? I've got Medicare. I have supplemental insurance. Why would I do this? It could go all wrong. They'd probably send out the coroner. It would make the paper. It might even make 'News of the Weird.'"

I was dead serious, but once Charley and the nurse started laughing, they couldn't stop.

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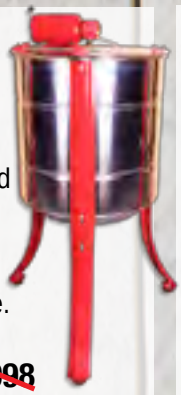

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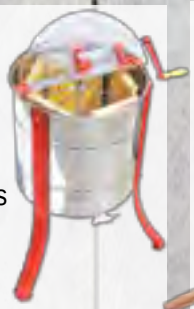

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