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Features . . . Bee Culture . . . The Rest

Canada Needs New Kind Of Beekeeper

It does not take a "Rocket Scientist" to figure out that there is a huge opportunity to supply the demand for replacement honey bees in Canada! In my little bee business, I could have sold over 1,000 nucs this spring if I had them to sell. The demand is there for Canadian grown honey bees! We obviously need a new brand of beekeeper that is totally focused on producing and selling honey bees to other beekeepers. We need this group of people (and it will take many beekeepers dedicated to this specialized industry to accomplish a significant impact on the large numbers of bees we need) to focus only on this one major core goal for their business.

The technology to produce large amounts of honey bees is developed in each region of Canada now! We do not have to go out and reinvent the wheel! We just have to learn from those in each region that are currently carrying out these practices! There are different methods to produce honey bees depending and where the beekeeper is located. In BC package bees can be produced early. On the prairies beekeepers have been very successful at overwintering nucs indoors. In Ontario we can Winter double nucs with a second split box outdoors quite successfully. We need more of our extension activities to focus on this specialized segment of the Canadian beekeeping industry so that more people are trained in this focused segment of beekeeping.

Marketing of these Canadian produced honey bees is the key to making this segment of the Canadian honey bee industry viable. Commercial beekeepers need to support those who make the effort to supply this segment of the demand for honey bees. It may mean changing some practices to accommodate sourcing bees from Canadian sources. The beekeepers who take on this specialized and focused business have to realize that they will only be successful if they develop long term working relationships with the beekeepers that they sell their bees too. It is a two-way street when you are dealing with a biological product such as live honey bees. Both sides need to help the other when things do not work out quite as planned.

Breeding of honey bee stock that is adapted to Canadian conditions is an obvious direct benefit of developing a segment of the Canadian beekeeping industry that supplies honey bees to other beekeepers here in Canada. These honey bee producers should be focused on breeding from selected Canadian stock that is productive in Canadian beekeeping operations. The purchaser of the stock should select the exceptionally productive queens and return them to the breeder to include back into their breeding program. Not all beekeepers that produce bees for others should necessarily focus on the breeding. That should be left to those individuals who have a bent for that even more specialized part of beekeeping. We need many beekeepers that will mass produce honey bees using breeder queens selected by those elite breeders of honey bee!

We need a government incentive program to encourage the development of this specialized segment of beekeeping in Canada. This needs to be a federal program so that all beekeepers across the country can access this money. Provinces should supplement what the Federal government does in each province to develop those provincial applications of such a program so it would be tailored to the needs of beekeepers in each province. We live in a very diverse country and the needs of beekeepers vary according to the geographical area that they live in with the various beekeeping opportunities that exist in each province.

We do have those who sell bees to other beekeepers now and they are doing everything that they can to supply bees! We just need more beekeepers working in this area to meet the demand! Hopefully this gets some beekeepers thinking about not producing honey but bees.

Doug McRory
Reprinted from Hive Lights

Skunk Problem

I read with interest the comments made to the question on 'How to deter skunks' (Skunk Problem, Ask Phil, *Bee Culture Aug 2014).*

I have tried the tack strips without much success.

The after it became necessary to have an electric fence due to black bears in our area of New Jersey, I had the idea of "electrifying" the hive entrance. I simply ran a strand of wire in front of the landing board on the hive, hooking it to the fence surrounding the hive area.

I have not had problems since, although skunks continue to be around

Friedrich Knapp
Schooley's Mountain, NJ

Bee Apocalypse Reality Check

Claims of the Apocalypse about managed hives ignore the apparent decrease in feral populations (there certainly seemed to be a lot more honey bees in crocus, dutch clover and residential flower gardens & lawns when I was a kid).

I have been getting more and more vocal locally about the hijacking of the bee crisis by the environmentalists.

If you google "What's killing the bees" the majority of articles are about pesticides, GMO and Monsanto. With headlines like:

What's killing the honey bees? Mystery may be solved.

Pesticides appear to play a key role in killing off the honey bee population, according to a new study from Harvard University.

Scientists discover what's killing the bees and it's worse than you thought.

But in a first-of-its-kind study **www.plosone.org/article/info%3Adoi%2F10.137%2Fjournal.pone.0070182#authcontrib** published recently in the journal PLOS ONE, scientists at the University of Maryland and the U.S. Department of Agriculture have identified a witch's brew of pesticides and fungicides contaminating pollen that bees collect to feed their hives.

Scientists may have pinpointed what's killing the bees: Yep, it's the pesticides.

Looks Like the Leftist Fringe Was Right About What's Killing the Bees.

After years of wait-and-see news reports, things are getting cinematic: The evil chemical corporation might be the bee murderer after all, but if it is, it's not going down without a fight.

news.vice.com/article/monsanto-s-herbicide-might-be-killing-farmers *Monsanto's herbicide might be killing farmers. Read more here.*

The sheer volume of articles submitted by environmentalists and their supporters seem to overwhelm the information channel.

Locally, one of the famous "bees are dying" movies was held locally at the Carmel Indiana library by an environmentalist group. They advocated planting only native flowers (which is fine, particularly for native bees, but frankly, some of the best forage for honey bees is non-invasive plants from Europe, home of our honey bee). But then they went on and said, effectively, 'we must lobby the state legislature to fund light rail transit, to save the bees.'

[Incidentally, the cost of a $2 ticket - each and every ticket - was estimated to need about $18 of tax money to break even].

The cell phone non-study, the Einstein quote, and the study by Chensheng Lu, and the PBS "Silence of the Bees" with the totally dishonest segment on China pears and chicken feathers (there are countless examples) – all take on a life where debunking is ineffective. When confronted with the data debunking their point, they act like promoting a falsehood is acceptable if it helps the final goal.

Like everyone else, I'm cautious about pesticides. After all insecticides kill insects. But this hesitancy had, for a long time, made me too cautious to speak out for better balance.

Well, I'm speaking out now.

Rob Green

Call For Beekeeping Stories!

We know every beekeeper has a story and we want to hear yours! Wicwas Press LLC invites you, your spouse, partner, or friend to submit a story about honey bees or beekeeping. Send us your final version in a Word or Pages file, not a PDF. You may send up to three submissions. We're open to true stories, fiction, and poetry. Entries over 1500 words for essays or three pages for poetry will automatically be disqualified. All entries will be considered by our selection committee with selection emphasis on new ideas and old concepts presented in a new way. Swarms stories will be hard to impress us.

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Third prize - $200.00
There is NO FEE to enter.

Winners and others selected will be published in an upcoming anthology. All submissions must be your own work and not previously published in any form. Those chosen for the anthology will receive a complimentary copy and may purchase additional copies at a reduced price. Wicwas Press LLC reserves first rights to publish your work and to edit your submission. We also retain the right to cancel the contest or not award a prize if our standards are not met.

Stay in touch! We want to hear from you soon! The deadline is March 1, 2015. We'll be looking for your stories! Please send submissions to: Electronic: submissions@wicwas.com (Word or Pages file, not PDF).

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Larry Connor
Kalamazoo, MI

Pollen

Dr. Clarence Collision wrote an article on bee pollen describing the process of collection and storage of pollen. The pollen is collected then combined with bee saliva before being stored as bee bread for the feeding of larva. It seems that the bee bread is the major source of protein for the developing brood. Dr. Collision notes that the pollen undergoes a fermentation process with the help of various species of bacteria and yeast before being fed to brood.

Is there any relationship between colony failure and the new pesticides, fungicides and systemic insecticides? While the quantities of neonictinoids are small but perhaps they are changing or stopping the fermentation of the pollen. This could lead to problems in the development of the brood.

I have often read about the need to remove old comb from hives because of the build up of toxins in the wax. What is the solution if the pesticide is in the pollen and not the wax?

Steven Manis
Gautier, MS

Editor's Note: *Yes, you are heading in the right direction. The newer systemic fungicides have been causing these exact problems, disrupting this process, but also digestion issues inside the bee herself. You will see, on occasion pollen that has been covered with wax – it's been called entombed pollen. That's because of this – and that frame of pollen is worthless to the bees. Good catch. Watch for it – and keep replacing old comb. Some of the work at the Tucson lab shows this, and some from Penn State also . . .*

Correction

In our August issue in the New Product Section we put an incorrect web page for the Beautiful Beehives. The correct web page is www.beautifulbeehives.com. Our apologies for the inconvenience.

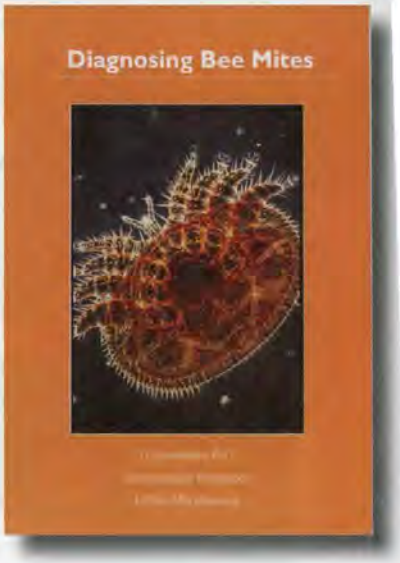
New Reading For Fall –

Care of Bees in Warre and Top Bar Hives. By Joe Bleasdale. ISBN 9781908904584. Published by Northern Bee Books. 9-1/2 x 6-3/4". 112 pages. Color throughout. Soft cover. Available at bookstores and Amazon. $20.00.

The author has been keeping bees for more than 30 years, and that amount of experience pays off when dealing with these hives. Although he addresses the needs of both, especially in comb formation and handling, the real value of this book is the knowledge he shares about bees and beekeeping in general. Although there are many photos, there are more pencil sketches, which to me make more sense. They simply show what's important, rather than trying to impress you with stunning visual closeups that have little value for learning. If you have either of these hives you should take a look at this book. You'll learn something new about caring for bees in these hives, and who knows, you might learn something new about bees.

The BEE. A Natural History. By Noah Wilson-Rich. Published by Princeton University Press. ISBN 9781400852192. 224 pages. 8" x 9". Color throughout. Hard cover. $27.95.

Written for non-scientists, and non-beekeepers, this book explores many aspects of many kinds of bees. Solitary, bumble, stingless and honey bees are all examined in some detail, but it's honey bees that are the focus of the work. There are chapters on development, biology, behavior and even beekeeping. If you've been keeping bees for more than a couple of years there is very little here that's new, but it wasn't written for beekeepers, though how to start is covered just in case a non-beekeeper gets excited after reading this. The redeeming aspect of this book are the photos and detail of the bees other than honey bees, showing size, diet, habitat and geography, a good description, life size silhouette, and enough about life cycle and behavior to have a good feel for the insect. If these interest you, this is the book for you.



Diana Sammataro's book is extremely practical in its approach, and gives the reader an excellent summary of the very latest methods of diagnosing varroa, and other mites, in colonies, what tolerance/threshold levels are acceptable, and how, when, and with what, the bees should be treated.

Both colony and apiary sampling are covered and she emphasises how important it is to keep records of the results so that an overall picture of varroa infestation can be ascertained.

Diana warns beekeepers of the dangers of relying on chemical treatments – not only because of the build-up of residues in the wax, but importantly, too, because it can lead to the mites becoming resistant to the products used. A diagram is given to illustrate what methods of Intergrated Pest Management can be utilised, and expresses the importance and value of colonies which can show resistance to the mites.

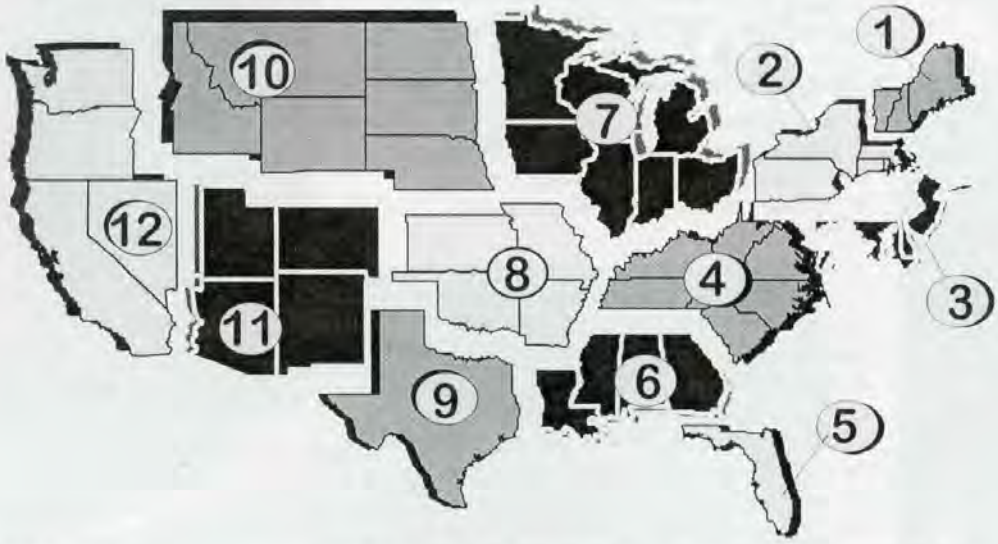
Acarine and exotic mites, including the various species of Tropilaelaps are given good coverage; while the former may have succumbed to varroa treatments, Tropilaelaps, though on the horizon, is an Asian pest that we hope will not reach our shores.

An excellently-produced, uncluttered book, by a beekeeping expert of international standing, which will be of enormous benefit to its reader by giving a realistic picture of the presence of mites in the apiary and the methods by which they can be successfully treated.

Purchase from Northern Bee Books for $12.

John Phipps

OCTOBER – REGIONAL HONEY PRICE REPORT



Selling Honey

We asked our reporters several questions this month on their honey crops, and a bit about where and how they will be selling this year's harvest. The answers are telling, and provide some clues on what the total honey harvest will be later this year, when everybody weighs the results.

First question was on prices, and the answer surprised everybody here. Will prices rise? 57% say they will actually decrease their prices, 38% will remain the same, and only 4% are increasing their price. Only 28% will buy from other beekeepers and resell, while 40% won't buy any, with the rest not sure yet if they will have to.

About 85% sell only retail, so even though wholesale prices are going up, they won't change. But those that do sell both retail and wholesale aren't going to change much, with about an even split on how much they sell in both cases.

The harvest this year is all over the map. 4% have essentially no crop at all, 25% didn't do well, but got something, 33% have an average crop this season, while 29% are doing OK, but only 8% have a new-truck-this-year crop. Interestingly, that 8% are almost all in the Midwest and the east coast.

We also asked where they sell their honey. And, as you might suspect, honey is sold in more than one place by most beekeepers.

59% of all our reporters sell honey directly from home, but they only sell about 43% of their crop there. 17% sell honey at work, which can sometimes be tricky, or easy, but they only sell about 25% of their crop there. 41% sell more than half, 53% of their crop, wholesale already bottled and labeled, to stores and other locations.

Not very many, only 21% of our reporters sell bulk wholesale, and even then they only sell about 20% on average of their crop that way. Of course a very few, 12% sell everything bulk because they make so much, and sell so much.

About 40% sell in other places. A lot, 33% in farm markets, and locations like county and state fairs, craft sales, health food stores on consignment and the like.

So when it comes to selling honey, there's more than one way to make a buck. Don't neglect any of these outlets.

	REPORTING REGIONS												SUMMARY			History	
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	$/lb	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																	
55 Gal. Drum, Light	2.20	2.25	2.20	1.92	2.20	2.32	2.42	2.20	2.20	2.18	2.34	2.45	1.65-2.65	2.25	2.25	2.17	2.02
55 Gal. Drum, Ambr	2.04	2.00	2.04	1.92	1.80	2.20	2.34	2.04	2.04	2.04	2.19	2.35	1.40-2.50	2.14	2.14	2.14	1.88
60# Light (retail)	217.00	225.00	175.00	185.83	180.00	182.50	194.00	190.00	201.76	171.00	176.00	240.00	150.00-270.00	193.52	3.23	193.73	168.70
60# Amber (retail)	224.67	230.00	175.00	181.67	180.00	180.00	179.60	170.00	192.96	180.00	166.50	240.00	144.00-250.00	188.93	3.14	194.15	169.00
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																	
1/2# 24/case	88.13	88.49	74.40	71.48	76.83	60.00	54.53	76.83	76.83	51.84	86.40	100.00	45.60-108.00	76.87	6.40	83.63	70.13
1# 24/case	133.39	124.18	123.60	97.50	108.00	116.74	92.80	102.00	120.03	107.16	108.00	130.80	79.20-172.80	114.06	4.23	113.45	104.38
2# 12/case	123.48	107.49	115.20	87.33	99.00	94.43	86.44	108.00	104.80	97.44	96.00	106.00	72.00-144.00	101.59	4.23	102.00	95.25
12.oz. Plas. 24/cs	118.96	95.18	76.80	79.87	79.20	79.20	70.20	89.60	89.55	74.40	105.30	102.35	48.00-134.40	87.91	4.88	91.11	82.20
5# 6/case	153.33	123.59	108.00	93.88	126.00	120.00	103.98	117.00	122.76	102.10	110.40	130.00	83.10-175.00	116.48	3.88	116.47	106.71
Quarts 12/case	170.00	190.81	85.00	120.50	144.00	117.44	142.50	124.00	146.79	125.64	131.70	141.00	60.00-262.00	132.57	3.68	134.35	126.84
Pints 12/case	99.50	115.25	102.00	80.80	84.00	74.17	121.20	66.00	90.96	60.00	96.80	95.67	48.00-144.00	85.92	4.77	88.17	79.12
RETAIL SHELF PRICES																	
1/2#	5.05	4.95	3.92	4.05	4.41	3.50	3.28	2.19	4.41	3.80	3.98	6.00	2.19-7.25	4.11	8.22	4.19	3.89
12 oz. Plastic	6.75	5.65	4.00	4.56	5.00	4.75	4.24	4.76	5.53	4.08	5.55	7.05	3.00-8.99	5.07	6.76	5.10	4.73
1# Glass/Plastic	7.42	6.88	6.81	7.02	7.00	6.94	4.86	6.06	7.30	6.03	5.85	9.66	3.00-13.00	6.61	6.61	6.42	6.19
2# Glass/Plastic	14.19	10.30	13.38	10.00	11.95	9.80	9.20	12.50	11.53	10.04	8.49	16.00	6.29-18.00	10.91	5.46	10.77	10.47
Pint	10.00	12.02	11.00	8.72	8.25	7.81	12.25	6.55	20.00	7.86	8.56	11.13	4.00-20.00	9.25	6.16	9.03	8.29
Quart	18.50	18.13	18.50	14.75	15.00	13.12	14.47	15.75	35.00	14.66	14.79	17.60	8.00-35.00	15.69	5.23	15.11	13.40
5# Glass/Plastic	30.00	21.89	31.50	22.88	25.36	33.00	22.11	29.00	25.36	20.60	17.88	30.00	14.89-38.00	24.27	4.85	24.23	21.63
1# Cream	9.83	7.24	11.00	7.19	10.08	8.00	9.62	5.99	10.08	6.75	8.12	9.00	5.00-19.00	8.17	8.17	8.06	7.42
1# Cut Comb	10.75	7.98	11.00	8.42	11.10	8.17	8.95	8.00	11.10	10.00	9.50	17.00	5.00-20.00	9.70	9.70	9.39	8.43
Ross Round	12.00	9.95	8.99	6.42	8.99	7.00	10.50	12.00	8.99	8.99	8.75	8.99	6.00-12.00	8.97	11.96	8.79	8.28
Wholesale Wax (Lt)	6.80	8.13	7.00	4.55	3.20	6.33	5.93	5.67	5.00	6.00	4.00	4.25	3.00-10.00	5.82	-	5.92	5.26
Wholesale Wax (Dk)	5.83	6.38	8.00	4.28	3.15	4.83	5.50	5.75	5.00	4.99	2.87	4.25	2.00-8.00	4.98	-	5.02	4.67
Pollination Fee/Col.	99.25	80.00	115.00	64.67	70.00	63.67	57.00	85.00	95.41	80.00	129.00	117.50	35.00-185.00	80.83	-	87.22	74.04

INNER COVER

I seldom, maybe never is better, talk about meetings I attend. If I happen to pick up some good or new information, and I usually do, I'll use it later in context and credit the source but with little mention of of the meeting it came from. That's because most meetings I attend are like most meetings you attend – pretty predictable.

Predictable is good, at least for me when I'm on the road. Travel is stressful and predictable makes any travel less so. But predictable is also, usually, not exciting; airport, connection, airport, cab, hotel, meeting, hotel, cab, airport, connection, airport, home. Four planes, three airports, two cabs, one hotel, one meeting.

On occasion I get to skip the hotel and bunk with one of the meeting planners. You learn so much more when that happens – local beekeeping, food, people, and social life. Plus, you don't have to figure out the airport-hotel-meeting-hotel-airport transportation thing. Someone local who knows how it works takes care of that – and thank you.

Adding to the predictable is that most meetings are more or less the same, no matter local, state, regional or even a national gathering. Good meeting planners do that on purpose so those attending know what to expect. An introduction, talks and workshops, break, talks and workshops, lunch, more of the same after lunch, then done, or done for the day and a similar schedule tomorrow. I like that schedule. I'll know what I want to do when and where it will be. Predictable, but not exciting.

Well, let me tell you about a couple of meetings I've been to recently that broke every one of those rules. The planners of both were a bit apprehensive about pulling it off, and both were a bit of a gamble, but here's how they did it.

The Omaha, Nebraska Bee Club wanted to try something different. They have an active community out-reach program that works hard to get good beekeeping, pollination and honey bee information out into the community. They have an aggressive swarm call and bee removal program, club bee yard and regular meetings. They are only four years old but they have an annual Bee Fest, where they sponsor an all-day program for the public with bees and demonstrations. This year they wanted to ramp up the action by adding The Great Plains Beekeeper's Workshop, where they'd do the regular Bee Fest, but at the same time bring in a day's worth of speakers for their members and the public to share. So they invited several local "bee businesses" to show and sell their bee related items – beeswax soap, candles, cookies, ointments and the like, along with the nearby Council Bluffs Dadant branch plus some food vendors and the club's usual information table and observation hive.

They held this at the County Extension Center with a big parking lot, a large covered area and a big classroom. All the community players were outside under cover, and the all-day list of speakers was in the classroom. It was a mix and mingle day with regular folks and beekeepers coming and going as their schedules permitted. A speaker schedule had been published and they were kept on time, but folks came and went.

While there I talked with Tim Tucker, President of The American Beekeeping Federation, met an Extension guy that had a lot of good information on trellised apples I've been looking for – he would have been called a nozzle head in his younger days – and munched on some excellent food whenever the mood came by.

Perhaps better was the time I got to spend with Tony Sandoval and the rest of the local planners who made all this happen. Because I wasn't at a hotel I got to see much of Omaha including the site of the old A.I. Root Company Beekeeping Equipment factory over in Council Bluffs. Plus a lot of other people's bees and beeyards. I stayed with a beekeeper that runs a small farm market farm – blueberries, melons, apples, veggies and of course bees and his honey house. To see how innovative beekeepers solve the same problems in so many different ways is a continued source of wonder to me, and this was no exception. Thanks, Omaha, for a great meeting and weekend.

On to Boise, Idaho the very next weekend for an even less predictable, and very active five days. Let me introduce you to the Treasure Valley Beekeeping Club (TVBC) and their Honey Bee Day celebration. And, to Steve Sweet and Liz and Kevin Duesman and a whole community of Boise beekeepers who organized their very atypical bee meeting.

I arrived Thursday after lunch and Kevin took me to his incredible house with goats, chickens, apples, peaches, bees, a workshop and more, where we stashed my stuff and headed off to the University for a tour of the incredibly blue football field. From there it was downtown for a pub crawl (that's just what it sounds like, by the way), then supper and home. Friday we headed out to The Foothills Learning Center, a nature center just out of town where TVBC and the staff work together with bees, maintain a pollinator garden and offer programs for the public on bees and beekeeping. There, about 20 kids from various other schools gathered to look at the observation hive, listened to the beekeepers talk about honey bees and pollination, and finally dress up and go look at real hives being examined. When finished there was a short ceremony where TVBC present-

Better Meetings.

ed a $1000 check to the center for their work and help.

After that, several of the TVBC members took their Apprentice Level tests (part of their larger Master Beekeeper program) with the Center's bee hives, identifying members of the hive, evaluating their winter readiness, and accessing any problems encountered. This Master program works closely with the Oregon Master's program heavily influenced by Dewey Caron's input. It's multi-level, multi-year and an excellent example of ongoing learning. After a few questions they all passed and it was on to the next event.

Friday night was the First Annual NHBD BBQ for the group (last year was the Inaugural NHBD BBQ with John Miller as the guest), and about 70 folks showed up for the good food and times at a park on the edge of town. The club furnished the BBQ brisket main course and drinks, and members brought all the rest.

Saturday. Downtown again for the weekly Farmer's Market – timing is everything they say, and Honey Bee day and Farm Markets go hand in hand. The group put up a booth with an observation hive and gave away honey sticks and talked bees from 9:00 a.m. – 1:00 p.m. I got to walk all three blocks of the market, and ended up talking to kids and parents about bees at the booth. Then it was off to the 240 acre Idaho State Fair on the outskirts of town. The Ag folks were excited about having a bee talk sponsored by the TVBC and they had an incredible lunch for us prepared by a locally famous chef with every course made with honey. Fabulous! After lunch, the first of three talks that day to a great group of mostly brand new TVBC members who came for the fair and the talk, but others were there too who weren't yet beekeepers and were keenly interested in getting started and wanted to know what to do. We gave them an earful for over an hour. At the same time in the Ag Display building next door, the TVBC had a booth showing bees and beekeeping gear and talking bees all day.

Then, back to the Nature Center to meet with a more advanced group of TVBC members who wanted to know about honey bee nutrition – so we filled them up with all that information for over an hour. There were more people than chairs, which is always heartening. They went home, I hope, full of the nutritious snacks that were there and good information they can use.

Don't stop. It's back to the state fair again for supper and to talk to still another group of TVBA members who were past advanced, but not by much, so we discussed Second Season for more than an hour. The room was overfull and there were a ton of questions at the end. I love the question part because I almost never know the local answer so can turn to one of the members and get them involved. Everybody wins then. That wrapped up Saturday, except for the S'mores by the campfire back at Liz and Kevin's.

Late Sunday morning we headed back to the University for another talk – this one on The Hot Topics of the Day, to a full room of University people and yet a different group of TVBA members who couldn't make it to any of the other offerings. This was for anybody interested in the beekeeping industry, including the global honey market, honey bee health, and for kicks, my predictions on all of this. Then out to their roof apiary to have more Apprentice exams, but this time with a crowd of beekeepers and others watching. The University supports the rooftop bee program and the people who take care of the bees and they get a lot of help from TVBA members, especially Steve Sweet. But you wouldn't believe what they sell their honey for in the bookstore.

Here's the genius in all this. For the TVBC members there were four different presentations, offered in four different places and times. At the same times, their public presence offered six different presentations at six locations. The Omaha folks did the same, on a smaller scale, reaching out to both beekeepers and the public simultaneously.

The rest of Sunday was spent visiting a local winery, and a drive through the agriculturally rich part of the Snake River valley.

Monday. Breakfast with the Organizational Nine – the folks who did yeoman's work (missing a couple because they actually have day jobs), and a recap of the program...what worked, what didn't and why, and a recovery of sorts, and I learned the neatest trick with a table knife you've ever seen. Good, and talented, people.

A last Hurrah was the quick trip down the road to visit the Noyes, a commercial outfit that overwinters indoors, but that's a story for another time. And then – back to the airport and done.

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Planning meetings like these – one or more days, different venues, events and crowds – takes time and energy and people and planning. They certainly aren't predictable, but because they are spread out over space or time many more, and many kinds of people are able to take advantage of the events that are all tied together. For the TVBA the public had ample opportunity – the Ag building demo and two talks in the lecture hall at the fair, the Farmer's market booth, the University roof top and kids and adults at the Nature Center, to touch base with bees and beekeeping. The Omaha group had a single location, but several ongoing events inside and out that both beekeepers and the public could enjoy at the same time.

Maybe the best part of this was that I got to see both from the inside. So thanks folks, for two fantastic, unpredictable weekends.

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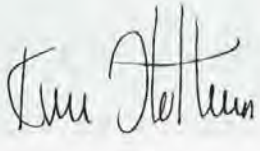
October. Winding down for most of us. I hope it's been good. All the predictions are for a Winter to remember because of how bad it's going to be. Hunker down folks. And keep that smoker lit to keep warm, your hive tool sharp to cut wood, and your veil tight to keep out the snow.



It's Summers Time –

We spent a week in southern Oregon visiting Kim's daughter, Jessica. It's a beautiful place. If you haven't been there and you get the chance you should go.

It's a long travel day for us, even when everything goes smoothly. This time ours didn't go smoothly. We got to check-in at the Akron Airport and were promptly told that our first flight of the day had been cancelled. Not a good way to start. So we got on another flight out of Cleveland. Yes, back in the car and drive quickly to the Cleveland airport, which is about an hour away. Of course now we had to get our return flight changed because our car was now parked at the Cleveland Airport instead of Akron.

But we eventually got to Eugene, very late because of a plane with a broken door in San Francisco. It was that kind of a day.

In spite of the bumpy start we had a great visit with Jessica and her husband, Brett. They live in the small town of Myrtle Creek.

There are mountains all around and everything is dry, dry, dry. The day after we got home Jessica sent photos of a fire along the freeway not far from her house. There are signs all along the freeways and when you are driving on mountain roads that tell you what the risk of fire is for the day – most days we were there it was high risk.

One day we drove up into the mountains to Crater Lake. I hadn't driven on mountain roads in many years, but it came back to me. I learned to drive in CA and we lived at the base of a mountain. So part of our driver's training was driving up the mountain. I was pretty comfortable driving on this trip.

Crater Lake is a huge lake at the top of a mountain that was created by a volcanic eruption some 7,000 years ago. It is gorgeous – the bluest blue I've ever seen. It was an amazing day – cooler up on the mountain, relaxed, not rushed and the most beautiful scenery you can imagine.

Travel home went a lot smoother. In fact because of having to change our return flight we actually got home earlier than we had anticipated. Safely home and back to those deadlines.

By the time you read this Fall should be in full swing here in Northeast Ohio. We've had a little taste of the last few days – warm sunny days and cool nights. Kim has already started his process of deciding which plants will come inside from the deck and which ones will be left to perish. Of those that he saves some come to the office to brighten things up through the Winter, some go downstairs to our wonderful plant room in the basement and the rest get scattered wherever we can find a spot for them. In the dead of Winter it's nice to have green all around you.

I enjoy Fall. The color here in Ohio is wonderful. I like the cool nights and being outside when it's not quite so hot during the day.

The chickens started molting a few weeks ago. So you know the story – fewer eggs and some grumbling from Kim. We still always manage to get at least two or three a day, so he has his breakfast covered. But I've been reading that this early molting is a sign of a hard Winter coming. Now I'm still fairly new to this chicken raising so I hadn't heard this before. So if any of you long time chicken raisers have a comment or an opinion on this, I'd love to hear from you. Is it just an old wive's tail or is there something legitimate here.

In Northeast Ohio we have the Woolly Bear caterpillar that predicts our Winters for us. Woolly Bears have 13 segments and are black on each end and brown in the middle. Traditional folklore suggests that the more black segments on either end, the harder the Winter is going to be. I haven't seen a Woolly Bear yet this year, but some have said they've seen some that are almost all black. Yikes!

So who knows what Winter will bring this year. Last year was pretty severe and long. Lots of our local beekeepers lost lots of bees. This year we'll try and leave even more honey for them than we did last year. Don't get greedy.

The chickens are happy girls right now. I guess we're all happier in the Summer time. They get an abundance of fruits and vegetables from us and the neighbor. And corn, my how they love corn. We do get wonderful corn from our neighbor Quentin. Remember we only got a few ears of our own corn. That raccoon that came up on our deck didn't touch the neighbor's corn that was right out in plain sight.

We're finishing up the third Summer with the chickens. We're still at 11, haven't lost anyone lately.

Kim is thinking about getting quail next. I guess the intention is to eat these birds. I'm not too sure how that's going to go. If I had to kill and clean my own food I'd probably be a vegetarian. I like the meat that comes nicely wrapped from the grocery store.

We're off to the next Mother Earth News Fair in PA this weekend. And next week we're flying off to Montana for the Western Apicultural Society meeting. I've never been to Montana, so this will be an adventure.

If you haven't yet there is still time to sign up for our Russian event the end of October. We have about 80 people coming and we have plenty of room for more. Hope to see you there.

Hoody Summers

A Closer Look

FAT BODIES

Clarence **Collison**

The activities of the fat bodies change as honey bee development proceeds.

Scattered all through the body cavity of the honey bee but especially in the abdomen are irregular masses of a soft, usually white tissue composed of large, loosely united cells. These cell masses are known collectively as the fat body because the cells contain, enmeshed in their cytoplasm, small droplets of oily fat (Snodgrass and Erickson 1992). Within the abdomen, fat bodies are localized subjacent to the epidermis (parietal fat body) and around the gut (visceral fat body). Fat bodies may also be found in gonads and in muscles (Martins and Bitondi 2012). Intermingled with the fat cells (trophocytes) are other cells of larger size having a pale yellowish color, known as oenocytes. These two cell types serve as the structural components of the fat body. Oenocytes are not randomly distributed among the fat cells; their occurrence is lowest near the heart and increases laterally. Between the fat body cells there are many tracheal endcells (Raes et al. 1985). The fat body is bathed in hemolymph, which is important for optimizing the secretion and uptake of molecules in spite of the basal lamina that interfaces between the tissue and the circulating fluid. Although 'fat body' implies an integrally functioning organ, this is not the case; all cells function as individual units (Morse and Hooper 1985).

The sheet-like abdominal fat body of the adult worker consists of a single cell layer lining the abdominal wall (Raes et al. 1985). It is segmentally arranged; within each tergite (the dorsal plate of each abdominal segment) the sheet is attached to the epidermis at the posterior end. At the anterior edge, the connection is much looser. Within the middle of the sheet, the dorsal fat body is kept in place by the heart and laterally by longitudinal muscles. The second abdominal segment contains only a very tiny piece of fat body. In the third segment the dorsal fat body is in loose connection with the heart. In the succeeding segments, this connection is gradually more firm until the heart divides the fat body into two lateral parts.

Fat bodies function as production and storage sites for food reserves, chiefly fats, glycogen and protein compounds. The energy stored within fat bodies is especially important during larval growth and other periods when feeding is restricted. Summer bees, which live only four to six weeks, have very few fat bodies. However, winter bees have large numbers of fat bodies, distributed throughout the abdomen. Presumably these fat bodies help the winter bees to live through the long periods of confinement. The development of the fat body into a thick, white organ, filled with protein granules during the Fall is determined directly by its protein intake (Maurizio 1961 as cited by Raes et al. 1985).

"Fat bodies function as production and storage sites for food reserves, chiefly fats, glocogen and protein compounds."

Worker honey bees in the Summer begin their adult life lean but develop larger lipid (fat) stores after a few days of consuming a nutrient rich diet of pollen and honey. After one to two weeks of elevated adiposity (fat stored in the fatty tissue of the body), they undergo a dramatic loss of abdominal lipid and subsequently remain lean for the remaining weeks of their life (Toth and Robinson 2005). Lipid loss is associated with thousands of gene expression changes in abdominal fat bodies. Many of these genes are also regulated in young bees by nutrition during an initial period of lipid gain. Surprisingly in older bees, when maximum lipid loss occurs, diet plays less of a role in regulating fat body gene expression (Ament et al. 2011).

Honey bees have two insulin-like peptides (Ilps) with differing spatial expression patterns in the fat body suggesting that AmIlps1 potentially functions in lipid metabolism while AmIlps2 is a more general indicator of nutritional status. Ihle et al. (2014) fed caged worker bees artificial diets high in carbohydrates, proteins or lipids and measured expression of AmIlp1, AmIlp2 and the insulin receptor substrate (IRS) to test their responses to dietary macronutrients. Worker lifespan, weight and gustatory sensitivity to sugar were measured as indicators of physical condition. The expression of AmIlp1 was affected by diet composition and was highest on a diet high in protein. Expression of AmIlp2 and AmIRS were not affected by diet. Workers lived longest on a diet high in carbohydrates and low in protein and lipids. However, bees fed this diet weighed less than those that

Fat bodies in the abdomen of a forager (left) and nurse or winter bee (right). From Keller (2005) and Scientific Beekeeping.

received a diet high in protein and low in carbohydrates and lipids. Bees fed the high carbohydrate diet were also more responsive to sugar, potentially indicating greater levels of hunger. These results support a role for AmIlp1 in nutritional homeostasis.

The activities of the fat bodies change as honey bee development proceeds. The fat bodies of young larvae very quickly grow to almost the size they are in the adult bee, and they store fats and glycogen. During the final days of the larval period the fat bodies are found to contain less fat, the production of albuminoid and glycogen having increased markedly. At the onset of pupation, the albuminoid granules increase dramatically in size, filling and swelling out the fat body cells. The cell membranes shrink and rupture, and the contents of the fat body cells flow into the body cavity. This material provides the nourishment needed for the rapid growth of the honey bee pupae (Morse and Hooper 1985).

The fat body has a primordial role (in the earliest stage of development) in the intermediary metabolism. During the larval stage, fat bodies are actively engaged in the metabolism of lipids and carbohydrates and in the synthesis and secretion of proteins, which are stored in large quantities in the hemolymph. The most abundant proteins in larval hemolymph are the hexamerins, also known as larval serum proteins or simply, as storage proteins. Hexamerins are high molecular mass molecules composed by definition of six subunits (Martins et al. 2011). Four different hexamerins have been found in honey bee hemolymph and fat body (70a, 70b, 70c and 110) (Martins et al. 2010).

All of the honey bee hexamerin genes are highly expressed in the larval fat body of workers, queens and drones (Martins et al. 2008). Hexamerins are massively synthesized by the larval fat body and secreted into the hemolymph. Following the larval-to-pupal molt, hexamerins are sequestered by the fat body via receptor-mediated endocytosis (An energy-using process by which cells absorb molecules such as proteins by engulfing them. They gain entry into a cell without passing through the cell membrane.), broken up, and used as amino acid resources for development completion during the non-feeding pupal stage and pharate adult stage (adult waiting to emerge from a cocoon) (Martins et al. 2011).

Hexamerin genes (Hex70a, Hex70b, Hex70c, Hex110) revealed distinct structural organizations and expressing patterns, suggesting that they have specialized functions in honey bee physiology (Bitondi et al. 2006b). Particularly the genomic architecture of the Hex 110 gene diverges from the other honey bee hexamerin genes. Its conceptual translation product is larger and contains exceptionally high glutamine content, 17.8%. All hexamerin genes were abundantly expressed during larval development, but Hex70a and Hex110 were also expressed in adult workers, and at a higher level in fertile than in functionally sterile workers. This denotes a function of these hexamerins in egg production.

In the fifth instar (developmental stage between each molt) feeding larva, all hexamerins exist in a larger quantity in the hemolymph than in the fat body, indicating intense secretion to the hemolymph. During the next developmental phase, when the fifth instar spinning larva prepares for the metamorphic molt, the abundance of all hexamerins increases in the fat body. Based on what is known about the exchange of hexamerins between the fat body and hemolymph, this increase may denote the resorption of hexamerins into the fat body, via sequestration from the hemolymph. From the fifth instar spinning larva to the pharate adult phases, the hexamerins still remain relatively abundant in the fat body, although HEX 110 is the less abundant. The abundance of all hexamerins in the fat body decreases to basal levels near the time of adult emergence, i.e., at the end of the last pharate adult phase. However, HEX 70a levels increase again in the adults, where this protein persists, even in foragers.

Hex 110 transcripts (first step of gene expression in which a particular segment of DNA is copied into messenger RNA (mRNA) by the enzyme RNA polymerase) were found in high levels during the larval stages, then decreased gradually during the pupal stage, and increased again in adults. HEX 110 subunits were highly abundant in larval hemolymph, decreased at the spinning-stage, and remained at low levels in pupae and adults. In 5th instar larvae, neither starvation nor supplementation of larval food with royal jelly changed the Hex 110 transcript levels or the amounts of HEX 110 subunit in hemolymph. In adult workers, high levels of Hex 110 mRNA, but not the respective subunit, were related to ovary activation and also to the consumption of a pollen-rich diet (Bitondi et al. 2006a).

Stage-specific expression profiles were determined as well as the action of hormones and of the diet in controlling the expression of hexamerin genes (Bitondi et al. 2006b). They also measured hexamerin messenger RNA levels in worker bees differing with respect to their reproductive status and in testes of developing drone pupae. Hex 70b expression was maintained at high levels for a prolonged period of time in larvae treated with juvenile hormone or 20-hydroxyecdysone thus indicating a positive hormone regulation at the transcriptional level. Adult workers responded to the lack of dietary proteins by reducing the amount of Hex110 transcripts or HEX70b subunits, thus showing that hexamerin expression depends on diet quality. Interestingly, in testes of drone pupae, Hex70a expression increases in parallel with the time reported for the final development of ⇨

spermatozoa, suggesting a function in spermatogenesis. Their findings support the premise that honey bee hexamerins are involved in specialized functions related to different physiological processes in honey bee ontogenesis (origin of an individual). The transcript and protein subunit of HEX 70a, were also detected in ovaries and testes (Martins et al. 2008, 2011).

Honey bees are sensitive to earth strength magnetic fields and are reported to contain magnetite (Fe_3O_4) in their abdomens. Kuterbach et al. (1982) found bands of cells around each abdominal segment that contain numerous electron-opaque, iron-containing granules. The iron is principally in the form of hydrous iron oxides.

Particulate iron was found within the trophocytes of the fat body of the adult honey bee (Kuterbach et al. 1982; Kuterbach and Walcott 1986a). These iron granules differed in their structure and composition from iron granules found in other biological systems. The granules had an average diameter of 0.32 ± 0.07 µm and were composed of iron, calcium and phosphorus in a non-crystalline arrangement. The granules were apparently randomly distributed within the cytoplasm of the cells, and were not associated with any particular cellular organelle.

The trophocytes (fat cells) of larvae and pupae undergo gross cytological changes during development. The cytoplasm of the larval and pupal trophocytes was never seen to contain electron-dense iron granules, even when examined at high magnification. Iron granules are present only in the trophocytes of post-eclosion (emergence from the comb) adults and have the same elemental composition as those in foraging adults (Kuterbach and Walcott 1986b). The granules increase in both size and number during ageing. Iron levels in developing worker honey bees were measured by proton-induced X-ray emission spectroscopy. The rate of iron accumulation was directly related to iron levels in the diet, and the iron can be obtained from pollen and honey, both major food sources of the bee. In adults, the iron content of the fat body reached maximum level (2.4 ± 0.15 µg mg^{-1} tissue), regardless of the amount of iron available for ingestion. Maximal iron levels are reached at the time when honey bee-workers commence foraging behavior, suggesting that iron granules may play a role in orientation. Alternatively, accumulation of iron in granules may be a method of maintaining iron homeostasis. Many of the enzymes required for energy production and respiration are iron-containing enzymes (e.g. cytochrome oxidase, NADPH oxidase). These enzymes are present in large quantities in the flight muscle, where they are used for energy production during flight. Thus flight activity creates a potentially high requirement for iron.

The iron in the trophocytes is derived, in part, from internal stores. This is shown by comparing the total iron content of the fat bodies of adults raised on an iron deprived diet with the total iron levels in the prepupae. Total iron levels in fat body of iron-deprived bees increased following ecolsion from 0.037 ± 0.005 µg (0 days) to 0.312 ± 0.003 µg (six days). Between day six and day 12, the iron levels remained constant. The total body iron (estimated by summing the total fat body iron and total flight muscle iron) of adults between 0 and 12 days post-eclosion never exceeded the total body iron of the prepupae. Since the pupae do not feed, the iron accumulated by the fat body during that time must have been derived from internal stores (Kuterbach and Walcott 1986b). BC

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The Bee's Knees

Ian **Stell**

What Is So Special About Them?

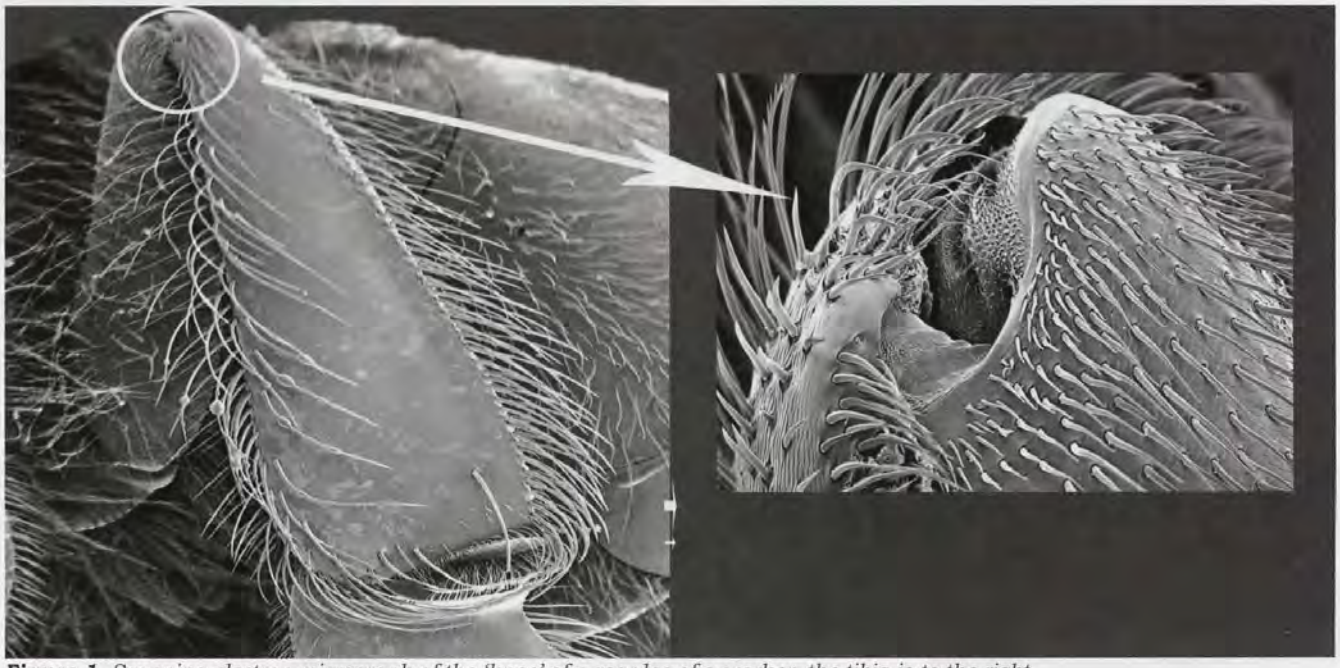

Figure 1. *Scanning electron micrograph of the 'knee' of a rear leg of a worker, the tibia is to the right.*

The bees knees – what is so special about them?

This article focuses on one particular leg joint in the honey bee, between the two largest segments of the rear leg, the femur and tibia. This 'knee' joint (figure 1) is of interest because of the relative complexity and elegance of its structure.

The knee joint is a 'hinge' joint with a transverse axis. The femoral (femur side) of the joint partly encloses the tibial side. The triangular central part of the tibial surface is 'locked' into the opening in the femur by the two prominent spines on the femoral side shown in the left panel of figure 2 fitting behind the triangle from either side. The spines fit into shallow recesses and create the pivot around which the knee bends. The tibia is able to swing up and down around these prominences. The knee needs to be able to swing through nearly 180° from fully straight to fully bent. However it is also important that the bee's knee does not move from side-to-side, as this would interfere with the leg's function in walking as the leg would not have the stability needed to swing the bee's body-weight forward. In humans this side-to-side stability is provided by ligaments. In bees this stability is provided by the two side wings on the tibial side of the joint (figure 3) which engage into hollow recesses at the widest points on the femoral side (figure 4).

The femur contains three muscles (figure 5). The larger two muscles are responsible for movement of the knee joint, the third, smaller, muscle is attached to a

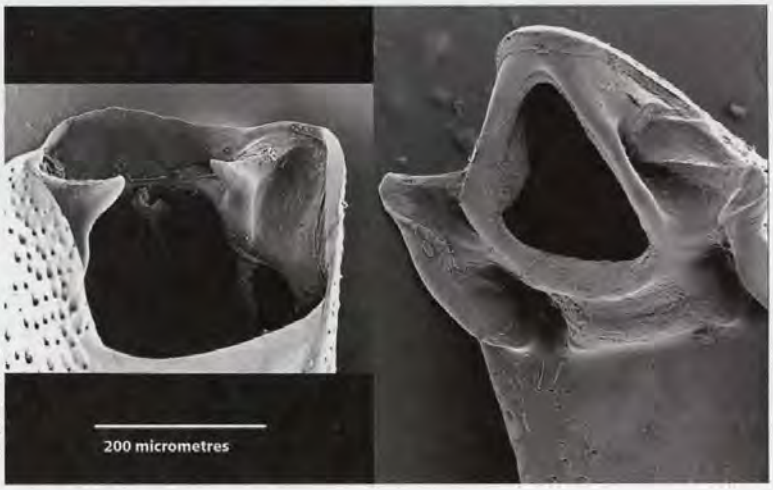

Figure 2. *The exoskeleton of the femur (left) and tibia (right) showing the two sides of the knee joint. The two prominent spines on the femoral side engage into recesses behind the triangular centre of the tibial side. This is shown diagrammatically in figure 7.*

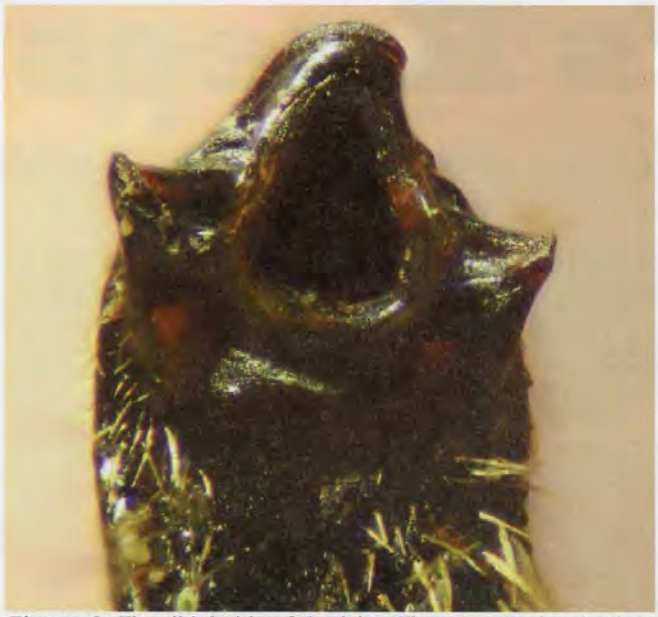

***Figure 3**. The tibial side of the joint. The two prominent wings to either side of the center are important in providing side-to-side stability.*

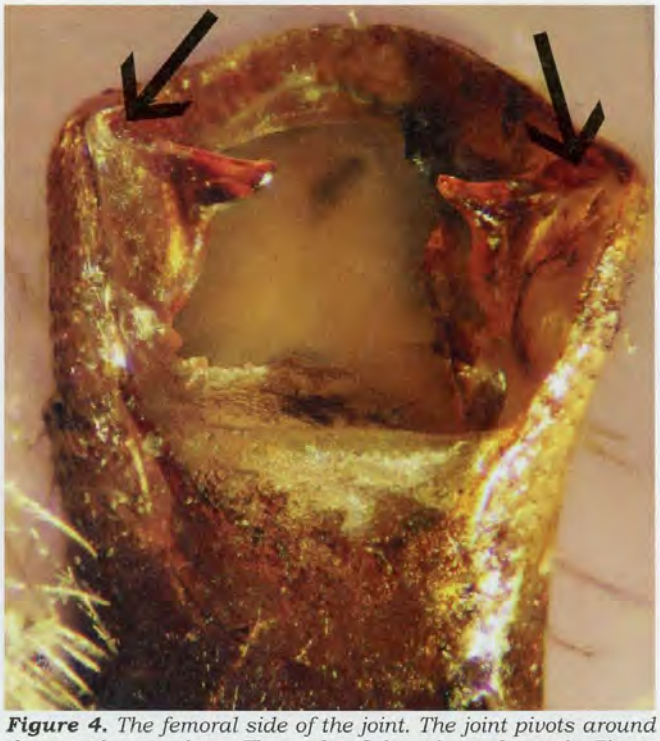

***Figure 4.** The femoral side of the joint. The joint pivots around the prominent spines. The ends of the wings shown in Figure 3 engage into hollow recesses (arrowed) ensuring that the joint cannot rock from side to side.*

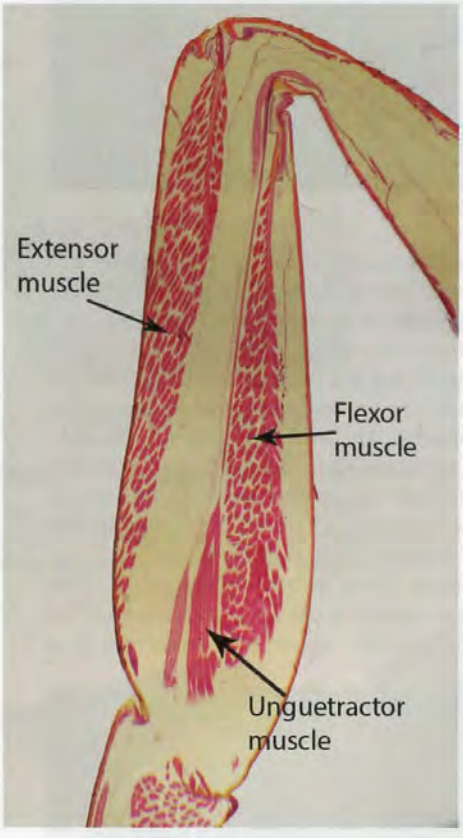

***Figure 5.** This section through the femur shows its three muscles. The extensor muscle straightens the knee, the flexor muscle bends it. The unguetractor muscle is resonsible for the grip by bending the foot segments (tarsus) and has a long tendon which passes throught he knee and beyond.*

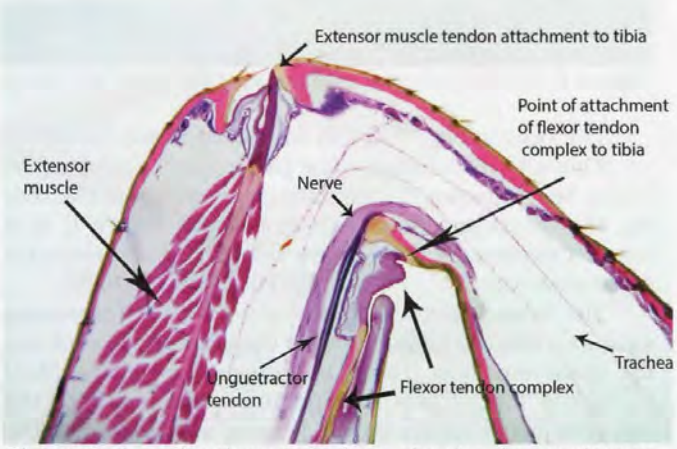

***Figure 6.** A section through the knee showing the attachments of the muscles which operate the knee. The tendon of the flexor muscle attaches to a small cuticle plate which in turn attached to a membrane (colored purple in this image) which attaches to the tibia.*

long tendon which passes through the knee joint and ultimately is responsible for flexing the joints between the small components of the foot (tarsus) and creating the grip. The large muscle running up the top of the femur is the extensor muscle, its tendon attaches to the very top of the face of the tibia (figure 6), pulling this part of the joint towards the femur, rotating the tibia around the spines and straightening the knee. The opposite muscle along the bottom of the femur is the flexor muscle. The tendon from this attaches to a small plate within the flexible membrane in the hollow of the knee which in turn attaches to the lowest part of the face of the tibia. This muscle pulls the tibia towards the femur below the spines, bending the knee.

The other main structures which pass through the knee are the main nerve and tracheae of the leg (figure 7). The nerve carries both outgoing nerve axons to muscles in the tibia, which operate the pollen press for example, and sensory nerve axons from a range of sensilla travelling back towards the body. The trachea is relatively wide, which facilitates the movement of the respiratory gases carbon dioxide and oxygen which need to pass up and down to the small tracheal branches passing throughout the segments of the leg including the narrow tarsomeres of the foot. The remaining space within the triangular opening of the tibia around the nerve and trachea allows haemolymph carrying nutrients etc to pass down the leg.

The basic arrangement of the knee joints of the front and middle legs is very similar to that described here for the rear leg. BC

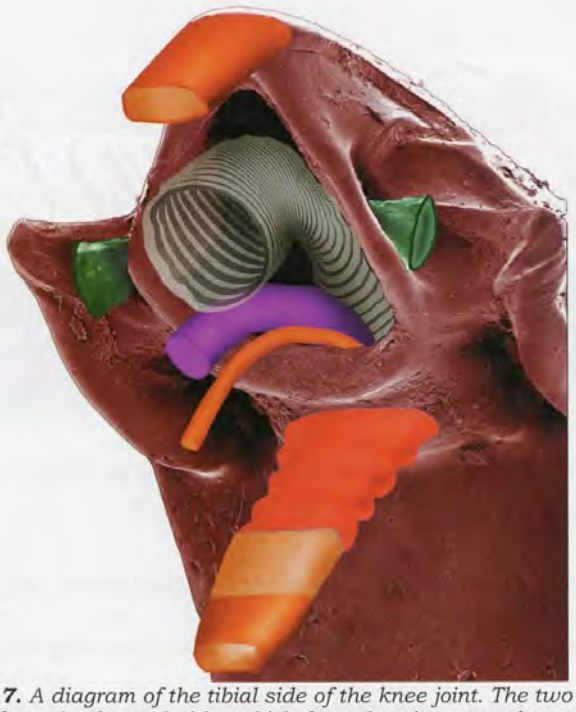

Figure 7. *A diagram of the tibial side of the knee joint. The two spines from the femoral side, which form the pivot, are shown as if cut off, and are colored green. Tendons are shown in orange, the extensor tendon at the top, the flexor tendon complex at the bottom, and the unguetractor tendon in the center passing through the opening into the tibia. The nerve is showin in purple, and the main trachea in gray.*

The Pollinator Stewardship Council

RESEARCH SHOWS IMPACT OF PESTICIDES ON POLLINATORS

Research shows, due to pesticides, our honey bees are experiencing weakened immune systems, a synergism of pesticides that affect behavior and brood development, and pre-lethal effects from exposure to pesticides.

Michele **Colopy**

Research is a systematic investigation to determine facts. A research study may encompass trial and error in the lab or in the field establishing facts and conclusions. The impact of pesticides upon pollinators has been widely researched. Quality research can be replicated. Quality research is peer-reviewed. Research tells us much about the researchers as well: their experience and knowledge of the subject, and their limitations based on time, funding, and oversight entity (be it university department, regulator, manufacturer, or private business promotion). There has been much research this year concerning the impact of pesticides on pollinators. The Pollinator Stewardship Council updates the Resources page on our website (**www.pollinatorstewardship.org**) with links to current research documents for your perusal and referral. Research findings this year show honey bees (and other pollinators) continue to experience lethal and pre-lethal (or sub-lethal) effects due to pesticide exposure.

Researchers write in "Chronic sublethal stress causes bee colony failure":

"Current bee population declines and colony failures are well documented yet poorly understood, and no single factor has been identified as a leading cause. The evidence is equivocal and puzzling: for instance, many pathogens and parasites can be found in both failing and surviving colonies, and field pesticide exposure is typically sublethal. Here, we investigate how these results can be due to sublethal stress impairing colony function. We mathematically modelled stress on individual bees which impairs colony function, and found how positive density dependence can cause multiple dynamic outcomes: some colonies fail while others thrive. We then exposed bumblebee colonies to sublethal levels of a neonicotinoid pesticide. The dynamics of colony failure, which we observed, were most accurately described by our model. We argue that our model can explain the enigmatic aspects of bee colony failures, highlighting an important role for sublethal stress in colony declines."

A study of the "Field realistic doses of pesticide imidacloprid reduce bumblebee pollen foraging efficiency" showed –

"exposure to systemic neonicotinoid insecticides in flowering crops has sub-lethal effects on the bumblebee workforce, and hence in reducing queen production." The researchers used "Radio Frequency Identification (RFID) technology to test whether exposure to a low, field realistic dose (0.7 ppb in sugar water and 6 ppb in pollen) of the neonicotinoid imidacloprid, reduces worker foraging efficiency. Whilst the nectar foraging efficiency of bees treated with imidacloprid was not significantly different than that of control bees, treated bees brought back pollen less often than control bees (40% of trips vs 63% trips, respectively) and, where pollen was collected, treated bees brought back 31% less pollen per hour than controls. This study demonstrates that field-realistic doses of these pesticides substantially impacts on foraging ability of bumblebee workers when collecting pollen, and we suggest that this provides a causal mechanism behind reduced queen production in imidacloprid exposed colonies."

During foraging activities honey bees are exposed to pesticides and beehive chemicals. Many of these agrochemicals are tank mixed creating new chemistry. In the study, "The synergy of xenobiotics in honey bee *Apis mellifera*: mechanisms and effects" the researchers showed the need for

"additional research to understand the synergy mechanisms between xenobiotics, as it is very important for the control of defined mixtures use, and also for the prediction of potential toxicity of newly developed substances in agriculture and apiculture. The main threat for honey bees are insecticides which primary molecular targets are few neuronal molecules therefore causing the impairment of neuronal system that have a profound effect on honeybee behavior, cognitive functions and physiology. However, the majority of synergistic effects observed in honey bees were ascribed to the inhibition of detoxifying midgut enzymes P450 involved in xenobiotic metabolism since most studies were done with the mixtures xenobiotic/P450 inhibitor. The main inhibitors of P450 enzymes are specific compounds used to prolong the effects of pesticides as well as some fungicides."

"Neonicotinoid clothianidin adversely affects insect immunity and promotes replication of a viral pathogen in honey bees" found –

"exposure to clothianidin, by enhancing the transcription of the gene encoding this inhibitor, reduces immune defenses and promotes the replication of the deformed wing virus in honey bees bearing covert infections. This honey bee immunosuppression is similarly induced by a different neonicotinoid, imidacloprid, but not by the organophosphate chlorpyriphos, which does not affect NF-κB signaling. The occurrence at sublethal doses of this insecticide-induced viral proliferation suggests that the studied neonicotinoids might have a negative effect at the field level. Our experiments uncover a further level of regulation of the immune response in insects, and set the stage for studies on neural modulation of immunity in animals. Furthermore, this study has implications for the

conservation of bees, as it will contribute to the definition of more appropriate guidelines for testing chronic or sublethal effects of pesticides used in agriculture."

Researchers at Royal Holloway University found bees exposed to low levels of neonicotinoids showed changes in bee behavior. Reported in *Apinews*, Dr. John Bryden, lead author said, "By understanding the complex way in which colonies fail and die, we've made a crucial step in being able to link bee declines to pesticides and other factors, such as habitat loss and disease which can all contribute to colony failure." "Exposing bees to pesticides is a bit like adding more and more weight on someone's shoulders. A person can keep walking normally under a bit of weight, but when it gets too much – they collapse. Similarly, bee colonies can keep growing when bees aren't too stressed, but if stress levels get too high the colony will eventually fail," added Dr Bryden. "Pesticides can have a detrimental effect on bees at levels used in the field," said co-author Dr Nigel Raine. "Our research will provide important evidence for policymakers. The way we test pesticides, the way we assess their impact on bees, and the way we manage pesticides can all be improved."

"Effects of insect growth regulators on honey bees and non-*Apis* bees. A review" from 2001 showed no changes to interactions with IGRs today. "The insect growth regulators (IGRs) are ecdysone or juvenile hormone mimics, or chitin synthesis inhibitors. They are more likely to be hazardous to larval insects than to adults. Application of JH mimics to adult honey bees may affect foraging behavior and some physiological traits. Topical and feeding tests revealed that application of IGRs to larvae may result in death and larval ejection by workers, malformed larvae and pupae with typical rimmed eyes, or malformed adults."

"Honey bees (*Apis mellifera*) are constantly exposed to a wide variety of environmental stressors such as parasites and pesticides. Among them, *Nosema ceranae* and neurotoxic insecticides might act in combination and lead to a higher honey bee mortality." Research published in PlosONE, "Transcriptome Analyses of the Honey bee Response to *Nosema ceranae* and Insecticides," "investigated the molecular response of honey bees exposed to *N. ceranae*, to insecticides (fipronil or imidacloprid), and to a combination of both stressors. Although *N. ceranae*-insecticide combinations induced a significant increase in honey bee mortality, we observed that they did not lead to a synergistic effect. According to gene expression profiles, chronic exposure to insecticides had no significant impact on detoxifying genes but repressed the expression of immunity-related genes. Honey bees treated with *N. ceranae*, alone or in combination with an insecticide, showed a strong alteration of midgut immunity together with modifications affecting cuticle coatings and trehalose metabolism. An increasing impact of treatments on gene expression profiles with time was identified suggesting an absence of stress recovery which could be linked to the higher mortality rates observed."

A new screening technique to analyze pesticide exposure was proposed by researchers in "Science for Environment Policy" in February of this year. "This study presents a promising technique to screen dead honey bees for a range of pesticides that may have led to their death. In all, 153 active substances, found in commonly used plant protection products, including acaricides (active against mites), fungicides, herbicides and insecticides, can be extracted and detected."

Oftentimes, the research paper title tells all such as, "Fungicide contamination reduces beneficial fungi in bee bread based on an area-wide field study in honey bee" or "Neonicotinoid clothianidin adversely affects insect immunity and promotes replication of a viral pathogen in honey bees." Our pollinators are fully experiencing everything in their, and our environment. Research shows, due to pesticides, our honey bees are experiencing weakened immune systems, a synergism of pesticides that affect behavior and brood development, and pre-lethal effects from exposure to pesticides used on blooming plants, which find their way into the nectar and pollen as well. Read the research for yourself, visit the Resources page of our website for past and present research of the impact of pesticides upon honey bees and native

pollinators. Be informed, work with fellow beekeepers and growers to protect pollinators from the adverse impact of insecticides, herbicides, and fungicides. BC

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The Gene Thief

Jeff **Harris**

"We do not steal, or kill, other people's livestock. We are better than that."

Pete Colby grew sick and tired of that big mouth spewing tall beekeeping tales. The mouth belonged to his nearest commercial beekeeping neighbor and rival – Rhett Hume. Although they grew up in the same small southern town and attended all grade levels of school together, they were not friends. Most of the animosity stemmed from a long history of competition among several generations of their beekeeping families. The market for queen and package bees was limited, and the two families struggled to secure a loyal customer base both locally and regionally.

Pete took great pride in selecting queen and drone parents with the same care and precision that his father had taught him. He and his father would carefully evaluate potential breeder colonies over many months of one field season, and then select parents to overwinter. The surviving selected queens served as drone and queen sources in the subsequent spring when they replaced all or most of the queens in their operation of a few thousand colonies. They kept records for each potential breeder in a database, and parents were selected based on performance averages throughout the year. They also established minimum standards for all characteristics important to them. Failure to meet a minimum threshold for any one of the characteristics meant exclusion from the breeding pool.

The approaches to producing bee stock differed significantly between the two families. Pete's grandfather and father had always practiced at least a modest form of selective breeding for good honey production, good Spring build up and low defense behavior. The Colbys especially emphasized the latter quality, and if "we cannot work our bees naked and not get stung, we won't sell them to you" was a proud family motto. The Hume family more-or-less sold unselected stock that survived well in their environment, but they did no formal selection for breeding parents. Incidentally, both families could sell every queen that they could produce.

The contrast in effort for selective breeding between the rivals would not have been an issue for Pete if Rhett did not brag so much about the fine quality of the Hume bees. He often contrasted the Hume bees to the Colby bees publicly, especially at a local café where the two families often crossed paths at breakfast or lunch. Rhett would say that "Hume bees are puppy dogs when compared to those Colby wolves." On several occasions Pete wanted to slug the braggart, but his father would restrain him and say, "Let him talk all he wants, Pete. We speak with the quality of what we sell. Don't let him bait you into a fight. It simply ain't worth it, son." Pete was also reminded by his father that some folks can only feel good about themselves by degrading someone else. Self-confident people, or those confident in the qualities of their own bees, would never need to slam us to increase sales.

The boasts from Rhett were especially irritating because they directly countered Pete's own experiences with the Hume bees. On many occasions, Pete had been called to help a new beekeeper in the local community with some kind of beekeeping issue. Often the bees owned by the new beekeeper were purchased from the Hume family, and the defense behavior of these bees would be best described as highly variable with some colonies stinging quite heavily during simple management maneuvers. To call them "puppy dogs" just seemed especially misleading from Pete's perspective. That's business though.

Although Pete admired the composure that his father (and grandfather) showed when confronted by the Hume clan, he could not understand how his father never seemed to anger. Pete often slipped into quiet periods filled with thoughts of passive aggressive retaliation whenever his father stifled his urge to punch Rhett. He never acted on these impulses, but he seemed to be reaching a

climax of frustration that might one day spawn the worst behaviors from him. One day he would snap!

The final straw involved the Colby mating yards. Pete and his father practiced standard drone saturation techniques in order to control the matings of their queens as much as possible. They had two mating areas. The largest and most saturated occupied a large area of a five-mile radius immediately around their home. They had 25-30 apiaries scattered throughout, and all queens were requeened with daughters from breeder queens. These colonies provided drones needed to mate virgin queens from two mating yards that were placed more or less near the center of the circular area occupied by the other apiaries. Each mating yard consisted of 500 five-framed mating nucs at the height of the queen rearing season each year.

A smaller mating yard was more than 12 miles from their home on the other side of town. They had less control of the drone sources here, but they had established four drone source yards, each within 1.5 miles of a small mating yard that could house about 300 nucs. The four drone yards were located at the four

compass points, and the mating yard was at the center of the compass. There were no other beekeepers in the immediate area; therefore, although they had a more limited number of their own drone sources here, they still felt like the mating control was good. However, this secondary mating yard was only used during the height of the queen rearing season once the other two mating yards were full.

The Colbys were also keenly aware of the potential for inbreeding, so every few years they added a few queens from Italian stocks that were unrelated to their stock from several different suppliers on the west coast. Another precaution to offset inbreeding was to keep the minimum brood quality at a 90% capped pattern (*i.e.* no more that 10% cell misses in an area of capped brood) as a criterion for all queen breeders. This measure helped avoid the shotgun patterns expected of inbred bees.

Any time they brought in new stock, there was a potential for bringing in some poor qualities that could diminish the overall quality of their bees that had been gained from decades of selection. They screened all new queens carefully and tried to limit any drone production from them until they had been evaluated. The undesirable queens were usually pinched and replaced. Undesirables had colonies with runny bees, or they stung excessively, or exhibited chronic problems with chalkbrood (etc.).

The final straw for Pete involved the more distant mating yard. One day he noticed an apiary almost hidden along a tree line about 100 yards from the roadside and, more importantly, within 1.25 miles of one of the drone source yards. He pulled over along the side of the road, and using a binocular that he always kept in the car for bird watching, he could tell that the pallets of bees had the unmistakable look of Hume hives. Initially he thought that Rhett was simply trying to compete for honey yield.

The real reason occurred to him after checking all of the remaining drone source yards. He found another apiary within a short distance of one of these yards, and this apiary consisted of 200 mating nucs. They were not trying to compete for honey Pete realized; they were sponging off the qualities of our bees by mating queens near us.

Pete's head ached and his face reddened later as he told his father, "Rhett Hume is a nothing but a gene thief!" "He's stealing our qualities right under our noses. What are we going to do about it, Pop?" Pete continued.

Pete's father responded, "We are not going to do anything, son. It's a free country, and we do not own the land on which they have placed their bees. We simply have no recourse."

Pete said, "Are you kidding me? We work hard to produce high quality bees, and you're just going to give it away?"

"What would you have me do?" replied Pete's father.

Pete's anger neared a crescendo as he exclaimed, "We should move those bees ourselves or poison them!"

Pete's father gave him that paternal look of disappointment as he suggested that such actions were not only criminal but well below the moral standards that he had expected of his son. "We do not steal or kill other people's livestock. We are better people than that Pete," he retorted. Pete's body posture shifted from puffed up belligerence to one of head-lowering shame. Pete's father continued, "We are not even using that mating yard this year, and we probably won't use it anytime soon to avoid outcrossing our stock with the Hume bees. We will just have to make do. You will refrain from doing anything to harm the Hume bees, and I do not want you to tell Rhett that we know about their new apiaries."

Pete stormed away and festered. Several days passed, and he decided to poison the Hume bees. He would sneak in at night and deliver a powdered insecticide into the entrance of every colony at the two yards. Although dusting every hive increased the chance that he might get caught, he could not poison the bees with an open syrup feeder because of the possibility that his own bees might visit the poisoned syrup. He had decided that someone had to teach Rhett Hume a lesson. He thought that his father was just too nonchalant about the matter, and Pete knew that one day he would be running the family business. He wanted Rhett to know that he was not the push-over that his dad was.

Pete arrived at the Hume mating yard at just a little after midnight. He pulled his truck into the long driveway that wound back to the apiary, and he stopped about 150 yards from the apiary. He hid the truck so that it could not be seen from the country road, but he really did not expect traffic any way. "So this is it", he thought to himself. He sat quietly for 10 minutes not realizing how tightly that he gripped the steering wheel. His mind raced as anger at Rhett and the words of disappointment from his father seemed to randomly mix within his consciousness. He grew paralyzed, not so much from fear of being caught, but from the fear of becoming a pariah within his own family. He pounded his head repeatedly against the top of the steering wheel as he tried convincing himself to follow through with his plan.

Suddenly, he knew that he could not poison the bees. He loved bees, and the thought that he was about to kill all of those colonies sickened him. How could anger bring him so close to doing something so totally against his ethos? More importantly, he loved his father and all that he represented. He knew that poisoning the bees would destroy his relationship with his father. That price was just too high, and Pete sat quietly until his pulse rate returned to normal. He drove home and never mentioned to anyone how close he had come to killing the Hume bees.

That queen rearing season passed, and the Colbys did not use the distant mating yard that year. One day the following spring, Pete and his father were culling breeder queens from some west coast stock they had bought the previous Spring. Most of the colonies were good, but they encountered several undesirables. Pete announced that the blue-painted queen in colony 34 continued to have chalkbrood as she had done in the Summer and Fall of last season. "You want me to pinch her, Pop?" asked Pete. "Oh, no, son. We have a new procedure for undesirables." replied his father. He continued, "Put her into a queen cage with attendants, and I have a special place for her."

"A special place?" queried the bewildered Pete. His father answered, "Awe, yes. Last Summer your grandfather began placing all undesirables into our distant drone yards." Pete look stunned as he watched the fiery twinkle of his father's eyes. His father continued, "We have replaced about 70% of the existing queens with the undesirables!" Pete flashed a big toothy grin, and he never felt closer to his father than that moment. BC

Beekeeping In Central New York In The 19th Century

David **Edwards**

Prior to 1850, in New York State, as elsewhere, beekeeping was a rather haphazard affair. Feral bees were the primary source of managed bees, and honey was obtained by either killing these recently domesticated bees in the process, or "beelining" a feral bee tree, cutting it down and gathering the honey while aggravating the bees and destroying their home.

Captured swarms were usually kept in a hollow log called a 'gum,' a skep, or sometimes an early version of today's 'hives.'

The first mention we can find of beekeeping in Otsego County is in the Diary of Sabrina Campbell, of Middlefield Center, in1803, in the collection of the New York State Historical Association:

"June 6, 1803

This forenoon, Mr. Parse came here. Told me that mice had found their way to his bees. Had almost destroyed them. I got him to go with me to search our hemlock hive. Found mice holes round the bottom. Turned it up. I could not be satisfied. Mr. Parse thought he saw where the comb had been gnawed. We put it back for future discoveries. Some frost this morning."

"June 7, 1803

*Cold morning. Some frost. Up early. Been cold since the rain. About noon today, the little hive sent out the largest swarm I ever saw. Unkles (*sic*) boys came at the sound of the horn. Several girls here called for Louise to go quilting. None of them dare assist me. I hived there alone. I took* Plutarch Lives *I got from the Library. Sat in the little nursery and wacht (*sic*) there awhile. Sat the hive on the bench tonight. It was very heavy. All is hush except the humming of the bees"*

This reference to a single hive is probably the reality of the time, where most farm families kept a hive or two as a source of honey for their own use. It wasn't until after mid-century that equipment, techniques and information made it possible for beekeeping to be a source of significant income.

MURPHY OF MIDDLEFIELD

Among those adding beekeeping to his income stream was Adriel Murphy, farmer, hop grower and hop service provider, fruit tree grafter, mortgage lender, and in 1877, Middlefield Town Supervisor.

The Samuel T. Murphy Account Book, 1852-1900, was also utilized sporadically by his son Adriel Murphy as a diary. Adriel was a beekeeper as early as 1864, but entries during the years 1871, 1872, 1873, 1886 and 1891, show that Adriel was extensively involved in all aspects of beekeeping – tending bees, harvesting and shipping honey and wax, building and selling equipment, buying equipment from Van Deusen in Montgomery County, visiting Quimby's operation, working at out-apiaries, selling nucs, queens and queen cells, and subscribing to beekeeping journals. This diary describes Adriel's significant time commitments to beekeeping, as a business not just a hobby. He was a player.

By 1871 Adriel had a mechanical extractor, packed and overwintered his bees in a 'bee house" and had bought at least one Italian Queen for $5.00. He was a subscriber to both the American Bee Journal and the Washington Bee Journal, as well as Scientific American.

In 1872 Adriel generated nearly $1000 from sales of honey alone. He purchased 54 acres of farm land that year for $325. That means $1000 could buy about 150 acres of farmland. Today, even at only $2000 an acre, 150 acres of farmland would cost $300,000. That's a lot of honey money!

In a 1934 book, Henry Hilton Wood, a former resident of Middlefield notes –

"Soon after this (*Ed note: a bout with measles in 1885*) I bought a few swarms of bees and began the study of beekeeping. Our neighbor, Adriel Murphy, who had taught me how to graft, was now an expert beekeeper, and he became my tutor in the care of bees. I built a bee house, one room for a shop and one to store honey in. At this time I had 50 hives of bees. There was always honey in the store room and the family had all the honey they could use. I sold 3,000 pounds of box honey at one time."

(*Ed. Note: The "graft" mentioned by Wood refers to grafting fruit trees, not Queen bees. The relationship is confirmed in the Murphy Account Book, February 25, 1886, where "H. Wood came. We worked at sections".*)

Adriel Murphy went on to become a Director of two regional railroads and Vice-President of the Second National Bank of Cooperstown before his death in 1910.

We are unaware of any published articles by Adriel Murphy, but there is a testimonial that was published several times in various beekeeping journals in the advertisers section –

Middlefield, N.Y., January 8, 1879

Messrs. Bingham & Hetherington – Dear Sirs: We have been using your two-inch uncapping knife the past season. For rapidity and ease in operating they far excel any knife I have ever used. Its shape and beveled edges make it perfect for uncapping uneven and crooked combs. It works equally well with either right or left stroke. We uncapped hundreds of combs in prize boxes, and both my associates and myself have come to the conclusion that they facilitate the labor fully one-half, and are perfection itself, leaving nothing more to be desired.

A.G. MURPHY

Testimonial in Bingham ad in American Bee Journal, April 1879

Adrial Murphy was probably the most active beekeeper in the Town of Middlefield in his day, but there were others who we know little about such as Stephen Cooper (no relation to the Coopers of Cooperstown, but possibly a relative of Adriel Murphy), a Cary and a Dutton, as well as Henry Hilton Wood.

FLOYD, NELLIS AND HOFFMAN OF MONTGOMERY COUNTY

Further north, in the Mohawk River valley area of Montgomery County lie the villages of St. Johnsville, Fort Plain and Canajoharie, where three more well known beekeepers, John Floyd, John Nellis and Julius Hoffman lived and worked.

John Floyd emigrated from England in 1845 and settled in the Fort Plain area in 1849. He reportedly established an apiary there in 1851 and at some point after that became a partner for 14 years with Moses Quinby in nearby St. Johnsville. He later established the Garoga Valley Apiary, a modest affair of approximately 100 colonies. Little else is known of him, but simply being a partner of one of the best known beekeepers in the world confers some legitimacy.

Jacob H. Nellis is the better known of a father/son team of varied business and agricultural interests in the Canajoharie area. The elder Horatio was at one time or another Town Supervisor, Assessor and Auditor. They were beekeepers, developers and manufacturers of bee equipment, sellers of bees and buyers of beeswax. In 1876 Jacob grew and shipped about 1000 queens, but found it too cold in central New York for this to be profitable, so he turned to making comb foundation.

Jacob H. Nellis was the editor and publisher of the *BEEKEEPER"S EXCHANGE*, a journal that he started in January of 1879 in Canajoharie. It was later published by Houck & Peet. It was well edited with a variety of articles but was of short duration, suspending publication with the July 1883 number. Nellis, who also operated a lumber yard in conjunction with his manufacturing business, was essentially put out of business when the West Shore Railroad was re-routed through his property in 1883.

Jacob H. Nellis

Jacob H. Nellis was active in national and regional association meetings, and served as Secretary of the North-eastern Beekeepers Association from 1871 to 1879.

In *Barns of New York*, reference is made to the illustration of the residence of Horatio Nellis in Canajoharie, with the "...house, apiary and workshop of J. H. Nellis...", with highlights of beehives in the inset illustrations.

In *Beers History of Montgomery and Fulton Counties of 1878* it is noted that "...An apiary is carried on by J.H. Nellis, who is an importer and breeder of Italian bees, manufacturer of artificial honey comb and general dealer in apiarian supplies in Canajoharie ".

Jacob Nellis moved to California sometime after the turn of the century, and was still in contact with friends in New York as late as 1927. In 1926 he wrote from Huntington Beach (where he owned the Gateway Bazaar) commenting on the fact that he had used eight different styles of hives in his career (age 16 to 76), and that he currently had 20 colonies just west of Santa Anita. He claimed he took a ton of orange blossom honey from 18 stands in 1925, then the bees stored enough honey for Winter from "weeds and lima beans." In 1926 the oranges failed to blossom.

Nearby, a beekeeper of note was Julius Hoffman, inventor of the Hoffman Brood Frame as well as self spacing frames. He was a native of Grottkau, Silesia, Prussia, just a few miles from his mentor the well known beekeeper Rev. Dr. Johann Dzierzon (the *Father of Modern Apiculture*) who introduced him to beekeeping at age 13.

Born in 1838, Julius Hoffman left his native land (with a hive of bees under his arm) in 1862, landing first in London, then four years later New York City and Rockland County, just northwest of the City. In 1871 he met Jacob H. Nellis at the Northeastern Beekeeping Association meeting in Albany, New York. Nellis convinced

Julius Hoffman

him to move, first to Fort Plain in 1872, then in 1884 to Canajoharie. He was known to maintain anywhere from 400 to 700 hives during his career, which allowed him to make a comfortable living.

Hoffman's self spacing frames – the kind most of us use today – were most likely devised as modifications of Dr. Driezon's early work with moveable frames and and the concept of bee space as well as Quimby's and Langstroth's elaborations on those ideas.

Hoffman was a occasional contributor to contemporary beekeeping literature; in 1881 he won a Gold Medal for "Best Essay" at the annual meeting of the North Eastern Beekeepers Association in Utica, New York. He published a short article "Races of Bees and Different Crosses" in the American Bee Journal in 1880, concluding it would be best to "mate the gentle Italians with the vigorous Cyprians".

A few miles south of the Mohawk River towns, near the Montgomery County / Otsego County line is the hamlet of Sprout Brook, the home of the Van Deusen Manufacturing Company. A few miles to the west, in neighboring Herkimer County are Starkville, the home of Phillip Elwood, and Mohawk where L.C. Root got his start before marrying into the Quimby enterprise in St. Johnsville.

VAN DEUSENS OF SPROUT BROOK

The Van Deusen business near Sprout Brook was started by Justus van Rensselaer Van Duesen as a jewelry and watchmaking business. In 1849 the family built a woolen mill which was eventually converted to a manufacturing plant for beekeeping equipment. In about 1879 the elder Van Deusen developed a machine to make flat bottom foundation.

Charles Catlin Van Deusen

His son, Charles Catlin Van Deusen, was a beekeeper and inventor of beekeeping equipment including a number of Atmospheric Feeders. C.C. worked closely with Captain John Hetherington in nearby Cherry Valley to develop flat bottom foundation. The fact that Hetherington's aunt was C.C.'s mother helped the collaboration. The Van Deusen product was advertised as "Patent Wired and Thin Flat Bottom Foundation – has no sag in

John Hetherington

brood frames and no fish bone in surplus honey, Patent 8962, dated November 11, 1879." This was made under royalty to John Hetherington.

C.C. attended and participated in state and national beekeeping meetings on a regular basis, and served as Vice-President of the North-eastern Beekeepers Associations from 1871 to1873.

Unfortunately, C.C. died at age 47 in a horrible train accident in Battle Creek, Michigan. He and his wife were on a trip to the 1893 World's Columbian Exhibition in Chicago. With the death of his father in 1897, and the death of John Hetherington in 1903, the Van Deusen operation began to wind down. They were still advertising from Sprout Brook in 1905, but by 1907 the address in their advertising was Canajoharie. At some point the Van Deusens lost a patent legal battle with Jacob Nellis over flat bottom foundation production.

ELWOOD OF STARKVILLE

Phillip Henry Elwood of Starkville was in a sense a "third generation" beekeeper. He learned his skills from Captain John Hetherington, who had learned at the knee of the master, Moses Quinby.

In 1748 Richard Elwood emigrated to Montgomery County from England, where his ancestor Thomas Elwood had claimed to have been educated in the 17th century by the poet John Milton. Family history claims that Milton submitted his work *"Paradise Lost"* to Elwood for critique; the response was something to the effect "But how will it be regained "?, leading to the sequel.

In America the Elwoods became patriots of the first order, serving in the well known Tryon County Militia during the Revolutionary War. Richard's grandson, Moses Elwood (b. 1817), had several children; the youngest son, Phillip Henry, eventually became the well known beekeeper.

Phillip H. Elwood, born in 1847, was educated at the prestigious Cazenovia Seminary near Syracuse, New York before returning home to teach in the local district schools, then traveling to Michigan to do the same. He also "read the law" and came back east to practice law. In failing health at an early age, he gave up the law, sought a healthy outdoor occupation, and became an apiarist, starting in 1872 as an associate with Captain John Hetherington in Cherry Valley.

Five years later Elwood returned to Starkville to establish his own apiary at Melwood, his father's farm (**M**oses **Elwood**). He must have learned his lessons well, because the following year he took the First Premium Award for Honey at the Paris World's Exhibit of 1878.

Phillip Elwood was published frequently in beekeeping journals, contributed significantly to discussions at beekeeper meetings locally and nationally, and was an acknowledged authority on bee diseases and overwintering. In 1922, E.R. Root of Ohio visited Elwood's operation and declared him one of the pioneering leaders in Bee-Keeping in New York if not the United States. "The suggestions of Phillip H. Elwood practically revolutionized the manufacturing of bee supplies" declared Root.

Active in beekeeping organizations, Phillip Elwood served several terms as President of the North American Beekeepers Association; its successor, the National Beekeepers Association when the Canadian component was spun off; the North Eastern Beekeepers Association; and the New York State Beekeepers Association. In 1891 he served concurrently as President of the National Beekeepers Association, the United States Honey Exchange, and the New York State Beekeepers Association.

Phillip Elwood was the last beekeeper known to use the original small Quimby hive exclusively, helped in the development of self spacing frames, helped solve the swarming problem and demonstrated the value of using cellars for overwintering bees. He generally kept about 1300 hives in out yards of about 75 colonies.

The 1879 Beers History of Herkimer County notes that "P.H. Elwood is, with one exception, the most extensive beekeeper in the eastern United States." (That

exception is, obviously, Captain John Hetherington of nearby Cherry Valley).

ROOT OF MOHAWK

Unrelated to the Roots of Ohio, Lyman C. Root was born in St. Lawrence County, New York in 1840, and was educated at the well known Fairfield Seminary in Herkimer County, New York and St. Lawrence University, Canton, St. Lawrence County. He graduated from the Eastman Business School in 1865. He carried on his beekeeping activities first near Mohawk, Herkimer County, and then in conduction with Moses Quinby in nearby St. Johnsville, Montgomery, New York.

On February 28, 1869, Moses Quinby wrote to Lyman C. Root

"Men can be trained to manage this way much easier than the others, and when Montgomery County and Herkimer County is filled with apiaries three miles apart there is a little room outside yet for more. Now if I have reasoned correctly in this matter – and my 40 years experience ought to tell me what to expect – there is the fairest chance for a future with the least labor and capital of anything of which I can conceive."

This constituted an offer to Root to join Quinby as a 50/50 partner in the bee business. Lyman apparently continued to maintain his apiaries in Mohawk; he and his brother (unnamed) reported on their 1881 crop from Mohawk in the American Bee Journal in December of that year.

He accepted, and Quinby soon had not only a partner but also a son-in-law. Later that year L.C. Root and Elizabeth Hannah Quinby were married in St. Johnsville. Elizabeth Hannah Root was an indispensable part of the bee keeping operation of both her father and husband. It was she who was responsible for most of the rewriting and editing of the Quinby books as well as doing almost all the illustrations, many from direct observation. Her skillful artwork was recognized internationally.

By 1872 Quinby & Root was listed in Boyd's Business Directory as a local business supplying honey, Italian Queens, and packages of bees, various bee supplies and of course, his book.

Lyman C. Root brought some new business principles to the partnership. Quinby's Quaker belief that patents were not a proper way of doing business since "the invention was a gift from God and should be available to all" was not a belief shared by Root. Root gradually talked Quinby into considering placing patents on some of his inventions, but Moses Quinby died unexpectedly on May 27, 1875. Root took on the task of editing and revising Quinby's book, and in the process made sure he obtained a copyright for the first time. Root continued to edit the book until 1915, changing the name along the way to *Quinby's New Beekeeping, the Mysteries of Beekeeping Explained: A Complete Guide to Successful Bee Culture.*

Root was for a short period of time the answer man for a Question & Answer column in the short-lived *BEEKEEPER'S EXCHANGE* journal published by Jacob Nellis in nearby Canajoharie.

Active in beekeeping organizations, Lyman C. Root served as President of the North Eastern Beekeepers Association in 1879, 1880 and 1881 and again in 1885 and 1886 as it transitioned into the New York State Beekeepers Association. He was also the Treasurer of the North Eastern association in 1877.

Lyman and Elizabeth Root, along with their daughters Stella and Kathryn, moved to Stamford, Connecticut in 1887 ostensibly to engage in dairy farming, but one must assume that he did not completely eliminate beekeeping from his life. Dr. Stella Root practiced general medicine, obstetrics and anesthesiology in Stamford and Kathryn Root was for many years the Supervisor of Home Economics for the Stamford Public Schools.

Both Lyman and Elizabeth died in Stamford, she in 1896 and he in 1928.

As impressive as these many individuals were in the beekeeping community, their activities pale in comparison to those of their neighbors, friends and mentors, Moses Quinby of St. Johnsville and Captain John Hetherington of Cherry Valley. Part 2 and Part 3 of this manuscript will deal with these icons of beekeeping. BC

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CHANGE IS . . .

If beekeepers want to represent the world of beekeeping, they need to move into the 21st centry. Part of every beekeeping association's mission is to educate non-beekeepers about beekeeping.

G. **Splevin**

If beekeepers want to represent the world of beekeeping, they need to move into the 21st century. Nonprofits begin with a group of like-minded people who come together for a common purpose or goal. In beekeeping, the commonality is bees. Beekeeping associations need to come of age like their fellow agricultural associations. The beekeeping associations must professionalize, and have accessible spokespeople for the media, for public presentations, and for interaction with their fellow beekeeping groups.

Opportunity does not wait weeks or months for beekeepers to be less busy. To protect the interests of beekeepers, honey production, crop pollination, backyard, sideliner, or commercial, organic beekeeper, male or female, young or old, Hawaii to Maine, Alaska to Florida beekeepers need to speak with one voice to maintain, sustain, improve, and educate about beekeeping. If beekeepers want beekeeping protected from laws prohibiting beekeeping, public actions that kill bees, agricultural practices that decrease the number of pollinators, and practices forced upon beekeepers by non-beekeepers, then beekeepers have to make their voice heard. Beekeepers have to actively participate in pollinator workgroups, coalitions, task forces, community meetings, health department boards, and farm groups at all levels in the community. Part of every beekeeping association's mission is to educate non-beekeepers about beekeeping.

Agricultural associations have professional staff

The only way Beekeeping Associations can compete with their fellow agricultural associations is to professionalize. Staff run the nonprofit, managing the day-to-day activities. They are available to speak for the industry at a moment's notice, and to provide the beekeeper's viewpoint for media coverage of honey production, bee losses, crop pollination, bee toxic pesticides and more. Staff can respond to opportunities and correct myths and falsehoods about bees and beekeeping. A professionally run member association can focus on strengthening beekeeping, gaining protections for bees, educating about beekeeping, and supporting the work of fellow beekeeping groups. Revenues generated by local, state, and national associations should support staff who drive the mission forward; a mission that supports all beekeepers. Revenues pay staff salaries, pay for administrative overhead, and for program activities. A nonprofit must be a good steward of their funds, under the guidance of a Board; however, not micromanage staff. Working Boards are for the first and second year of a nonprofit. Once staff are hired, the working board must transition to policy development and fundraising only. The activities of the nonprofit are managed by the professional staff, guided by the mission and strategic plan. Board interaction is through monthly or quarterly Board meetings, to set policy, check on progress of the strategic plan, and provide contacts for funding opportunities. Many communities have Nonprofit Centers for Excellence or similar organizations whose sole purpose is to assist in the development and growth of local nonprofits. The National Council of Nonprofits lists Centers by state to assist nonprofits. Board development trainings are available at State Nonprofit Council groups, and all Boards need to know their role and responsibilities. Far too many Board members, especially those from the for-profit business world, think they know how to be a Board member. In actuality, few have any concept of how to be a nonprofit Board member.

The first two to five years of any nonprofit are the hardest.

Grant funders will want to know you are supported by the public, and/or your constituents, so you will have to raise funds to support all grant funded projects. Foundations and grant funders are nonprofits also, with a mission, and guidelines, and a Board. Grant applications must fit the funders' guidelines. If a foundation or grant funder looks at your grant application, and it shows you clearly did not follow their directions, nor did you research the application funding levels, you have failed the first test of grant writing: following directions.

Boards however, are supposed to provide the initial financial support, through donations, and connections to other donors. If the Board does not support the organization, why should anyone else?

The mission is to serve your members.

Annual dues reflect the cost of running a nonprofit, and the services provided to the membership. If dues are $5.00 per year (that is not a typo, there are beekeeping groups with $5 annual dues), that group does little for its members. But then the members are not demanding better service either. Dues should be a significant monetary amount, and should be part of the budget of

"The activities of the nonprofit are managed by the professional staff, guided by the mission and strategic plan."

any member association. Even if the association receives grant funding, dues are a part of the funding support the association must provide to support their share of any grant funded program.

Nonprofits should be responsible with the dues, donations, and grant funds.

Generally Accepted Accounting Principles (GAAP) show good financial management and responsibility. To be fiscally professional and responsible, your association's finances should be on Quickbooks® software or similar. Grant applications will require a balance sheet and P&L, and Quickbooks® makes accounting reports easy. A spreadsheet accounting format shows the organization is stuck in a by-gone era.

Leadership needs to grow and change –

or the organization risks becoming stagnant, driving away new members and new ideas. Beekeeping has changed over the last 60 years, so should the status quo of the beekeeping associations. At some point a two-term leader needs to nominate someone else, who can become a Board officer in the association. Groups far too often refuse to change the status quo as it is comfortable. The status quo though, stifles any organization.

It is time the beekeeping member associations joined the 21st century. Put your association bookkeeping into Quickbooks®. Plan a continual flow of officers that progress in leadership positions at a minimum every two terms. Use the internet and social media to communicate with members, educate your members and nonmembers, and make it easy to contact the leaders (with a response guaranteed within 24 hours or less as you represent not just yourself as a leader, but all beekeepers).

Local associations need to work with their state associations on legislation and program activities.

Nonprofits can express written support of bee supportive local, state, and national legislation. Legislators need to know what beekeepers think about the Highways Bee Act, the Saving America's Pollinators Act, and local legislation your community has developed to allow/regulate beekeeping. Sending a support letter to your local legislator is not lobbying. If your community is threatening to ban beekeeping, the local and state beekeeping groups must come together in support of beekeeping. Beekeepers need to educate their community leaders, garden clubs, Rotary, Junior League, etc. about bees and beekeeping. The association has a mission. All members must support that mission. If one person or a small group controls a beekeeping association for more than two terms, or for 10, 20, or 30 years, that is not so much a nonprofit, as their own small business.

If you want to financially understand a current nonprofit, review their tax return. You can find their 990 IRS form at Guidestar® or the Economic Research Institute. Funds to support the program activities should be 75% of total expenses. Whether it is one staff person or 40, staff are educating, advocating, networking, developing and implementing program ideas, seeking funding, writing and managing grants, travelling, and more, all to drive the mission of the nonprofit forward. Conferences are the money-makers for member associations, and conferences achieve much of a member association's mission. Conferences often generate one-half to two-thirds of the revenue for the year. Professional nonprofits should pay staff a living wage, for housing and food costs are the same for nonprofit staff as for everyone else! If the association is at the national level (and some State associations too), 21st century beekeeping member associations need to demand professional, paid staff (part-time or full-time) to truly fulfill the mission of the organization.

How do beekeeping associations move into the 21st century?

How do they become *relevant* professional nonprofit member associations? They must decide if they want to represent the world of beekeeping, or continue to be behind the times. Do they continue

to let non-beekeepers speak for beekeepers, or do they want to speak for beekeeping based on their experience as beekeepers?

Are beekeepers content with allowing non-beekeepers to make decisions about beekeeping practices, laws, and regulations, hoping the non-beekeepers will solve the problems of honey bee pests, pathogens, pesticides, and poor forage? Assess your own association. Do your member dues reflect the services to the membership? Are members involved in leadership activities, and are members being trained for leadership positions? Is your association collaborating with other local groups, and your state and national beekeeping groups? How are your activities fulfilling the mission? Have you moved into the digital age using accounting software, and electronic and social media? Is your Board aware of their role and responsibilities, and are they open to new ideas, supporting new leaders? If you need help to bring your beekeeping member association into the 21st century seek a nonprofit council in your state for guidance. Beekeeping, honey production, and crop pollination generate billions of dollars as an industry, enhancing the value of agricultural products and our ecosystem. Beekeeping is an industry that provides Master beekeeping education and certification, has distinct sub-industries (honey production, crop pollination, categories delineating industry investment (backyard, sideliner, commercial), equipment and support system suppliers), specific media publications, and state, regional, and national conferences. It is time for beekeeping associations to become professional associations and move into the 21st century. BC

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Watch for more from G. Splevin at the new **www.Beeculture.com**

All The Buzzz in...

Bee B. Queen Challenge

Do you have a top bar hive? Send me a photo.

Anna Zook, PA

Gary Weaver, IN

Natalie Drier, 7, MI

Hello Friends,

Thank you for sharing your artwork, poems, and questions with me. You are sweet!

Bee B.Queen

Photo by Linda Smith.

Top Bar Hives

What is a top bar hive?

The top bar hive is very different from the Langstroth hive that most beekeepers in the United States use. The top bar hive is inexpensive to build so it is often used in other countries. Sometimes it is called the Kenyan top bar hive. It is a simpler hive than the more well-known Langstroth hive.

A top bar hive is a box or container that has moveable bars that rest on the top. The bars are usually made out of wood with a strip of foundation along the bottom side to help the bees gets started building their comb. The bees attach and build their comb on the bar from the top down.

How do you harvest the honey from a top bar hive?

First you remove the comb from the top bars. Cut it up to make comb honey or extract it from the wax the low tech way. Crush it in a bag, squeeze it out by hand, wrap in mesh and hang it up for the honey to drip into a container. Some people use presses.

How does a top bar hive compare to the Langstroth hive?

Thumbs Up

It is simple and easy to make. It takes less work since there are no supers to lift or frames to nail together. The hives are inexpensive and can be made out of recycled materials like wood, plastic barrels, or boxes. There is no extractor to use, maintain or store. More beeswax is available since the comb is crushed to extract the honey.

Thumbs Down

There is less honey production. Combs may need to be harvested during the honey flow since you can't add another super like you can in Langstroth hive. The combs need to be handled very gently so they will not break off the bar while examining or moving the hive. These hives are not the best for large beekeeping operations.

A top bar hive in Cameroon. Photo by Trees for the Future

In recent years, there are more hobby beekeepers trying their hand at using top bar hives. Learn more about them and maybe you too would like to give it a try.

A plastic barrel top bar hive.
Photo by Rob Overton at beevac.com

... Bee kid's corner

Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
October 2014

Mystery Quote

Fill in the blanks to find out what Saint John Chrysostom said about bees. Each number corresponds to a different letter. Hint: Work on the letters of the shorter words first.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
8	13												20				21			25					

			B						R					N		R						A	N	
24	23	1	13	1	1	15	12	14	9	21	1	23	9	20	9	21	1	4	24	23	8	20			
				R	A	N			A			,	N			B			A	U					
9	24	23	1	21	8	20	15	14	8	16	12	20	9	24	13	1	6	8	25	12	1				
			A	B		R		,	B	U		B			A	U									
12	23	1	16	8	13	9	21	12	13	25	24	13	1	6	8	25	12	1	12	23	1				
				A	B		R				R							R								
			16	8	13	9	21	12	10	9	21	9	24	23	1	21	12								

Autumn Cates, 10, AL

Odem's Honey Red Velvet Cupcakes

Why do honey bees like doorbells?

They have bee-utiful buzzers.

You will need:
2 ½ c. flour
½ c. unsweetened cocoa powder
1 tsp. baking soda
½ tsp. salt
2 sticks butter softened
1 c. honey
4 eggs
1 c. sour cream
½ c. milk
1 oz. red food coloring

Directions:

Preheat the oven to 350° F. Line cupcake pans with paper liners. In a medium bowl, combine the flour, cocoa powder, baking soda and salt. In another bowl combine all the other ingredients. Beat with a mixer on medium speed until well blended. Mix in the dry ingredients on low speed and beat until smooth, about 2 minutes.

Divide the batter evenly between the prepared liners. Bake for 15-20 minutes, until a toothpick inserted into the center of a muffin comes out clean. Cool for several minutes in the pan before removing the cupcakes to a wire rack to cool completely before frosting.

Bee Buddy

Odem Cunningham, age 13, recently moved with her family to Virginia from Canada. Her dad is the beekeeper in the family but Odem has helped with the hives over the years. She loves the sweet, healthy honey most of all. It doesn't matter if it straight from the hive or baked into muffins. Honey is a special gift from the bees and flowers. When not baking, Odem enjoys swimming, horseback riding and traveling.

Beecome a Bee Buddy

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

Name
Address
Age
Birthday Month
E-mail (optional)

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

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

Answer:The bee is more honored than other animals, not because she labors, but because she labors for others.


The Things
We
Do
For
Research
Jennifer Berry

In the last article I mentioned how difficult research can be at times and that the current project we are working on has been the most challenging. Coming up with a research idea and getting it on paper is only the beginning of the process. Then, one has to find the funding to bring it all to life. Still, this is only another small step on the long road of completing a research deliverable.

After the funding is in place, what lies ahead is taking the ideas on the proposal and making it a reality – in the field! Now, there's the real challenge. And, any such project is going to be especially ambitious when you are dealing with honey bees. Their behavior can best be described as fickle. As wild creatures, they do their own thing, and "their own thing" very rarely tracks our experimental protocols (expectations) for very long.

One of the particular obstacles of our current project has been the collection of feral stock. And, I mean truly feral. They can't simply be swarms from a neighboring beekeeper's apiary. The bees have to have been free of human manipulation for several seasons. Pragmatically, this is as truly feral as it's going to get on a continent where the entire *Apis mellifera* population was originally (and has been regularly) imported and transported by humans. Even so, this single task in our research proposal has proved to be much more formidable than ever expected.

It's easy to postulate the best way of going about doing something, but just try to carry it out and you can find yourself in a serious struggle against Mr. Murphy (of Murphy's Law – "*If something can go wrong, it will go wrong, and at the most inopportune time.*")!

After perusing the literature, we believed that we were experts in the matter of swarm trap hives and would have no problem collecting the bees we needed in the spring. Our thoughts were to hang double-decker, five-frame nucleus hives in trees, about nine meters in the air, to capture feral swarms in Georgia's abundant national forests and wildlife areas – far from agricultural or residential properties. "Shouldn't be a problem!" we said. "Bees will flock to these wonderfully thought out traps, each strategically furnished with an old frame of drawn, 'stinky' comb, as well as a Nasonov pheromone bait lure and plenty of natural-wax-coated foundation for them to expand on."

The first year, we headed south to locations in the Oconee forest, an area chosen for its remoteness from beekeepers. After many hours of deliberation, we came up with a brilliant plan to shoot an arrow, with a rope attached to the end, over a particular branch. The chosen branch would have to be big enough to bear the weight of such hive and afford the proper height. Once the rope was over the branch, we would attach the hive and hoist it into position. Easy, right?!?

So, into the woods we went, lugging nucs, ropes, bows, arrows and a variety of other equipment. Well, the task of hanging hives proved to be not nearly as easy as we had expected. Over the coming days, numerous modifications had to be made to our less than brilliant plan. For instance, the bow and arrow idea simply did not work. Of course, the fact that none of us were proficient in the art of archery might have had something to do with it. We spent more time chasing arrows through the woods, trying to pull them out of trees and each other (if anyone reading this article is from OSHA, I was just kidding about the last one . . .), and searching for them amidst the leaves, sticks and branches on the forest floor, than we should have. Finally, after many a wasted hour, we abandoned the whole "Robin Hood" idea.

UGA bee lab crew Brett Nolan, Nicholas Weaver, Jennifer Berry and Ben Rouse deep in the swamp.

As we were scratching our heads, trying to figure out a better plan, one of our team members, Travis Dynes, PhD student from Emory University, bent down, and picked up a rock. He tied a rope to it, and tossed it through the air like an Olympic athlete. The next thing we knew, the rock and rope had flown over the branch and was hanging within reach on the other side. "Great," I exclaimed, "Let the games begin!" While it still wasn't child's play, at least it was working. After several weeks of enduring tick and chigger infestations, soaking rains, getting lost, tripping into gullies, and miscellaneous scratches and bruises on top of our scratches and bruises, we had 50 traps dangling in the trees. Then, we imagined, all we had to do was sit back and wait for the bees to move in. Enter, Mr. Murphy! Despite all the hard work, the weeks passed and all we had to show for it were a few swarm colonies.

The next year, we decided to divide and conquer to improve our odds. So, we placed hives again in the Oconee National Forest to our south, but we also tried placing trap hives in the Chattahoochee National Forest to our north. Again and again, we traipsed deeply into the woods, lugging our equipment over fallen logs and creek beds, stepping into the occasional (and very pissed-off) yellow jacket nest, and swatting at clouds of mosquitoes. It was worth it. We definitely had better luck in year two. Yet, it was still not what we had hoped for. Why were the bees not flocking to these trap hives in droves?

During one of our lab meetings, someone jokingly mentioned that we should travel to the Okefenokee

Swamp (Georgia's Okefenokee National Wildlife Refuge) and hang traps there. At first, we all laughed because it was a lot farther away than we had been venturing (not to fail to mention the snakes & gators!), but, then we thought, "Heck yeah! This may be the ticket." So, we decided to amend our operation – yet again – and head down to the wet land of cypress trees and Spanish moss. Surely, there must be eager feral bees down there.

The Okefenokee is the largest blackwater swamp in North America, covering over 700 miles of contiguous wilderness in the southeast corner of Georgia. The swamp is a shallow basin, which was once an ocean floor. It took over 6,500 years of accumulating vegetation matter and peat to form this wilderness wonder, which is home to over 440 species birds, fish, amphibians, reptiles and mammals. The tannins from the peat are actually what stain the water mahogany, rendering it more reddish-brown than truly black. Small islands poke up throughout the waters, providing sunny hangouts for the numerous alligators, turtles and snakes.

We began our new adventure by contacting the Okefenokee park headquarters and arranging to have two flatboats with guides motor us deep into the swamp. There are numerous commercial beekeepers around the perimeter of the park, and our goal was to get as far away from them as possible.

The first morning, we arrived early and met our two guides, Chip Campbell and Joe Knight. I could tell right off that this was going to be a very interesting trip. Chip had been living in the area most of his life and had worked for the park for decades. His wealth of knowledge about everything that lived on, swam in, and flew over the swamp was amazing. Joe was a Vietnam Vet and a romantic; he provided us with a steady stream of insider tales of broken hearts, murder, and even dead bodies buried deep in the swamp. This balance of interesting facts and local flavor kept us enthralled as we traversed the 11.5 mile Suwannee canal.

The canal was actually dug in the late 19th century in an attempt to drain the swamp. It was believed the land would be better suited to the cultivation of rice, sugar cane and cotton than home to all of its natural inhabitants. Fortunately, the Suwannee Canal Company went bankrupt, but, soon after logging companies swept in and exploited the land for over 431 million board feet of timber in 18 short years. The swamp was eventually purchased by the Feds and protected as a wildlife refuge.

UGA PhD student Brett Nolan and Okefenokee guide Chip Campbell on day one, loaded and ready to go.

And a refuge it is. There are birds everywhere. There are amazing backdrops of gnarled scrub trees draped with Spanish moss, and massive cypresses towering overhead. As we were led deeper and deeper into the heart of the swamp, we gave up trying to keep a count of the multitudes of alligators lining the shores. To confess, we were like little kids at first, pointing in all directions. Look over there – it's an alligator! And, over here – it's a crane, turtle, snake, egret, etc., etc.!!! Eventually, though, it was time to get to work.

At first, we envisioned two crews, each supplied with nuc boxes and a ladder. Why ladders and not rocks, you ask? Well, before leaving the lab, we did some research and checked out images of the swamp. Most of the trees didn't have branches low enough to toss a rock over and I doubt there would be many rocks to be found in the swamp. I could just imagine the reaction of our guides if, in addition to us and the rest of our equipment, we expected to load a box of rocks into one of their modest crafts – They would probably have just shook their heads and motored away – leaving us on the dock!

Once we got started we quickly realized that it was a real job just getting our people and equipment from the boat to the trees. Also, our two-man team approach to installing the nucs, with one person on the ladder and the other on the ground passing up equipment, needed some serious tweaking. It was precarious for the person on the ladder to hold onto the tree, as well as lift and affix a 30-pound swarm trap. The ground beneath the tree was often soft, out of level, or covered in tree roots and offered little in the way of stable footing for either the ladder or the person on the ground. So, our plans continued to adapt accordingly.

Chip and I formed a search team and motored ahead to locate suitable trees with enough solid ground underneath to place TWO ladders, one on each side of the tree. Once a suitable tree was located, the guide would power the engine and, using the front of the boat as a wedge, literally punch through the underbrush. My job was to take clippers and cut away bramble and brush to form a hole for the crew with the ladders and nuc boxes to walk through.

Fortunately, it was February, so the alligators and snakes weren't highly mobile. Yet, I have to say that jumping from the safety of the boat into the murky waters (sometimes thigh-high) and thick brush, concealing untold numbers of slithering, crawling critters with big teeth, was a bit unnerving – especially when landing on something that quickly moved from underfoot!

By the time it would take me to clear a spot of thorny debris, our now three-person installation crew would show up and begin to offload equipment. Then Chip and I would head off in search of the next tree. Once the ladders were set-up on each side of the tree, two crewmembers would ascend them, and one would hand up equipment from the ground. With two people aloft, one could hold the swarm trap nuc to the tree in the right position, while the other strapped it in place, which worked out much better than working solo. In the photo, notice that the nucs were painted in camouflage. This was a pattern that we affectionately referred to as "Desert Storm." Then, we added a touch of Spanish moss to complete the disguise. We went to this trouble because the park officials advised

Nicholas Weaver and Ben Rouse finishing strapping the last hive.

us that bright white boxes hanging from trees might attract the unwanted attention of any potential saboteurs paddling by. We had had a few of our forested traps shot by bored hunters; so, we were happy to comply.

Over the two day period, working from sunrise to sunset, we were able to hang 50 swarm traps over a six-mile stretch inside the swamp. It undoubtedly was an experience of a lifetime. The wildlife and scenery were spectacular. And, our guides were amazing. Both nights, they were able to motor us out of the swamp in pitch darkness, without the aid of any headlights, flashlights, or even moonlight to guide them. Crazy! I couldn't see a thing, yet they just tooled along, slicing through the dark waters and mysterious overhanging corridors of the Okefenokee swamp, in unwavering confidence of their knowledge and skills.

Several months later, we returned to the swamp to gather our loot (full swarm traps!). Yet, we were sorely disappointed again, as only one trap had bees. Oh, well. Chalk another one up to ole Murph! But, we left the others hanging, and plan to head back to the swamp once the temperature cools a bit and the flies stop biting. Fortunately, in terms of getting our current study underway, our split strategy succeeded when many of the traps left hanging in the National forests turned out to be occupied this time around.

So far, lots of work has gone into this project, and we are certainly making progress. However, as you have read, the smooth transition from our propitious words on paper to their successful implementation in the field has certainly not gone as planned. Why won't honey bees just do what we want them to, when we want them to do it? I guess that it's because they don't read the books on bees and beekeeping. So, despite our educated strategies and fancy equipment, sometimes we just have to humbly wait for Mother Nature to unfold her plan!

And, a word of travel advice, if you ever get the chance take a trip to the Okefenokee, I highly recommend it! It is beautiful. You will want to make reservations early in the Spring to avoid blood-suckers and high temperatures. Also, be sure to ask for Chip or Joe and take advantage of their guided tour services. They can answer just about any question about the swamp. And, they will entertain you with all sorts of stories and show you things about one of the natural wonders of Georgia that you would never see otherwise. But, if you spot one of our swarm traps, stay clear! Those are my bees. See Ya! BC

Jennifer Berry is the Research Director at the University of Georgia Honey Bee Lab.

Preparing For A Beekeeping Course, Part II

Selecting The Instructor(s)

Larry **Connor**

Selecting the Instructor(s)

As promised last month, there are additional topics to be discussed regarding the labor and joys of planning a beekeeping course for new and existing beekeepers. One matter can be compared to a chicken or egg question – which should come first, finding a special instructor or selecting a topic? My experience has been that the two must develop together – there needs to be a coordinated effort to determine the content of a course while finding the best person to do the instruction. If multiple instructors are needed, you add the third dimension of making sure that the level of instruction is even and coordinated between speakers. This coordination is often lacking in courses I have observed, with one instructor directly contradicting something taught by the previous instructor. An easy way to get around irreconcilable differences is to announce that the two instructors will present alternative methods, say Langstroth bee colonies versus Top Bar colonies, but there still needs to be coordination between speakers so they do not negate the work of the other person. Learning should be an additive process, not one based on conflict and disagreement. Since honey bees are very adaptive, it is useful to point out the flexibility beekeepers have teaching different methods that may seem to be at odds.

How do you determine if a potential instructor should be hired to do the job? Most of beekeeping is done by word of mouth. I am frequently asked 'who would be a good person to talk about a particular subject?' Of course, the best person may not be available, or affordable. With the overriding tendency of bee clubs to go with the least expensive instructor, they often get what they pay for as a result. Here are some simple guidelines for instructor selection:

1. Seek references from someone who has heard the person make a similar presentation or someone who has taken a course by that person.
2. Find and review an online video post of the person making a presentation.
3. Ask the instructor for a list of prior instructor assignments and get feedback from the organizers and students who took the course.
4. Keep in mind that the best author of articles and books may not be the best instructor for a class. Everyone has strengths but few are excellent at everything.
5. Ask for the potential instructor's input. Establish a dialogue to develop a concept for the course. During this time, make sure to settle on compensation for expenses and teaching fees, if any. If you have budget limits, tell the potential this in advance so they can kindly stop the discussion or agree to the fees.

Choosing a textbook and getting the best price

While I write and publish books, I will gladly use another author's book for a course when I feel that that book will best suit the needs of the student or the budget of the organizers. I am gratified that many course organizers use the books published by Wicwas Press, but there are books by Diana Sammataro, Keith Delaplane, Malcolm Sanford, Kim Flottum and others that I frequently recommend. If someone asked to recommend a book for a class on mead making, I would recommend Ken Schramm's book (*The Complete Meadmaker*) over the Wicwas title by Roger Morse (*Making Mead, Honey Wine*) because Schramm's book is more accessible to many future home brewers (although it is too complicated for some). However, when asked about a book on queen rearing I am a strong supporter of my own book (*Queen Rearing Essentials*) over any other title. For a general class, the cost of the book will often be the determining factor. This unfortunate fact is ameliorated by the knowledge that most publishers offer a discount on books purchased in quantity. Wicwas Press titles are available at a 40% discount to anyone who orders six copies or more of one title, reducing the price of many books to a point where they are affordable for a course. Most book publishers will offer discounts for a minimum order. Not all online suppliers are able to do that.

Some groups develop a set of handouts for their course, instead of using a textbook. I have done this for special classes (like one on Advanced Colony Management). Any materials copied from journals must be done with the permission of the author and publisher. I am not aware of anyone who charges for such reprints, as most authors are eager to see journal articles disseminated over a wider audience. Photocopies of chapters from books may be a different matter since this cuts into the income of the author and the publisher.

U.S. government and Cooperative Extension Service materials are usually within the public domain but it is polite to ask for permission from the author before making copies. They may have an update they would prefer you use instead.

If you do develop a set of handouts, have them bound together by a print shop or send them off to a print-on-demand service and have the materials bound in a soft or hardcover cover. This only emphasizes how serious you are

about the course.

A final thought about instructors – if you allow students to video tape or otherwise record a presentation, each person should request the permission from the instructor to do this prior to the session. They should be willing to leave the recorder off if the instructor does not provide permission.

Setting Course Fees

Boy, can this be a hot button to push within a bee club! Determining what to charge is often a tough issue. However, get a finance person to summarize the expenses for the meeting and the needs of the club. Here are items that beekeeper groups include in their fees:

1. **Cost of the instructor.** This should be where you start, but most bee clubs add the instructors' fees to the very last. Set a minimum number of students. While you may hope to have 100 students, budget for 50 or 60. Divide the cost of instruction by that number of people. If you have more students enroll then you are in the black with your budget.
2. **Textbook or handout.** If you have six or more students, you know you get a discount. Or require the textbook and let people buy it independently.
3. **Facility rental.** What will the cost of the room or building run, including any possible overage charge? I was once in a theatre group that could rent the auditorium for $100, but we had to pay a janitor to be there from opening to the last person left, at $50 per hour with a four-hour minimum.
4. **Refreshments.** Food, snacks and beverages are important to most participants. They expect them, so include them in the budget. Some clubs have members provide treats for breaks so make sure the facility will allow you to bring in outside food. Motel and banquet facilities make their money providing food and drink, so budget carefully! If coffee is worth $2.75 per cup, a crowd of 100 will be drinking some expensive beverages!
5. **Promotion.** Will you print and mail/pass out fliers? Advertise in a local foods magazine? Pay for a website? Include all these promotional costs in your budget.
6. **Membership.** Many bee schools include a year's membership in the registration fee. Decide if this will be courtesy membership (no additional money collected) or an annual membership fee added to the registration, making the membership report look really nice.
7. **Operating income.** Many bee clubs plan to make money from their bee school. An additional $15 per student will generate $1500 if 100 students enroll. This can be the funding for future speakers and other educational events, as well as community outreach projects. The students, who are now new members, will reap additional benefits from this sort of investment.
8. **Surprise costs.** Does the club need special liability insurance for the event? Is there someone spending money for the club who was not authorized to do so? Oh, the stories one hears about people who run up expenses and expect to be compensated. All people spending money should collect receipts and submit them to the person acting as course treasurer for payment.

Selecting a Venue and Food Service

The local Kalamazoo Bee Club first met at a community center where there was no fee. It outgrew that facility and moved to the Kalamazoo Nature Center. That facility was also outgrown in a few years. Last winter they tried a facility at a mega-church, but are now looking at the local community college for their 2015 Bee School. Each time, either growing enrollment or other issues have catalyzed the decision to move. Over the years, the initially zero-cost facilities have been replaced by bigger and more flexible places that have adequate parking, rooms for breakout sessions, and a place for food. But they charge a fee.

The Kalamazoo club has used caterers and prepared lunches from Subway-type shops. There is a coffee pot on and alternative beverages for non-coffee drinkers.

Every beekeeping program is different. If you do a daylong program and do not provide food, allow 90 minutes for people to leave the facilities, find something to eat and return. And not all will return once they leave the building. That is why I like to have food provided for them as part of their registration fee.

Handling Registration

More and more people are willing to register online but a stubborn few will refuse to do this, due to their lack of Internet access or their refusal to knowingly transmit certain personal information online. Wicwas Press hosts its own programs, as well as programs where we serve as cosponsors, such as the Southern New England Beekeepers Assembly held in Connecticut every November. We list the registration as an option on our PayPal store at the wicwas.com website and collect the registration fee. The income from this, minus the 2.75% fee PayPal charges, is sent to the treasurer of the Connecticut Beekeepers Association. While some people argue that the PayPal fee cuts into profit, it is actually a sales incentive as people with PayPal accounts will register more readily on line and get it over with without having to find the checkbook, an envelope and a stamp. Of course, there is an address for mailing the registration fee, if one desires. As a convention, refunds are available up to the day before the event and, after that, only if there is a medical emergency. No-shows are never refunded if the participant fails to notify an organizer.

Online registrations may have limited refund policies, as individual services may not accommodate full refunds outside a specific time window. PayPal refunds all fees requested less than 90 days in advance of an event, but after 90 days the organizers must pay the fee out of their own coffers.

Vendors

Adding vendors to a beekeeping school adds great interest to the program. If a newbee is able to learn about bees and shop for beekeeping equipment, the program becomes even more attractive. Here are a few thoughts about vendors:

1. Invite a wide group of vendors selling bee equipment and bees. Stay away from non-beekeeping materials as they rarely do well.
2. Charge a fee for space or table rent. Or provide a free table if a vendor is also a sponsor, as for coffee and refreshments. The table rental should include breaks and

lunch so the vendor does not need to run out to get something.

3. Allow time prior to and after the program for setup and removal of displays. Assemble volunteers to help with moving materials into the meeting/vending area – this encourages the vendor to return in the future.
4. Don't hound the vendor for door prizes. If you need to ask for something, hold out for something a bit more substantial that can be put into a silent auction or other fundraiser for the club. Many clubs use a teacup auction to award items donated by both vendors and the general membership. This will require a coordinator and a few more volunteers to help sell tickets and award prizes. Lately, I have seen teacup auctions bring in an additional $2,000 for the club without taking away any valuable instructional time.
5. Don't do an auction. They take too much time.
6. Don't do a Honey Queen program. They cut instructional time unless the queens are instructors or demonstrators.

Youth Programs

As a product of the 4-H program, I encourage clubs to sponsor scholarships and involve young people in their educational programs. Make no effort to dumb down the teaching content for the youth; believe me, they are usually on top of the learning game. Invite locally home-schooled science groups, as well as other programs, to enroll in the program. The club may choose to sponsor some of these students and I encourage any who do.

Evaluations

Every participant should be expected to complete an evaluation form at the end of the program. This will help guide the future organizers in all aspects of the program, from speaker evaluations to facilities, food, parking, registration and more. Some groups meet to review the evaluations and to make preliminary plans for the next program.

Certificates and completion pins

Beekeepers love to get a certificate or a participation pin. They do not add too much to the cost of the program but recognize the people who attend the entire course.

Thanking the troops

Once the program is over, make sure someone takes on the duties of thanking everyone who worked on the program. It just takes a little time to send out a summary email that thanks everyone. Include the enrollment numbers and some of the positive feedback for the day. BC

Next Month:

The Bee Club Scenario
The Self-Sponsored Class
College and University Course
Specialty Classes

Check out future programs featuring Dr. Connor at **www.wicwas.com**.

BEESWAX

A Quick Look At Preparing This Very Valuable Commodity

Alice **Eckles**

Reaping the value of beeswax

Many beekeepers don't bother to collect and use beeswax from their hives, though the wax, pound per pound, is more valuable than honey. It is a lot of trouble to collect beeswax when scraping down equipment, removing older combs, and putting the cappings out for the bees to clean after the honey harvest. But when we don't collect our beeswax and render it into high quality fragrant beeswax chunks prized for so many uses, we throw away something of real value. We can make value added products with our beeswax, sell it to others, or use it in the craft of our everyday lives.

But how does one transform these crumbs of comb full of bees, and honey and dark matter into treasured bars of beeswax? It's not that hard when we know a few tricks. Whether one is starting with cappings full of dead bees or a nice yellow free-form blob from a solar wax melter, beeswax can be rendered into saleable pure beeswax portions for the many purposes of those who use beeswax. Artists use beeswax for encaustics, Ukrainian eggs, sculpture, and batik. For now lets get started with turning a waxy mess into a fine pure product from nature. If you start the process below with wax from your solar wax melter it is so much more pleasant, but this method will work even with cappings with many dead bees included or comb.

Rendering beeswax

First there is the melting

We fill the inner pot of a double boiler about one third full with water, add raw messy beeswax into the pot a bunch at a time until the pot is two thirds full. Water-soluble impurities, honey for example, will leave the wax and dissolve in the water as we melt them together in this way. Don't over fill the pot or we may have problems with over flow and splashing. Use a pot that will be only for melting wax ever after, since beeswax it not easy to clean off. Iron pots are not recommended as they can change the color of the wax. Steel or aluminum pots are fine. Safety alert: Never apply heat directly to the pot with wax in it. Always use a double boiler to slowly heat the beeswax. You can heat it on a wood stove, an electric burner, or a gas stove, but whatever your heat source it is important to remember that beeswax is extremely flammable. Don't heat it so hot that it smokes, because the smoke isn't good to breath and smoking wax means it is too hot. It's good to melt wax in a well- ventilated area.

Gently stir the wax with a long handled wooden spoon, stick, or some utensil devoted to beeswax. When the wax is liquid pour it into a bucket with a couple of inches of water on the bottom, or if your wax is especially impure use a slotted spoon or piece of hardware cloth (maybe a mouse guard would do) to scoop out gobs of impurities before pouring it into the bucket to cool.

Once the liquid beeswax has been poured into a bucket with a couple inches full of water you will have to wait until the beeswax has cooled and hardened completely before removing it. If it is cold outside you can put the pot out in the cold and that will free up the wax sooner with no sticking. Water in the bottom of the bucket makes it easier to remove by preventing the wax from sticking to the bottom of the bucket. After removing the hardened wax, scrape off most of the debris from the bottom of the wax block. A hive tool makes a good scraper.

Melt again

It is recommended to repeat the above process again before going onto the next step: getting many remaining impurities out of the beeswax. The more impurities we can separate out by this melting-with-water-process the longer our filters last before getting clogged up.

Filtering

Before filtering the beeswax, melt the wax one more time without water in the pot, just the beeswax. Always use a double boiler for melting beeswax. This safety technique helps to keep the wax from getting too hot.

Save the cappings for the nice, lemon yellow wax they produce.

Use old wax, but don't mix it with your light wax.

Save your hive scrapings, too.

Light wax is best for clean burning candles.

I've created a beeswax filter that I like quite a bit. I buy an old sweatshirt at a thrift shop and cut it up to fit my filter frame. My filter frame is metal flowerpot ring meant to be attached to the wall to hold a flowerpot. I attach the sweatshirt material to the metal ring with metal binder clips or clothespins with the fuzzy side up. The sweatshirt material works well to get all the propolis, pollen, and everything else out of the wax. It is important to get all the impurities out if the wax will be used for candles, otherwise candles will not burn well. Once the filter is set up, pour the melted wax though the filter into another pot. The used sweatshirt filters can be re-used for fire starter in the wood stove or barbeque. I have heard they can also be cleaned and reused by pouring boiling water back through the sweatshirt material with the smooth side up, but I have never tried it.

Pouring the wax into molds

If we want to sell our beeswax for top dollar we can re-melt the wax and pour it into molds of different sizes and shapes. Since pots and utensils used in wax processing can be difficult to clean, I keep two beeswax pots; one just for re-melting clean beeswax and another just for rendering raw unfiltered beeswax. Many people like bulk beeswax made from standard molds because each piece doesn't have to be weighed and the pre-measured wax is easier to use in recipes. At Dancing Bee Gardens we use plastic hex and ingot molds that can be purchased from almost any beekeeping supplier. If you just wash them with soapy water every now and then the beeswax won't stick and you can save money on mold release spray. Placing the wax in a cold environment while it is cooling will also help the wax to pop out of the molds easier. Regular shapes make the beeswax easy to store for later use. Like honey, beeswax never goes bad though it can over heat and melt.

The whole ball of wax

While we are working with the bees it can be hard to attend to collecting wax, and propolis, which is also useful and valuable, but it helps if we have a partner, then one of the beekeepers can focus on cleaning equipment, and gathering the good stuff. This is often considered the most boring and least glamorous part of beekeeping, but it is satisfying to know that we are making the most of the hard work of the bees (and the beekeepers) by saving their efforts from waste, and in the end we have something golden to show for it. Plus there is no heavy lifting and it is unlikely to get stung doing this "easy work". BC

Soap, and a host of other products can use either light or dark wax.

BIGGER PICTURE

Jessica **Louque**

The Buckwheat Saga

Buckwheat has been around for several thousand years as an agricultural crop. Our ancestors recognized a good thing when they saw it, and they spread it all over the world. A few places in North America still commercially produce it, but nowadays, buckwheat is not getting the recognition that it truly deserves.

The buckwheat we grow is *Fagopyrum esculentum*. It grows around 3' tall or more, depending on the climate. It has several inflorescences of tiny white flowers, each of which will produce a cute little three-sided seed shaped similarly to a chinese lantern (in the *Physalis* genus of the nightshade family). They produce their nectar early in the morning, and are usually emptied out by noon. Honey bees love the flowers for both nectar and pollen, but they will find a lot of competition from other pollinators such as bumble bees, leaf cutter bees, carpenter bees, syrphids, and sometimes butterflies and moths. Buckwheat honey is dark like molasses and has a strong molasses like flavor. I personally am not a huge fan, but some people can't live without it.

My job in this article is to sell you on the awesomeness that is buckwheat. It should be the new clover of the beekeeping world. Even if you don't decide to stuff your pillowcases with buckwheat hulls or grind your own flour for buckwheat pancakes, at least the ease of growing along with the bee's love for the plant should convince you to have a go at gardening with buckwheat.

First of all, the way buckwheat grows lends itself to greatness even in the hands of a brown thumb gardener. It likes acidic soil and usually will grow where other things will not. Planting buckwheat in an area with high organic material or compost that hasn't been limed will produce a lot of flowers – as long as there's not a lot of nitrogen in the soil. Buckwheat doesn't do well with high nitrogen, probably because most of its vegetation is the stalk and few leaves (I don't really know; it's just my guess). It's also really drought resistant. This Summer we had a rain right after it was planted and then it didn't rain again for almost a month. It was suffering and I thought it was all going to die. It stalled out in its growth to around maybe 12-18 inches. We finally started getting rain again, and it shot up to 3' or more in about a week. The moral of that story is that it can tolerate a lack of water, but it will pick back up quickly when it rains, and it grows fast.

When you plant buckwheat, it needs to be covered. The seeds won't germinate without total darkness. However, once it gets covered, we usually have germination in about four days. I'm a big Johnny's Seeds fan, so we ordered over a thousand pounds of buckwheat from them this year (we planted around 22 acres in total of buckwheat at around 75 lbs/acre) and it came up pretty well, especially compared to seed purchased elsewhere. We had flowers usually after around 35 days if we had any rain, and they lasted for about two weeks of good bloom.

The best way to work with buckwheat is to do succession planting in strips, so you have plantings a week apart for maybe six weeks, then you can start again. I am referring to large-scale in this situation, but this could also apply if you just had strips in your garden. If you can only plant something like a 5x5 or 10x10 patch, go ahead and plant it all at once so it's more attractive to the bees, but if you can do bigger plots, give it a go at spacing out the timing. If you're really active in it, you can also till it under after the seeds have fallen, and in a few days you'll have buckwheat again. If you have good weather for the year, you can easily have four rounds of buckwheat in a season. Down here in NC, we can start planting buckwheat normally around mid-April and the last planting would be in early September. We usually will get some hateful frost early in October before we hit high 70s or 80s again for a few weeks just to torment the plants. The downside to the repeat sowing is that sometimes it will reseed itself in the strangest places because it can grow nearly anywhere, and you'll have to be on the lookout for volunteers if it starts coming up in places you don't want it. We have a fairly scattered garden scene here,

Butterfly on buckwheat.

Syrphid on buckwheat.

Bumble bee on buckwheat.

and if the buckwheat wants to come up in the melon patch or pretend it's a sunflower, that's okay by us.

Now, what can you do with buckwheat? Some of you might just plant it because the bees think it's delicious, and that's always a good reason to plant things. However, it's a great field crop if you want green manure or as a cover crop. This is the section you'll have to search on Johnny's website to find the buckwheat, as that is its main selling point in large settings. It's pretty good as a forage crop for non-bee animals, and it can be used for erosion control. It does break easily and if you drive on it, it doesn't pop back up like grass, but it will grow in densely and cover an area fairly fast compared to other plants. It does not spread like clover, which is a major selling point for some people. It may spread with its volunteers, but they are easily removed instead of spreading via runners. You can switch it out with something like corn to add a lot of nitrogen back to the soil instead of using soybeans. I know soybeans are used a lot because they make money and fix nitrogen, but in smaller cases like home gardens, buckwheat takes less work. You can also sell the seeds both for planting or for grain.

Buckwheat is not technically a cereal, but is considered a pseudo-cereal because it is made into flour, but it is the seed that is ground up and it is a dicot instead of a monocot like grasses (true cereals).

Mabry Mill is up near Mt. Airy and sometimes when I was little, my family would go on picnics there. They used to mill buckwheat there back in the day, and I don't know if it's still operational for visitors, but you can still buy stone ground buckwheat flour there (at least the last time I checked). I have had buckwheat pancakes made from a box, and every single time they are gross and taste like soot. If I make buckwheat pancakes from scratch with buckwheat flour, they are glorious pancakes of divine nature and can be topped with additional gloriousness of homemade whipped cream and pure maple syrup or buckwheat honey if you are so inclined to double the pleasure (and you like buckwheat honey). If you're not into the whole buckwheat pancakes thing, or you're just a crafty person, you can always make your own pillows with the buckwheat seeds like people used to if they didn't have feathers, or I guess if they didn't want bird lice in their bed. I'd go for seeds over feathers any day. At least if there were beetles in it, eventually they're going to crunch up too and you'll never know the difference.

If you do go the pancake route and you become addicted to the pancakes (how could you not?) then you should be aware of nutritional benefits and downsides. The seeds are fairly high in protein and iron and it's a seed so it has a lot of starch. However, you can have an allergic reaction to it called fagopyrism, as they have Fagopyrin that can give you anything from a rash to full anaphylactic shock if you are extremely sensitive.

Personally, I'd risk it for shrimp and soba noodle salad. Please, if somebody is feeling fancy and makes soba noodles from buckwheat flour, let me know how you did it if it turns out well. I thought I'd show off my mastery of the flour after my successful rendition of pancake production, and make soba noodles. Little did I know that Japan has people training for years to be able to hand craft these delicious denizens of the pasta society, while I was planning to whip them into shape with no prior knowledge of soba noodles outside of Panera Bread. The flour has no gluten from my understanding, because it's not actually flour. This means that the flour paste loses the ability to stretch and stick, and will just fall apart when you try to "noodleize" it. I now order them in bulk from Amazon and it works out better for everyone. Supposedly they are organic, but I've never had to spray anything on buckwheat so I can't imagine production without pesticides is too hard.

Obviously we are getting into the cold season, but I'm big on planning for the Spring as soon as the growing season is over. I hate ordering seeds and ending up on backorder, so I'm usually perusing the web by the end of October to plan out the garden. What I am expecting is that this article is going to be so inspiring to everyone that you will all go out and order buckwheat and it will be such a burst of profits from the buckwheat that it's all going to be backordered until March. In such case, may the odds be ever in your favor, unless it conflicts with mine! BC

Jessica Louque and her family are living off the land in North Carolina.

Got A Question?

Ask Phil

Phil **Craft**

He Knows!

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

A beekeeper in New York writes:

I have read that a type of bee called cape bees, is causing a lot of damage to the native African bees in South Africa. Would it be a good idea to introduce cape bees into the parts of the United States where Africanized bees are a problem?

Phil replies:

In a word, no, and for the following reason.

First, a little background. The European honey bee, *Apis mellifera,* which is native to the continents of Europe, Africa and Asia has more than 20 sub-species. Two of these, *A.mellifera scutellata,* and the cape honey bee, (*A.mellifera capensis),* are indigenous to the Republic of South Africa, located in the southernmost part of the continent. From here on, I'll just refer to them as scutellata and cape bees. (Of course, no honey bees are native to the New World, but were introduced here by colonists during the seventeenth century.)

Though both sub-species are indigenous to South Africa, their native ranges were originally quite distinct, with cape bees being found at the southern tip, or cape, and scutellata further north. Scutellata are good honey producers in their native range and, like most honey bee subspecies endemic to Africa, are extremely defensive. They are also the subspecies of African honey bee which was introduced to Brazil in 1956. There, they were crossbred with some European sub-species brought to South America centuries earlier. The resulting hybrid, which retains most of the genetics and extreme defensive stinging behavior of scutellata, escaped and has now migrated through South and Central America into the south/central U.S. where we refer to them as Africanized honey bees (AHB). Problems have followed in their wake, including stinging incidents resulting in numerous human and livestock deaths. Hence our interest in finding methods of controlling or at least limiting the spread of AHB.

The damage you refer to as being inflicted upon scutellata in South Africa is their displacement by cape bees in much of their native range. The cape bees' dominance is the result of a characteristic unique among honey bees: the ability of workers to lay female eggs. In an earlier column (June 2013), I described the problems that beekeepers face in hives with laying workers. All workers have the ability to lay eggs, but the urge to lay is normally suppressed by pheromones produced by queen and brood. In a queenless colony, after all the brood has emerged, inhibition of the workers' impulse to lay disappears and some will start depositing eggs in cells. However, since workers cannot mate, the unfertilized eggs laid by almost all sub-species of honey bees, including those found in Europe and the western hemisphere, develop only into drones. Queenless, laying worker colonies are socially disrupted and, as a result, will not accept a new queen. They eventually die out, due to the absence of new worker brood.

The dynamics of a queenless cape bee colony are very different, though the end result can be the same. When cape bee workers lay eggs, a high percentage of them do produce female offspring which develop into workers. This is known as thelytokous parthenogenesis. Even with fresh worker brood, however, these cape bee colonies, like all queenless, European honey bee colonies with laying workers, are socially disrupted. They often fail to rear new queens, and eventually die out because the laying workers are not able to produce sufficient new workers for the hive to thrive. But because they are able to produce some female brood, a typical cape bee laying worker colony will take longer to succumb than other European sub-species.

In South Africa, both scutellata and cape bees have been successfully maintained in their respective ranges by commercial beekeepers without significant interaction between the species. The genesis of the present situation was in the early 1990s when colonies of cape bees were moved north into the home range of scutellata by

A capensis worker (the one in the center with outstretched wings) in a scutellata colony – illustrating the typical posture of capensis under such circumstances. (photo by Mike Allsopp)

migratory beekeepers. All honey bees will occasionally drift, or end up in the wrong hive. Normally, drifted bees are accepted and incorporated seamlessly into whatever hive they end up in. Cape bees however, after drifting into (or infiltrating) a colony of scutellata, will begin laying eggs which, of course, develop into more cape bees. This stealth attack disrupts the colony where they have found a home. Like cuckoos or cowbirds hatched in another bird's nest, cape bee larvae manipulate (presumably through pheromones) the original inhabitants of the hive into feeding them a richer diet than they feed their own offspring. The laying cape workers emerge larger than typical workers thanks to better nutrition, and even mimic queen pheromones, causing the host bees to recognize them as pseudo-queens. This enables them to control reproduction in the host hive, though they are not as efficient brood producers as real queens. The increasing social dysfunction eventually causes the scutellata bees to reject their original queen. She dies and, eventually, so does the colony, but not before the cape bees have produced enough new workers of their own sub-species to invade and usurp neighboring colonies.

The cape bees' unique ability is threatening, not only scutellata, but also commercial beekeepers who depend on them for their livelihood. The incursion of cape bees, effectively parasitizing scutellata colonies, has resulted in devastating losses. Nor can beekeepers in the North simply adapt to managing hives of cape bees. In their respective home ranges, both species are good producers, but cape bees are not well adapted to nectar sources in scutellata's territory, and honey yields from them are far lower.

It's evident that we are not good at foreseeing consequences when our actions alter the ecological balance of a region or a continent. The introduction of the European honey bee to North and South America was a resounding success – at least for bees, humans, and certain plants. On the other hand, the decision to import scutellata to Brazil in order to increase honey production there has had overwhelmingly negative repercussions, the extent of which is yet to fully manifest itself. Transporting hives of cape bees to the northern region of South Africa has been disastrous for both scutellata and for beekeepers there. All beekeepers are familiar with the consequences that the introduction of Varroa, tracheal mites, and small hive beetles have had in North America. These last were brought here unintentionally, but still through human agency. These are just examples from the beekeeping world; there are many more from both the plant and animal kingdoms. In general, any introduction of a non-native species, even as a biological control upon another introduced and undesired species, is potentially dangerous, and must be done with extreme caution.

Would cape bees imported to North and South America act as an effective control on AHB? Very probably. We have already seen the effect they have on AHB's close relative, scutellata, in South Africa. Is it a good idea? Absolutely not. Suffice it to say that much of the research revealing the mechanism by which cape bees parasitize colonies of other sub-species was performed, not in South Africa on scutellata, but in Sheffield, England on some of the European sub-species from which our North American honey bees are descended.

A beekeeper in Washington state writes:

Long time reader, first time 'caller'.

I live in Carlton, WA. We just had a devastating wildfire that burned nearly 400 square miles and is still burning. My bees survived, although the fire burned within a foot of their hives. They are in my garden, which is full of flowers and blooming herbs and veggies - so there is a small bit of foraging food within the garden, but all of the wildflowers that they visited are now gone. They appeared to have eaten some of their honey stores during the fire, and there is not enough vegetation around for them to adequately create and store more food for winter.

There is not much information out there on the effect of wildfire on honeybees and how to care for them through the next winter. Have you had any experience with this? What do you suggest?

Phil replies:

Congratulations on your narrow escape. I just received an email from a friend reporting that her cousin recently lost his hives in a Washington wildfire. You are not alone.

For now – and at least until Spring – you are, in effect, living in a desert. You will have to be prepared to provide all the resources that your hives need. This includes not only carbohydrates (in the form of sugar syrup as a honey substitute), but also protein (in the form of patties as a replacement for pollen).

Your first step is to assess your hives' immediate needs. Go through them and count frames of stored honey, both full and partial, and make notes. Each hive needs a minimum of two or three deep frames of honey at all times; later, of course, they will have to have more to get them through the Winter. If you do not see the necessary minimum in the hives now, it's time to do some feeding. Mixing a thick syrup of two parts granulated sugar to one part water will encourage the bees to use what they need immediately and store the rest as reserves.

In the Fall, the colony's focus should change to the raising of brood, and its food requirements will change also. September and October are for rearing Winter bees – the ones which will survive until Spring and supply the biomass to provide warmth to the hive throughout the Winter. Normally, this activity is stimulated by the autumn nectar flow. If you don't see fresh nectar being

Photo courtesy of Kentucky Division of Forestry.

deposited in the cells in early September (which I doubt you will), you will have to imitate a flow by feeding a thin syrup of equal parts water and sugar. Since your goal at this time is to encourage brood production and not the storage of food reserves, don't let the bees occupy too much of the brood space with syrup. Stop feeding for a while if they fill up more than few frames. In the meantime, as larvae start to develop, the nurse bees will need protein. In the absence of natural pollen sources, you'll have to purchase some protein patties. Place one on the top bars of the top brood box in each hive, and keep a patty on throughout September and October. If they consume most of one, add another.

In the middle of October, it's time for the hives' focus to change again – this time to storing food for Winter. About the 10th of the month, switch back to a thick syrup, 2:1 sugar to water. The bees will tend to store the thicker syrup, and you can give them as much as they will take. Each hive will need about 50 pounds of stored syrup, in the absence of honey, to get through the Winter. A deep frame full of syrup provides about six pounds of food reserves, a medium frame about four, and a shallow frame about two and a half. Normally, by mid-October the colonies start cutting back on brood production and begin to fill the top brood box with honey. Under these most abnormal conditions, the change to thicker syrup will help prompt that behavior. A full medium box or a mostly full deep, together with what is stored in the bottom, will go a long way toward meeting your hives' Winter food needs.

In the spring, it is to be hoped, there will be new plant growth, a re-flowering, and fresh nectar being brought into the hive. Early in the season, watch for pollen on the legs of returning bees; if there is pollen, there is likely nectar as well. In Spring, as in Fall, you want to see brood being raised. Monitor your hives closely for fresh nectar, pollen, and brood. If you're lucky, things will be back to normal, but it's possible that there will still be dearths created by the fire. Let what you see in the hives be your guide. BC

THOUGHTS ON COMB MANAGEMENT

Ross **Conrad**

Although I have been keeping bees for over 20 years, I think the supreme importance of proper comb management on the overall health of the hive is really only just really sinking in. When I began beekeeping, beekeepers would brag about how long they had been reusing old combs. Claims of combs being 20 years old, or older, black as night and still in use, were not uncommon.

Why replace old comb regularly?

Since Colony Collapse Disorder reared its ugly head, volumes of research have consistently indicated that beeswax combs have the potential to attract, absorb and build up numerous chemical contaminants.[1,2,3,4,5] Over time, beeswax comb can also potentially build up significant levels of viruses and other bee pathogens.[6] Additional research has shown that the sub-lethal levels of pesticides that can be found on combs in a typical beehive can make a hive more susceptible to pathogens that may be present.[7,8] The level of pathogens in a hive also impacts the ability of bees to tolerate *Varroa* mites.[9] Among the vectors that may contribute to pesticide and pathogen build-up in the combs are foraging workers, drifting bees, pollen, and beekeepers themselves. The preponderance of scientific evidence has led to the general recommendation that beeswax combs in hives be replaced every three-to-five years.

Some approaches to comb replacement

Various techniques have been developed to achieve the goal of comb replacement in the hive. Each beekeeper must choose the one that fits into their beekeeping operation the best. Most methods require that frames be marked in some way so that the year that the comb was built by the bees can be tracked. To accomplish this some beekeepers will write on the top bar, others use thumb tacks pushed into the top-bar of each frame that are color coded for the year in much the same way that the age of marked queens is monitored. Some beekeepers may use the color of the comb as a way to judge its age. However, the color of the comb can be deceiving since combs used for honey storage will tend to darken much more slowly than combs used for brood rearing.

The most dramatic way to replace comb in a hive is all at once. This is hard on the bees since they must build up the hive's comb supply in its entirety in time for Winter, and the comb-less period temporarily reduces the ability of the colony to raise young and expand the worker population. Since the creation of new comb is dependent upon the availability of copious amounts of carbohydrates (sugar in the form of nectar or syrup) rebuilding an entire hive worth of comb often takes a lot of money and time invested in feeding unless the bees are located in an especially rich and productive foraging area.

In order to temper the huge investment of time and resources required to create new comb most beekeepers will opt to replace a small portion of the colony's comb at a time. A common recommendation is to replace two-to-three combs in each box each year. In this way all 10 frames of comb in the standard 10-frame hive body or super will be replaced within five years or less. One way to accomplish this task is to rotate the oldest combs in the hive to the outside positions in each box in Autumn. Then in early Spring, when the colony has a modest population and much of the comb in the hive is empty, the outside frames are removed and replaced with foundation.

The making of nucleus colonies with three to five frames of brood, honey, pollen and bees is another way to rotate old combs out of a hive. By the same token, it is a good practice to always include a couple frames of foundation when ever a nucleus colony is installed into an eight- or 10-frame hive body. It works well to place the foundation in positions #2 and #9 and allow the straight combs on either side of the foundation help guide the bees in building a straight comb within the frame.

Another approach is to utilize a three deep hive body system for each hive. Early in Spring, when the bees are primarily occupying the top hive bodies, the bottom hive body that is mostly empty can be completely removed and all the frames replaced. By replacing all the frames in a single deep box each year, frames in the three-hive body hive are never allowed to become older than three years. A modification of this approach is to use five medium boxes for each hive. By replacing all the old frames in the bottom box when reversing the hive each Spring, a five-year comb rotation will be achieved.

What to do with those old combs?

As I outlined in the July 2014 issue of *Bee Culture*, beeswax is an incredibly unique and valuable product from the hive. The old combs we cull from our hives on a yearly basis can become an important source of wax that can produce an additional income stream. Combs

Drawn comb is one of your most important assets. Don't neglect it.

Scientific evidence is building regarding the wisdom of regular comb replacement in the hive in order to help improve colony health and survival.

that still have eggs, larva or brood that has yet to hatch should not be culled from the hive. Ideally only old empty combs are removed and replaced. However, we all know that the "ideal" is often not the real-world situation we have to work with. Sometimes, old combs being culled from our hives will still have small amounts of honey or nectar in them. In such a case, it's a good idea to not allow these carbohydrate resources to go to waste, and instead leave the frames out for the bees to rob out and take back to their hive. Just be sure to leave the frames to be robbed out at least 300 feet away from the beeyard if you have more than one hive, in order to prevent your hives from trying to rob each other.

Options for getting new comb started

Numerous options exist when it comes to providing the bees with the opportunity and incentive to build new combs. Each option has various pros and cons related to time and labor, durability, cost, honey bee acceptance, reliably straight worker comb, and the initial level of potential chemical contamination (a problem that is ubiquitous due to contamination of commercial beeswax used to manufacture foundation).

Beeswax coated plastic foundation is the most durable option available. While it tends to cost more than sheets of 100 percent beeswax foundation, it takes less time and labor to assemble, and the potential level of the initial chemical contamination is likely to be lower since the majority of the foundation is made of plastic rather than wax. The beeswax coating on plastic foundation is important because honey bees are unlikely to accept the plastic foundation without it. Plastic foundation becomes a problem when it comes to disposal, a problem that is not an issue with other options. When it comes to harvesting the beeswax, all other options allow the wax to be removed in a solar wax melter. Old frames of comb built on plastic foundation require a lot more labor in order to harvest the wax since the plastic will warp in the heat of a solar wax melter and so the wax must be scraped off each comb manually if the plastic foundation is to be preserved and reused.

Sheets of 100 percent beeswax foundation have stood the test of time for producing consistently straight combs of worker sized cells at a price that is typically less than that of plastic. Beeswax foundation is not as durable as plastic foundation even when wired and the time and labor required to produce frames of wired wax foundation can be significantly more than that required to assemble frames of plastic foundation. Since full sheets of foundation have the highest wax content of all the options available, the level of the initial chemical contamination has the potential to be the highest. Honey bee acceptance of beeswax foundation is not a problem and the entire comb can be rendered down with the exception of any metal supports such as wires or pins.

Starter strips of foundation deliver significant cost savings over the use of full sheets since the bees will build the majority of comb naturally without the benefit of foundation. Starter strips can be made of either 100 percent pure beeswax or beeswax coated plastic. In the case of starter strips made of plastic, disposal issues are reduced, though not eliminated. Time and labor association with starter strips of wax is about the same as for full sheets of foundation since the time saved by not having to support the foundation strip with wires or support pins is used by the time required to cut up the full sheets of foundation into strips. Potential initial contamination issues are greatly reduced since much less commercial beeswax is being used to begin with. Strips take more time and attention in order to produce consistently straight combs. While mostly natural comb built from starter strips may contain significant amounts of drone cells, science is starting to support the idea that a certain level of drone comb is important to maintain the health of a colony. Starter strips do not result in finished combs that are as durable as full sheets of beeswax foundation, however this

Beeswax or plastic foundation, starter strips, or natural comb – there are options for all styles of beekeeping.

weakness can be overcome with careful management and handling.

One hundred percent natural comb is the least expensive option and requires the least amount of time and labor since the bees are given no foundation at all, and instead are given frames or top bars that are shaped in such a way that simply encourages the bees to build their comb in place. Natural comb also has the potential to contain the least amount of chemical contamination since absolutely no commercial beeswax is utilized in the construction of the comb. As with starter strips, combs are likely to contain significant amounts of drone cells, and more time may be required to ensure that the combs are consistently built straight. In addition, greater care in handling and management is needed with frames of naturally built comb due to the lack of comb support typically provided by wires or pins.

Get those new combs drawn out

All new combs, whether they are built from full sheets of foundation, starter strips, or built naturally without foundation will require a honey flow. In order to get combs drawn out in a timely manner, it is best to time your comb rotation activities to coincide with the local honey flows whenever possible. If the timing is off or the honey flows don't materialize, feeding an artificial diet rich in carbohydrates will be necessary.

Given what we know about the pesticide and pathogen laden environment that today's honey bees have to navigate, the importance of comb management has never been greater. With the many options for comb rotation available, beekeepers have little excuse not to adopt a method that ensures hives are filled with comb that have relatively low levels of pesticides and pathogens year-round. BC

Ross Conrad manages his comb and his bees in Vermont.

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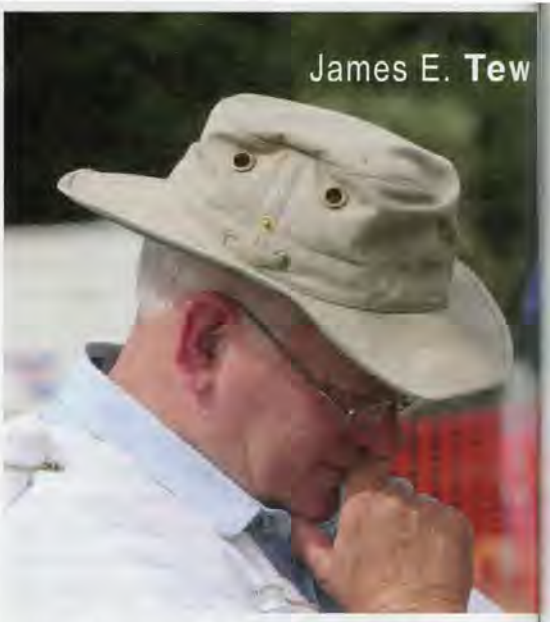
If You Have Never Managed An Observation Hive – You Should

At the same time, they educate and entertain



A unique aspect of beekeeping

In recent articles and in many presentations, I have been exploring the dual world in which bees can live – their natural world and our artificial, unnatural, beehive world. Bees seem to have acceptable survival strategies for both worlds. However, when it comes to observation hives, I just have to believe that the bees are nearly at their wits end to figure out what to do in this contraption. In the realm of the unnatural hive, surely the observation hive[1] ranks near the top of the list.

I am drawn to these units

One way or another, in my long life as a beekeeper, I have always had some kind of interaction with observation hives. I have looked at them in restaurants, museums, bee supply companies, educational exhibits, homes of beekeepers, and the one that I maintain. I have written previous articles about building simple ones and have described complicated ones. I presently have a nine-frame unit (three deep frames on three deep frames on three deep frames) about 10 feet from where I am writing this for you. Even if you don't presently have one, I know that if you see one on exhibit, you will be drawn to it.

Observation hives are a constant source of entertainment and education; however, it must be said that the units do present management challenges to their keepers.

Why are observation hive so trying for the bees?

1. The frame configuration is usually wrong. Bees would not normally construct a colony on single frames stacked one upon the next. Winter clustering are nearly impossible.
2. There's usually too much light in the observation hive. It is a fact known to all beekeepers that bees live their indoor lives in complete darkness. Observation hives completely reverse that to a world that is completely lighted.
3. They frequently become crowded. Most are small colonies and are normally kept at a small population. Alternatively, since they are small, they can crash quickly, too.
4. They are difficult to feed – especially protein substitute - and difficult to treat for mites.

Styles and types of observation hives

Some models of these viewing hives correct the issues presented above better than others. Indeed, there is no standard observation hive unit. Many of these hives allow the creativity and expertise of the beekeeper to shine. For a couple of interesting observation hive designs, look at: Draper 's Super Bee Apiaries, Inc. or **http://observationhives.co.uk**. I can't review all styles and designs. I selected these two after only a cursory look. There are many, many more designs and models available. Choose the one that best suits you and your needs (or design and build your own).

Categories of these viewing hives

The broadest two categories of these viewing hives are (1) temporary and (2) seasonal. Temporary observation hives can be set up at anytime other than hard Winter. As the weather becomes cooler, the setup becomes more challenging.

For instance, just last week, I provisioned a single frame unit with a frame of brood and a few hundred bees. Once the glass was reaffixed, the simple hive had no bee exit. I *wowed* a group of nursery school kids (and their parents and teachers) and then took the unit home and returned the bees to their parent colony.

A quick comment before I leave this section . . . I put the marked queen in a small queen cage that I kept in my pocket. When the expected question arose, *"Where's the queen?"* I simply removed the caged queen from my pocket. Yes, though I have done it before, I was a bit nervous about this procedure. The queen had no attendants and no food. In the three hours I had her out, I gave her a single tiny droplet of honey and a smaller droplet of water. She immediately took the honey, ignored the water, and was readily re-accepted by her home unit. Of course, it was raining heavily during both the observation hive setup and breakdown. To prevent colony confusion and to help find the queen, I used no smoke and got stung more than I would like to admit. This recent event is an example of using an observation hive in a temporary way.

Seasonal observation hives are for viewing and studying bees and their behavior. They are not normally relocated or moved. In early June, I initiated my nine-frame observation hive with three frames of brood, a queen and about two pounds of bees. Presently, all nine frames are full. To prevent a late season swarm, I need to remove at least three frames of bees and brood and give the large observation hive extra space. I will dedicate the excess bees to a needy colony I have in my apiary. I marked the queen when I installed her. I will make sure that she stays in the large observation unit. After a

[1]In some other countries, the term, *"observation hive"* is sometimes abbreviated with just the letters *"OH"* rather than typing out the long name every time. I would like to have used that designation in this piece, but I know it would have read strangely to Ohio (OH) beekeepers.

killing frost or two, I will break this special hive down and contribute its bees and component parts to other colonies that are a bit light in Winter stores. This large, seasonal hive is great for just looking at bees doing bee things, but it is also good for determining when food in coming in or alternatively, when supplemental foodstuffs are needed.

Is overwintering a seasonal observation hive ever possible?

Yes, if you and your bees live in a warm climate, larger units can over Winter. It will need protein and carbohydrate stores, but it may be able to limp along completely on its own. I tried to winter mine last year, but it did not make it. It is in an unheated room. If I try it again this season, I will have them go into Winter with proportionally more stores than a regular hive of similar size and will wrap it in some way. During the warm season, observation hive bees are obsessed to close off all ventilation holes with propolis. I fought that for a while, but gave up. However, the wintering observation hive will accumulate moisture so I provide upper ventilation to prevent moisture buildup.

A question for you....

While at a meeting, a beekeeper whose name I do not know told me he was having good luck wrapping his outdoor wintering colonies in *"Cement Blankets*[2]*."* That concept took a minute to get my arms around. After reviewing, I have found that these covers are more commonly called *curing blankets* or *insulated tarps*. These blankets are used to cover fresh cement to aid in curing during Winter months. Is anyone familiar with these cement-curing coverings? I was wondering if they could be cut to a smaller size and if they are a possibility for completely wrapping my wintering observation hive? Anyone have experience with these specialized blankets?

Living with a seasonal observation hive

They have an odor.

Large semi-permanent observation hives like mine produce a strong and pervasive odor when nectar stores are being processed. This same odor can be easily sensed in the apiary. It is not a sweet odor but more something like the odor of clean dry straw. Consider this characteristic before installing a large observation hive in your living quarters.

A crowded hive like this does not show much actual biology and behavior.

They are noisy.

Large observations hum 24/7. The larger the colony is, the louder the buzz. My large nine-frame unit can be heard 15-20 feet away. The warmer the temperature is, the louder the buzz. It's not offensive, but it is ever present.

These hives seem to attract other animals

This characteristic depends on the hive style and on the involvement of the keeper. Also, this is not a characteristic that I can easily quantify. I sense that more beetles, beetle larvae (not small hive beetles), ants, lesser wax moths, and spiders seem to be in the general vicinity of my large observation unit. My hive is in an unheated, storage room. I get all the above *plus* mice. I suspect the numbers of these hive acquaintances would decline if the unit were inside in a tight, heated room.

Larger populations do not necessarily make better observation hives

Large populations of bees make it impossible to see other normal bee behaviors. Additionally, as the hive space fills, more and more bees seem to become unemployed. A packed out hive offers little to view but a bunch of bees.

Interesting, but presently useless, observations

When necessary, the queen produces eggs around the clock

I watched the queen deposit eggs at odd hours throughout the night. This has to be a seasonal colony buildup behavior. It makes sense. If it were pitch dark inside the hive all the time, why would the day/night cycle matter?

Brood capping color varies with the age of the comb

Initially, the brood capping color on new comb is just a bit more yellow than eggshell white. As the brood combs are used for subsequent brood cycles, the brood cappings darken. At once within the observation hive, my bees can have very light pale yellow brood cappings on one frame while they have the typical darker cappings on other frames. The color change comes from the immediate frame the brood is on. Propolis is involved. If brood cappings are a mix of propolis and wax, why the color range?

Bees that are telling me something – but I just don't know what it is

I whimsically assigned most of the following bees their colorful names.

[2]If you were that beekeeper who gave me this information, I would like to speak with you more about these blankets.

I needed something to describe what action they seemed to be pursuing for use in this discussion.

Fire bees

These bees run – flat out—the full distance of the three frames. They act like something is afire. They crash into other bees. They may pause briefly but essentially, they just seem to run from hive top to hive bottom. While they are few in number, they certainly make their presence known. They are not present much of the time. I don't have a hypothesis for what these bees are telling me. (This is not a breaking dance.)

Groomer bees

These bees go from bee to bee providing grooming services. They appear to simply take the next closest bee. I could not tell that any of these bees were asking for the service. The grooming service goes on for several minutes and really seems to focus on the wing hinge mechanism. Would these bees provide a service if *Varroa* were on the bees being groomed? Are groomers simply house bees or nurse bees or can any aged bee be a groomer?

Possessed bees

These bees are just weird. Initially, I thought they had been subjected to insecticides, but they will, at times, stop the behavior and look normal. They gyrate, vibrate, and contort themselves. They shake. They quiver. Often they are in an area where other bees are not nearby. On a few occasions, groomers began to work with them, but not often enough that I can guess the answer to be that they soliciting a groomer.

The five bees at the top of the entrance are washboarders. See a 40-second video at http://youtu.be/H31EiVOEeig

Washboarding bees

Of course – the ever-present *Washboarding Bees* are here, too. These bees rhythmically move back and forth with front legs waving just over the substrate and antennas in constant use. I have seen washboarding bees on the glass inside an observation hive doing their thing. I recently photographed some wash-boarders at the outer entrance to my observation hive several inches away from the entrance.

A year ago, I published a three-minute washboarding video on YouTube[3] and I put up a shorter clip of bees washboarding outside my observation hive entrance. I have read many possible reasons for this behavior, but so far, I don't think any have been conclusive.

[3]See: http://youtu.be/sxjc4tSKJFs

If you have never managed an observation hive – you should

If you have never managed an observation hive – you should – but you should wait until next Spring. For all but the most heroic efforts, the prime season for this project has passed. Sure, you can do the temporary-type unit for special occasions, but for the real unit, the seasonal unit that helps you grow as a beekeeper, you will need to plan for next Spring.

Spend time acquiring the hive and getting it set up. Providing the opening to the outside is the biggest hurdle for most beekeepers. Don't drill or cut into your electrical, gas, or plumbing system. In fact, if you are not trained, have a professional make the cut through the house wall. If you have unique observation hives or unique experiences with observation hives, I would like to hear about them. Beekeepers do clever things. These units are truly fulfilling. Give them a try. BC

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

APPLE CYSER

Jack **Blackford**

Apples of all kinds, and your special honey, make a cyser to 'die' for

Scratter, which chops the whole apples into little bits, run with a drill that has a lockable trigger is much faster than the handwheel. Next upgrade an electric motor and pulleys.

There are many food revivals going on in the U.S. right now, fortunately two of them go hand in hand benefiting from each other. Beekeeping is booming across this country, and now, thanks to more and more interest in craft cider, small apple orchards are blooming everywhere.

Cider predates the American revolution when it was the most popular alcoholic drink, just about every farm had some apple trees just for making cider. Unfortunately, prohibition seems to have put a damper on cider making and orchardists had to transition to growing apples for fresh eating dessert apples as well as apples for sauce and simple apple juice, or cider as we Americans call it.

Everywhere else in the world cider means fermented apple juice, or as we call it, hard cider. These eating and sauce apples do not make the best hard ciders, they lack an important ingredient, tannins. It is the astringency of tannins that give body and mouth feel to a hard cider, it is the tannins that try to shrink your head down to the size of a golf ball when you bite into a good crabapple. The tannins in today's craft ciders raise the quality of the drink well above simply fermenting store bought apple juice.

For years we used the store bought apple juice, and fresh cider from roadside stands to make apple wine. There is an arbitrary line separating cider from wine, mostly its about the percentage of alcohol. Our apple wines were nice, had a crisp apple flavor, a bit flat when made with store bought juice, something we made when we had room to make it but not a batch we always planned to make every year. We have planted some apple trees on our small farm and there are a bunch of wildling apple volunteers planted by our horses, protected by rock breaks from the bush hog. 2013 was a great year for apples in mid-Atlantic states, we had enough rain during the summer to really size up the apples and cool fall temperatures to ripen the fruits well. In 2013 we also found Distillery Lane Ciderworks (DLC), the head ciderist, Tim, gave me and my wife a tour of the ciderworks and the owner Rob chatted us up about the kinds of apples he grows to make their craft cider. We learned about tannins coming from bitter sharp and bitter sweet apples, the bitterness from the tannins and the sharpness or sweetness from the level of acids in the apples. Unlike grapes, the tannins in apples are mostly in the flesh instead of in the skins so apples can be pressed and used immediately for making cider like a white grape wine. Well known European cider apples with names like Kingston Black and Dabinette are grown by DLC. They also grow American apples like the Roxburry Russet and even new disease resistant apples such as Liberty and Goldrush. Just like in grapes and honey, apples have terroir, they take on characteristics of the land they grow on. Some grow better in the North, able to ripen during the short growing season and others thrive in the South and like the heat and require a long growing season. What may be a great cider apple in Vermont might not be able to stand the heat of South Carolina, and a Georgia apple may not have enough time to ripen in Maine, so even the apples used to make ciders are regional, just like honey.

I returned to the ciderworks with Russian queen breeder Charles Walter to encourage DLC to make a cyser using cider from their special cider apples and Charles's honey. Rob and Tim had us try some of their apples thinking we would spit them out due to the bitterness from the tannins, but these apples tasted like some of my wildling apples that we were used to eating so we finished our sample apples happily, much to Rob and Tim's surprise. Gentle people would call these apples spitters, you spit them out because the taste is too intense, really, we much prefer all the taste we can get thank you. Plus we are fans of elderberry meads, packed with tannins from the elderberries. DLC also sells a cidermakers cider pressed from a mix of their bitter apples and aromatic eating apples. We of course bought a couple buckets of cidermakers cider and went home to make cysers since we have bees and honey and would never consider adding sugar to a wine but instead would much rather make a mead.

Tasting these cider apples also encouraged us to turn our attention to our own wildling apples. Since apples do not produce true to seed every apple tree raised from a

seed is unique. Most of our wildlings are sharps, they are sweet but have a high acid level, very brisk and containing a lot of flavor. Our crab apple, which we are naming Crabby Daddy in honor of my Dad, who was never crabby, turns out to be a strong bittersharp. At first bite the acid levels pinch your lips together like a lemon when picked fresh from the tree, then the tannins show up and try to shrink your head, then finally the sweetness arrives and saves your taste buds. The later in the season the crabs are picked the less acid they have as they ripen, but at some point they are overripe and begin to get soft so tasting them for the balance you need in your cyser is the best way to determine when they are ready to pick. Many cider apples improve in taste after being sweated, stored for a couple of weeks or months until they reach their perfect taste, Goldrush is one of these apples that improve with storage. Our wildling apples ranged from a total acidity of 1.0-1.2 % acid with a specific gravity around 1.040, so very definitely tart apples, as compared to the cidermaker cider of 0.73% acid and a specific gravity also of 1.040, so much lower in acid while being at the same sweetness.

We had previously picked up a nice fruit press from ebay to make melomels with and to press honey from top bar hive and foundationless combs. After searching the web for ways to first crush the apples we realized many of these do-it-yourself methods would only work for a small bunch of apples and not the truckload we were planning on picking, so we bought a scratter. It came with a hand turner, that was quickly replaced with a ¾ inch drill to provide the power, watch those fingers. The scratter buzzed through the apples quickly. We mixed different apples together, some bittesharps, some sharps, some crabs and some sweeter aromatic apples together as a blend and crushed and pressed them together.

Most wine presses are set up with a round basket to press grapes. Old time rack and cloth apple presses used flat plates between layers of crushed apples pulp wrapped in a press cloth to form a stack of cheeses. The multiple layers press much more effectively than just one big bag of apple pulp. This same principle can be easily applied to the common winepress. We found round 1 inch thick cutting boards at Freckleface.com cut perfectly to fit our winepress. By using two of these spaces in between three press bags filled with apple pulp we get a lot more juice than if we just used one big bag. It is well worth getting some spacers if you use a wine press.

There is nothing wrong with cloudy cider, but for apple cyser we felt it should be clear. We diluted some pectinase from CiderSupply.com in water and put it in a ketchup squeeze bottle. During the crushing of the apples with the scratter we would squirt a little pectinase on the crushed apples to help break down the pectinases and added a little amylase to split any remaining starches into sugars, we like to apple modern winemaking techniques to make a better cyser.

Our fresh cider was certainly brisk from the proportion of sharp and bittersharp apples. Apples have predominately malic acid which is a bit stronger than the tartaric acid in grapes. Fortunately, the old time ciderists discovered that if they left their hard cider setting in barrels long enough in the spring after it was made it would be transformed into a much softer hard cider. They did not realize then that it was malolactic bacteria eating the harsh malic acid and turning it into lactic acid which is much softer. Some modern malolactic bacteria can withstand higher sulfite levels and lower pH levels which makes them much easier to use than hoping a wild malolactic bacteria will take over and soften your hard cider. Some yeast, like D47 or QA23, support a malolactic fermentation so we selected these yeasts to trail in our cysers.

Old time rack and cloth apple presses used flat plates between layers of crushed apple pulp wrapped in a press cloth to form a stack of cheeses. The multiple layers press much more effectively than just one big bag of apple pulp. This same principle can be easily applied to the common winepress. We found round one-inch thick cutting boards at Freckleface.com cut perfectly to fit our winepress. By using two of these spaces in between three press bags filled with apple pulp we get a lot more juice than if we just used one big bag. It is well worth getting some spacers if you use a wine press.

Winepress can be used as either a cloth and rack press or as a basket press with spacer plates to make it more efficient like a rack press. Wine press with apple scratter converted to a rack and press setup or with spacers used in press basket to make it much more effective than just pressing a single big bag (basket removed to see configuration of spacers and bag).

Cleared fresh pressed sweet cider, ready to be made into cyser, after overnight treatment with sodium metabisulfite and settling out the bigger particles that make it through the pressing cloths. Cups just to keep fruit flies out while we mix up the must. After honey is added a drill mounted stirrer mixes everything up easily.

Some cider purists would never consider adding anything to their cider, they roll the dice in favor of whatever wild yeasts are on the fruit and living on their presses and barrels to ferment their cider. We prefer to be a bit more selective and use wine yeasts for our cysers. Many cider makers use ale yeasts and others use wine yeast, some even let the wild yeast start the ferment and finish it off with a cultivated yeast. We wanted to trial different yeasts on the same kinds of apples, the batch for the D47 was pressed and inoculated immediately while the apples for the QA23 sat in a cool basement for a week before being pressed and inoculated with yeast. This one week of sweating decreased the acid levels from 1.245% to 1.09%, a significant reduction which may have biased our choice of QA23 a little bit over the D47 even after malolactic fermentation. The fresh cider was then treated with potassium metabilsulfite to knock down any wild yeast and bacteria in our juice that would spoil it and try to turn it into vinegar or give it any weird off flavors. D47 is widely used in making white wines using a cool fermentation, it has a narrow range of temperatures it prefers to work in, 59-68F. QA23 works from 59-82F, the lower range is preferred for fermenting cysers. Both yeasts add body and mouth feel to a white wine. We chose to compare the QA23 to the D47 due to its wider range of temperature tolerance over the D47. Our basement can stay at 68F which is at the high end for D47.

After fermenting with D47 or QA23 and then Malolactic bacteria cysers made from both types of yeast are simlar. They both taste very good, expressing appleness and honey as well as good body and mouth feel. In blind taste tests so far, everyone has preferred the QA23 over the D47, but only by a slim margin. So we feel, at least for our sharper apples, that a primary ferment with QA23 followed by an acid lowering malolactic acid secondary fermentation is the best route. We are in the process of planting a small experimental cider apple orchard focusing on the most disease resistant apples here in the Mid-Atlantic area in West Virginia. We of course must grow Grimes Golden, a WV apple, and are searching for some WV Sweets. Since we are in the middle between the north and south we are trying apples from both regions like the Roxburry Russet from the north and Hewes crab from the south. We are also including a lot of dual purpose apples like Liberty and Goldrush that make both good cider and good fresh eating.

You can also graft your own apples, its as easy as grafting queens but takes a little longer to see the results. Once you learn to graft you can get scions very cheap and put them on rootstocks of your choice depending on what your growing zone is and what kind of soil and disease pressure your area has. If you see a nice looking wild apple tree you can snip a few scions off of it in the winter and then graft them onto your rootstock or even add it to a limb on an apple tree you already have growing. Who knows, you might even find the next great cider tree or the next Gala dessert apple. Grafting opens up a whole new range of apples to try. The USDA has some apple germplasm for experimenting with at **http://www.ars.usda.gov/Main/docs.htm?docid=10013**. Several places sell scionwood like MapleValleyOrchards.com and Fedco Trees. You can get a lot of different apple varieties and even the original source of apple trees from Kakistan. Some good advice is given at Cummins Nursery. Dr Cummins helped create some of the most disease resistant roostocks currently in use and they have a nursery specializing in cider apples. Other good sources for cider apples are Fedco nursery, Century Farms, Albemarle Vintage Virginia Apples and St Lawrence Nursery for northern growers.

We are more about technique then recipes. When designing a cyser you need to know the amount of sugar, or the specific gravity, of the fresh cider first, usually somewhere around 1.040-1.050 or a little higher. You can then decide how much alcohol you want you cyser to end up at and how sweet you want it at the end. We like our cysers around 11.5 to 12.5% alcohol, that is a gravity of between 1.090 and 1.100 to start out, so almost half or more of the sugars come from the honey. This results in about 12 cups of honey into five gallons of fresh cider. Using a drill mounted stirrer makes it very easy to stir the honey into the must without heating. We add the pectinases and even amylases to the apples

Cyser apples don't need to be pretty like supermarket apples. A few blotches and scabs might even make the apples produce more phytochemicals to fight the diseases and make them better to ferment into cyser. Mix of wildling apples and eating apples, Northwest Greenings, a tart sauce apple that really makes a brisk addition to cider.

during the crush, but if you start out with fresh cider you can just add the enzymes into the juice. We have also added potassium metabisulfite to the juice after it was pressed to protect against turning into vinegar. Since we are making a cyser instead of a cider, we plan on using a wine yeast to take advantage of the increased sugars from the honey to raise the alcohol levels, we dont want anything else competing with our yeast so sulfites knock out the competitors.

We want our yeast to be well fed so we also add about 7.5 tsp of Fermaid K, usually half when the must is mixed up and half when the gravity falls by about a third. Brining in some modern additives, we add 1 gram of Opti-White nutrient that helps smooth out the cyser and helps prevent oxidation and increases mouth feel. We like to use a 6 or 7 gallon carboy to ferment 5 gallons of cider, at the start of the fermentation we just cover the opening with a nylon pantyhose secured with a rubber band. This allows the cyser to gas out easily, once the fermentation has slowed an airlock is used. Once the gravity reaches 1.000 we rack into a smaller carboy to decrease airspace and allow the cyser to age. After the cyser clears we racked into another carboy, added VP41 dry Malolactic wine bacteria and the nutrient OptiMalo Plus to help the bacteria ferment. After several months of MLF we racked again, degassed with a vacuum pump, added another dose of sulfites to inhibit further MLF, and sweetened with just a little honey. We added 7.5 grams of sparkaloid fining agent to clear the proteins from the added honey, waited a week for the fining agents to settle and bottled. You could choose to bottle in still wine bottles with cork or even Zorks. We can't use sorbate to inhibit yeast growth because of the MLF can metabolize the sorbated into something that smells like geraniums so we bottle without adding sorbate but we do use sulfites. A safer way to bottle is to use either champagne bottles or beer bottles with a metal cap. Even if you didn't innoculate with ML bacteria there is probably some floating around anyway and if it wakes up in your cyser it can pressurize the bottles enough to pop out a cork, so beer bottles and beer caps are perfectly acceptable to bottle cysers. You can even make them bubbly if you want but that is beyond the scope of this article. Wait at least a week before opening the first bottle, a month would be better!

There are so many options in making a cyser. You can do a varietal apple cyser using just one kind of apple, though not all apples make a good cider on their own. More commonly a blend of apples is used, there are a million different blends you could come up with, customizing them to your own tastes whether you like a brisk sharp apple fruity cyser or one more like a dry wine with tannins and a little softer acid. Some ciderists even

let the crushed apples soak in pectinases overnight on the theory they will get more juice and a little taste from the skin exposure.

Another important option in your cyser is what kind of honey to use. We used a light spring honey that was probably a mix of dandelion, locust and wildflowers, it was very floral but not strong tasting. There is no reason not to use some darker honeys to make a cyser to give an even more pronounced honey taste.

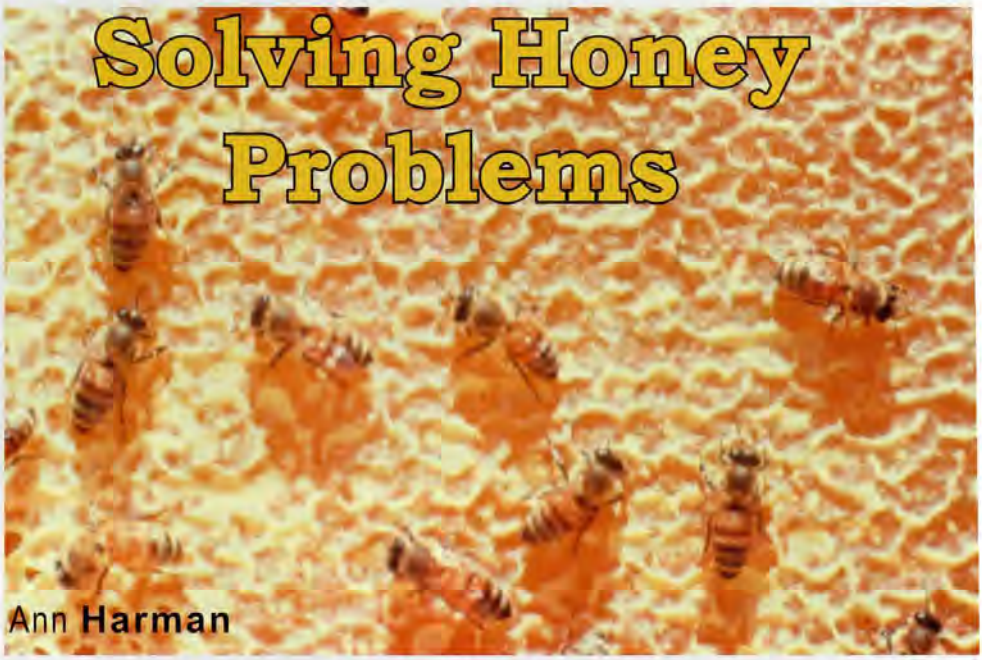
And there are pears. You can pretty much do exactly the same steps for a cyser to make a pear mead. I would suggest a pectinase that can digest arabinose that is in pears to make it clear easier. A pear and apple mix is very good, and dropping a few crab apples into a pear mead to add some acid and tannins bumps it up a big notch.

Keep your eyes open in the spring for blossoming apple and pear trees to revisit in the fall. If you find a good one snip a twig in winter and graft it onto a disease resistant rootstock and you can have it in your own backyard. BC

Jack and his wife Toni live on a small farm in WV. Email ***WVMJ@gmail.com***

Primary. Cysers have settled down after vigorous primary fermentation and now have airlocks. Inverted cups direct any geysers downward if the fermentation reinvigorates.

Solving Honey Problems



Ann **Harman**

Crystallized, Spilled, Fermented

Honey – that marvelous tasty, sweet, sticky stuff that bees provide for us! Why should honey be a problem? Well, we are going to think back to times when we have wondered what to do (and perhaps in a dark moment why we ever wanted to be a beekeeper). Perhaps we can find a solution to a problem. Here are just a few solutions – you probably have others.

Let us start at the source of some honey problems – the plant and its blossoms. Honey is actually more of a plant product than a bee product. The plant is responsible for the color, flavor, aroma, sugar content and other ingredients. The honey bee does change the sucrose to glucose and fructose with the aid of an enzyme. And the bees do quite a bit of work in evaporating all that water so the honey does not ferment and then topping it off with a nice cap of new wax. We do need to thank the bees. But the blame for some of our problems goes to the plants. And sometimes to us – we're only human.

The crystallization of honey is perhaps one of our biggest problems, unless you harvest only tupelo honey. In this case, you can skip reading until we mention problems caused by humans. Some honey will crystallize slowly, taking months to start showing some crystals. Other honeys will crystallize in a few weeks. And some will in just a few days. Crystallization of honey has rather complicated reasons. And since our harvests can be somewhat different from year to year, crystallization problems can vary in the same way.

You have just removed some frames from your honey supers and from their appearance you suspect the honey has crystallized. Perhaps your bees found some different sources for honey this year. Perhaps some farmer nearby has changed the crops being grown. Honey from canola can be very quick to crystallize. A quick scratch with the hive tool confirms that you now have multiple frames of crystallized honey, much too firm to extract. Are these frames now bee feed? Most probably. As long as the bees have a bit of water they can use the honey stored in those frames. In a drought-prone area, or in a cold Winter area, you may be glad you saved the frames for bee feed. Make a note on next year's calendar to check your supers frequently. Perhaps you can remove them before the honey becomes hard as a brick.

Now it is time to bottle that last five-gallon bucket of honey that you harvested last Summer. Hmmm – nothing is coming out of the gate. Guess what – the whole bucket is crystallized. You can indeed do something to rescue that honey but you won't be bottling it for a little while. This is a good time to build a warming box. It is very easy and will probably come in handy at other times. Here is what you need.

Take a trip to Home Depot or other builders' supply for a sheet (or two depending on how big you wish to make the box) of that rigid foam insulation, some duct tape, a lampholder, and an extension cord – lamp cord, not the heavy duty ones. You are going to cut the foam insulation to make four sidewalls and a top that will cover the entire top of your warming box. You decide on height and width of your box. Join the four foam insulation pieces with duct tape, covering up the joints. Do not seal the top on. Cut the socket end off the extension cord and connect the cord to the lampholder. Mount the lampholder in the center of top of your box so that the light bulb will be inside. Now all you need is an incandescent bulb to supply heat. Depending on the size of your foam box you can use a 25-watt, or a 40-watt or a 60-watt. Mounting the lamp in the top of the box, instead of the bottom will give a more uniform heat unless you construct some type of grid shelf for the bucket.

Uh oh – the incandescent light bulb! They are supposed to have joined the dinosaurs – extinct. However, many incandescent bulbs still exist as well as the many incandescent decorative bulbs in an assortment of wattages. Visit your local hardware store to see what is available. Or you can try the Internet for the now-antiquated ordinary incandescent bulbs. Incandescent bulbs can generate quite a bit of heat in a small enclosed, insulated box. You can install a thermometer inside the box so you can watch the temperature and not scorch the honey. Now just set the bucket inside the box. Loosen the bucket lid so you can check the progress from rock-hard to smooth flowing liquid honey.

You have a dozen jars of honey, all labeled and ready for sale. Why did you label those jars months before time to sell? Now you have labeled jars that are partially crystallized and are most unpleasant to look at. Did you make that box from foam insulation? Now is the time to use it again. Be careful of the temperature. You do not want to ruin your labels or get the honey in such small quantities too hot. A 25- or 40-watt bulb could be adequate.

If your days are sunny and

warm, and you did not make the insulated box, here is another technique that does work well with labeled jars. This time we will use the power of the sun – but not its light! All you need is a telescoping cover and a hive body tall enough to accommodate your jars. Find a place in full sun where you can set the jars down – a concrete patio works very well – then put the hive body over them, then the top. The sun's heat will liquefy the honey but since no sunlight is shining on them the honey will not darken.

Oh look! There is a cardboard box in the bottom of the freezer – what could be in it? Eight clamshells of cut-comb honey that was harvested and cut three years ago. Although in a freezer it has crystallized. Several options are to be considered. The comb pieces can be used as bee feed simply by either laying them on the top bars and using a shim to take care of the extra space needed or holding one or more pieces in a frame with rubber bands. However, you do not wish your bees to start building wild comb around them.

You could also try what some people do with comb honey when they do not know how delicious it is when eaten with the comb. Warm it gently in microwave or oven to melt the wax and liquefy the honey. The wax will rise to the top. Let the mess cool and remove the layer of wax. The honey can be salvaged and bottled. Another option with crystallized comb honey is to cut it into little chunks and call it Crunchy Chunks of Honey and just eat the little chunks like candy. Better, dip them in dark chocolate and refrigerate for an incredible treat.

Another problem – your jars of chunk honey are now jars of crystallized comb honey surrounded by crystallized honey. Even if the jars have wide mouths it can be impossible to get any honey or comb out. These jars can be put in your warming box or the hive body substitute. However this is probably the most difficult of crystallized honey problems to solve. Warming to liquefy the liquid honey part will allow you to remove the piece of comb unless the wax has melted. Perhaps you can salvage the liquid honey. If the comb piece is still intact you can remove it, allow it to drain and then decide what to do with it.

Liquefying crystallized honey in bears or other plastic containers requires care so that the plastic does not soften and collapse. Watch the temperature in any warming box you use as well as in the hive body method. You may need to use a lower wattage bulb than one used for glass containers.

The microwave is certainly handy for many kitchen tasks. Yes, honey can be liquefied in a microwave. However, honey heats very rapidly and can produce a volcanic eruption rivaling that of Vesuvius. Do not use full power. It is better to use low power and short bursts of time. With a bit of practice you can find the ideal combination. At the end of discovering the best setting you will probably have a very clean microwave.

Beekeepers love to make gadgets to help with many aspects of beekeeping. Probably the one seen most often is an alarm for the bucket under the open extractor gate. Honey is flowing out of the extractor but you are busy uncapping more frames. The bucket overflows and honey is slowly running across the floor. The amount of honey wasted depends entirely on how soon you discover the overflowing bucket. An alarm is simple to make using a doorbell, a float, a switch and a battery. You can adjust the setting so that the doorbell rings at two-thirds or three-quarters full.

Now what about that huge puddle of honey on the floor from the overflowing bucket? You have just made some bee feed. The best scoop for a large puddle of honey is actually a nice plastic dustpan. (How do I know? Guess.) Keep one handy in your bee house until you make a bucket alarm.

Honey can give us one more problem – fermentation. The fermentation of honey depends on the water content, the temperature and the ever-present yeast spores in the environment. Honey bees prefer their honey with a low-enough water content in the warm internal hive temperature both of which prevent fermentation. However a large part of the U.S. experiences high humidity during Summer months. Will bees cap honey above 18.6% water? Yes indeed. Perhaps they have tried very hard to evaporate sufficient water but realized it was an impossible task.

Beekeepers can blend honey with too high a water content with some that is sufficiently lower to give a final water content below 18.6%. But without a refractometer to check water content it is very easy to set a bucket of honey aside – 'to bottle later.' Well, 'later' arrives. The winey aroma given off as the lid is removed tells the story – fermented. Should this be bee feed? Bees will use slightly fermented honey but if it has reached the foamy, really smelly stage it is better to turn it into the compost pile.

If you are extracting and think your honey seems especially thin and runny, see if a beekeeper friend or a local club has a refractometer to check the water content. If you know the percent you can prevent the loss of a quantity of honey. If the extracted honey cannot be blended with other honey it would be best to sell it for immediate use to mead makers or bakeries that can cope with high-water content honey.

Go ahead and blame the bee plants for some honey problems. We should forgive the bees. They do try to produce a good product. However, we do need to give ourselves, humans, a bit of blame for a few problems, too. BC

Ann Harman solves her honey problems and keeps her bees at her home in Flint Hill, Virginia.

DOWNTOWN

As You Make Connections Try To Avoid Conflicts and Build Consensus

"Do I tell anyone?" is one of the most frequently asked questions in urban beekeeping. And of course I am going to give you a relatively complicated answer! It's not a simple "yes or no" because how much and what you have to say about beekeeping will change over time, as will your interactions with the people around you while you keep bees. Of course, the fact that you are reading this in a national beekeeping magazine is a pretty fair indication of how well I succeeded in being a "secret" beekeeper. And coming out from undercover has turned out to be a blast, while it was also tempting to lecture you here about the benefits of connecting and sharing with your neighbors.

But this is the real world, and the whole idea that someone can tell you how to handle your hometown relations is preposterous. But after ten years of doing this downtown, some of those experiences might inform your own, and I would like to have your back on this.

Coming Out To The Neighbors?

No Trust for Strangers

Tell me if you have heard this one – in my city neighborhood, con artists actually go door to door saying that they are the not-too-distant relative of a household "just a couple of houses away," that they have locked themselves out and need cab fare (neither assertion true, FYI.) This ploy often works, because in greenifying neighborhoods like the ones where urban beekeepers tend to congregate, we tend to have little idea who moved in years before we did. There's often a demographic fault line, too, that makes us that much more unknown to each other. If we do not know who actually lives in a house, it's pretty hard to judge how they might feel about the beehives on the roof. So how should we proceed?

It's probably a good idea to start carefully and a bit worriedly, and then build your comfort zone over time. You will need to know more about your neighbors in order to relax more in your apiary, but this does not have to be instant. You can reduce the fear your bees inspire if you are more of a known quantity and introduce yourself bit by bit. In addition, anything you can do to reduce the actual risk your bees represent, and to deploy more resources, both in skill and helping hands, to ensure the health and peaceable-ness of your bees will benefit you, them, and the unsuspecting masses around you.

Being ready to answer their questions, lots of them, is another way to reduce the strangeness, build interest, and increase the trust your neighbors feel toward you and your bees. Even if you are new, you can answer almost everything they can think of if you have attended a short course or read through a good textbook. You might want to let your neighbors know that you have completed a course if you have! If you want a cheat sheet, we have a compilation of dozens of questions (and answers) asked by America's elementary school students in a national pollinator webcast at http://tinyurl.com/kd68w5m. Dr. Elizabeth Capaldi Evans of Bucknell also has a fun book called *Why Do Bees Buzz* published by Rutgers.

Risk = Probability x Impact

How much should you tell, who, and when? Your mileage will vary, based on this easy calculation. *The risk you face is roughly related to how likely a problem is to emerge multiplied by how bad the situation can get.* But your risk might start high and get lower, or go the other way if you or your neighbors act like jerks. A lot of this is in your hands. You can build protection through social connections, building your own skills, alliances with community institutions, thoughtful bribery, acting like the kind of person who deserves trust, and avoiding the battles you might not win.

When I started keeping bees on my townhouse roof, I had nowhere else to place an apiary, and no allies to help me out in a pinch. Beekeeping was also not specifically protected in this city, and I did not yet know how to move a hive, let alone a full sized colony or two down a spiral staircase. My risk went all the way from possibly being sued to problems with the police. I lost a bit of sleep, and decided to keep a low profile. No surprise there.

Cloak and dagger strategies that seemed to help at the time included

painting the hives to blend in, working the bees only on weekdays (when my neighbors were unlikely to be outside, looking up), storing empty woodenware indoors, obsessively preventing swarms and robbing, providing a delicious, algae-edged water source, and keeping my mouth shut within a 10 block radius. I got the chatter out of my system by anonymously blogging like a maniac and going to beekeeping meetings in the suburbs.

A decade later, a lot of this seems quaint. Beekeeping is now legal, most of my neighbors know, there are at least two crisis apiaries available in or near town, a bunch of urban beeks are around to help each other out, and we have moved many a hive in our time. We have even been known to hive sit for each other. It's a nicer world. But it wasn't instant, and not everyone gets here.

What happened in between was piecemeal – the standard advice is to hand out honey from your first harvest, but I would give slightly different advice. My husband and I first shared honey with folks in the general vicinity (but not next door) whom we knew through other connections, mainly dog walking and gardening. We gauged their reactions, and asked them to try the honey, tell their friends about it, and tell us what folks said. And then we tried closer, and closer. We found that having some other connection ahead of time really helped neighbors get over the strangeness of the idea of urban beekeeping, and that having a relationship they valued tempered an out-and-out rejection or complaint. It's easier to trust someone you know, and most folks are conflict-averse.

It was also important to join up with a beekeeping community nearby in order to become a better beekeeper and better beekeeping neighbor, as well as to get help if we needed it. The suburban beekeeping associations also received requests from people in my town for speakers willing to talk about the bees, and to outline how garden clubs and churches and schools could help. Those talks created more beekeepers, opened up potential apiaries, and created many citizen advocates when legalization came around. It's worth your while to invest in this invaluable social insulation from risk, and community protection for your bees, maybe even before you talk to the gal or guy next door.

There's the Law, and Then There's Life

But here's another truth – there are people on my block with whom I do not share a language, and they have still not heard from me. There are people here who complain to the authorities rather than to the neighbor who is irking them, so they may never know about my colonies (if we can help it). This is all really a shame, but even with the law on my side, with an out-apiary in my back pocket, with a much stronger skillset, and friends with helping hands, it's easier to let those neighbors slide. In a pinch, the law and peer pressure will probably win, but we still have to live with each other.

My buddy Karl was kind of an "out" beekeeper from the beginning: he had a cool completely legal hive-on-a-porch setup that his neighbors OK'd – until they didn't. They probably would not have won the lawsuit which they threatened, but who needs a new hobby like that? Luckily, Karl is a great community minded guy and his gals moved to the top of a crypt in a nearby cemetery. Another friend, Bradley, wrote his neighborhood bulletin board that he would be getting a completely legal hive on his roof, to which all but one neighbor said, "Ok, cool." But that one neighbor wrote an email that was almost funny to read: she started out ill at ease about her *possible* sensitivity to stings, and worked her way up to a terrified state where she would become a prisoner in her own home, no longer able to eat jam on her toast in the garden (the latter 100% verbatim). Bradley got his hive, but the neighborhood stopped getting updates. And freaky lady is still eating toast in happy ignorance.

Consensus or Else: Choose Your Battles

When I first started shopping for out-apiaries, especially at sites run by bureaucracies, one facet of human nature showed itself loud and clear: if something is strange, scary, or unfamiliar, the easy answer is "No." That negative can be devastating in the fragile environment inhabited by most urban beekeepers: many times I have been to zoning boards and city council meetings where the vote to allow bees had to be unanimous to pass, though there was no legal reason why. Most neighborhood organizations operate on this principle, and one loud naysayer can blow away a lot of the fight that would otherwise be on your side.

If I think "no" is coming, I don't ask. More hopeful strategies such as lobbying that person's boss, creating peer pressure, presenting fun and inspiring information, and seeking forgiveness rather than permission (be careful with that one!) are all more likely to work, with fewer permanent consequences. Once a person issues that "no!" they tend to be dug in, and the fight will not be pretty. If you do manage to overturn a "no," you will likely have a long term opponent who does not wish you or your bees well.

Basic advice

Your situation is probably as unique as your spot on the planet, but I do think some wisdom applies in most cases. First, don't make the bees pay for the tortured relationships that can exist between people. Reveal as much about your beekeeping as your community connections can handle, and manage your bees with an eye to the impact their presence might have on those around. As your expertise and your alliances grow, you can share more. Keeping yourself undercover can be a long term strategy, but you never decrease the risk you face or the worry you carry around with you if you don't work to make space for beekeeping where you live. Make sure that the folks who share their space with your bees get some benefit at some point, maybe a jar of honey, maybe some information about how the environment works, maybe a unique visit to the inside of a colony. But realistically know this: you will never get 100% of everybody to be comfortable with anything, and as you make connections try to avoid conflicts and build consensus. If you take care of your bees responsibly, and are within the letter of the law, sometimes that is the most that anyone needs to know. BC

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

GLEANINGS

OCTOBER 2014 • ALL THE NEWS THAT FITS

WALTER T. KELLEY COMPANY, LLC, SOLD!

The Frandsen Corporation is pleased to announce that it has entered into a purchase agreement to acquire The Walter T. Kelley Company, LLC of Clarkson, KY. The acquisition was scheduled to close on September 9. After close of the acquisition the company will be known as Kelley Beekeeping Company (KBC).

Kelley will join the Frandsen Corporation family of companies and become a "sister company" to Miller Manufacturing Company. Kelley is a current supplier to Miller and strategic partner in expanding the availability of beekeeping supplies to the retail channel.

Although formally an acquisition, the intent and spirit of the transaction is to create a partnership among KBC, Frandsen, and Miller. Frandsen is excited to bring additional resources and investment to KBC in support of the important and growing industry of beekeeping, both for commercial beekeepers and hobbyists. This partnership provides the opportunity to further strengthen the synergy between KBC and Miller.

"The beekeeping industry has exploded with growth in recent years and is expected to continue growingand evolving rapidly," said Dan Ferrise, EVP of Frandsen and CEO of Miller. "We will provide the KBC team with resources that will allow them to continue to grow to meet the needs of beekeepers throughout North America."

Ferrise went on to say, "It's been great to work with KBC on this transaction. The commitment to the industry and community that its owners and leadership team have demonstrated is clear. We are thrilled to work with them to continue the rich heritage of KBC and embrace the legacy that was created by Walter T. Kelley and has been carried on by its employees and the Clarkson community. Frandsen is built on a legacy of similar commitments, and we are proud to associate with a company of like values."

Joe Papalia, majority owner of the Walter T Kelley Company, said, "Being a part of the Kelley legacy has been a great experience. As we go through this change, we are happy to be working with an organization that is committed to the beekeeping industry and is committed to investing in the community, the employees, and the continued growth of the company."

We have 82 factory employees and will be adding 30 more for the second and third shift," said Kevin Harrub, the company's marketing director. "The hobbyist market is really expanding in new areas that haven't happened before."

"We're in about 100 stores," Company President Jenny Everett said. "By Summer's end, we'll be in more than 1,000. We're partnering with Miller Manufacturing under the Little Giant name. If we are to keep recruiting new beekeepers, we've got to get into the farm/ag stores."

Started in 1924 by Walter T. Kelley, KBC is a highly respected leader and staple of the beekeeping supply market. KBC currently has over 100 employees and sells over 2,600 items related to beekeeping and honey harvesting.

Frandsen Corporation and related entities are a family of businesses owned and operated by Dennis and Greg Frandsen and headquartered in North Branch, MN. The manufacturing sector has operations in MN and the banking sector has facilities in MN, ND, and WI.

Miller Manufacturing Company is a market-leading manufacturer, distributor and marketer of farm, ranch and pet products which are sold under the brand names of Little Giant®, Hot-Shot® Springer Magrath®, API™, Double-Tuf®, and Pet Lodge™. Today, Miller Manufacturing's catalog features over 1,000 products which are sold through a large network of farm and animal health supply distributors in the U.S. and over 30 countries. Miller Manufacturing started as a family owned business in 1941 and today is owned and operated by Frandsen Corporation of North Branch, MN.

EPA'S INADEQUATE TESTS

A group of ecotoxicologists say the U.S. Environmental Protection Agency's practices for evaluating pesticide safety are inadequate and likely to result in decisions biased toward industry interests that underestimate potential harm.

Michelle Boone of Miami University and her colleagues write in the journal BioScience that most pesticide toxicity tests used in risk assessments are conducted by pesticide manufacturers themselves, which the authors believe can result in untenable conflicts of interest.

Moreover, rigid inclusion criteria often mean that potentially relevant studies are barred from the EPA's assessment process.

The ecotoxicologists highlight the case of atrazine, which the agency reassessed on the basis of a single manufacturer-funded study. The herbicide was ultimately deemed safe to amphibians, despite the existence of a number of studies that could have led to a different conclusion.

They also cite other problems with EPA risk assessment practices, including inconsistent application of criteria among taxonomic groups and an overreliance on laboratory studies, among others.

Taken together, these problems result in a "presumption of innocence" that Boone and her colleagues maintain may be inappropriate for the evaluation of potentially harmful substances.

They conclude that "the risk assessment process can and should be improved so that decisions are made with the best available data with an evidence-based approach."

Among their recommendations for reform is the use of an independent third party to stand as a barrier between industry and research. This separation would serve to reduce concerns over conflicts of interest.

In addition, they recommend a wider use of all available research – particularly field studies – and suggest that the assessment process should be made more transparent.

Alan Harman

OBITUARY

Lenard Hancock Hines was born October 23, 1925, to Mary and William Hines of Phoenix, AZ, and passed away on July 12, 2014, at his home in Mescal, AZ. Lenard graduated high school and then served in the Army in World War Two. After the military, Lenard attended and received a B.S. degree in agriculture from AZ State Teachers College in Tempe. While employed by the USDA Soil Conservation Service at Tucson, AZ, Lenard attended the Univ. of AZ where he earned his teaching certificate. In 1961 the Hines family relocated to Sierra Vista, AZ, where Lenard taught science, mathematics, and shop classes at the Fort Huachuca Accommodation Schools.

Lenard developed a love for beekeeping starting with a 4-H project at the age of 12, and was a commercial beekeeper until he sold his bees in 2010. Lenard loved his bees and the AZ flora that supported them; he was dedicated to sharing the depth and breadth of his knowledge about these subjects with everyone. His beeyards were located only on the deserts and in the mountains of AZ ranches, and not on the irrigated farms like other AZ beekeepers are prone to do. Lenard was an active member of the AZ Beekeepers Association and a frequent collaborator with the staff of the Carl Hayden Bee Research Center. When tracheal mites came to AZ in the late 80s, he used no chemicals and, working with the bee lab, developed tracheal-mite resistant honey bees in his 700-plus colony bee operation. Following his retirement, he enjoyed many days of gardening and working in his shop at his "new" home near Benson, AZ.

Lenard is survived by Anne Hines, his devoted wife for 64 years, daughter, Susan (Steven) Bonds of Prescott Valley, and three sons, Michael (Jackie), of Phoenix, David (Anette) and Bob of Tucson.

BEES – ASIA! NOT AFRICA?

The first global analysis of genome variation in honey bees finds a surprisingly high level of genetic diversity and indicate that the species most probably originates from Asia, and not from Africa as previously thought.

Researchers from Sweden's Uppsala University says honey bees face threats from disease, climate change, and management practices and to combat these threats it is important to understand the evolutionary history of honey bees and how they are adapted to different environments across the world.

Matthew Webster, a researcher at the university's Department of Medical Biochemistry and Microbiology, says the research team used state-of-the-art high-throughput genomics to address these questions and identified high levels of genetic diversity in honey bees.

"In contrast to other domestic species, management of honeybees seems to have increased levels of genetic variation by mixing bees from different parts of the world," Webster says.

"The findings may also indicate that high levels of inbreeding are not a major cause of global colony losses," he says.

In a report published in Nature Genetics, the researchers say another unexpected result was that honey bees seem to be derived from an ancient lineage of cavity-nesting bees that arrived from Asia around 300,000 years ago and rapidly spread across Europe and Africa.

This stands in contrast to previous research that suggests that honey bees originate from Africa.

"The evolutionary tree we constructed from genome sequences does not support an origin in Africa, this gives us new insight into how honey bees spread and became adapted to habitats across the world," Webster says.

Hidden in the patterns of genome variation are signals that indicate large cyclical fluctuations in population size that mirror historical patterns of glaciation. This indicates that climate change has strongly impacted honey bee populations historically.

"Populations in Europe appear to have contracted during ice ages whereas African populations have expanded at those times, suggesting that environmental conditions there were more favorable." Webster says.

The researchers also identified specific mutations in genes important in adaptation to factors such as climate and pathogens, including those involved in morphology, behavior and innate immunity.

"The study provides new insights into evolution and genetic adaptation, and establishes a framework for investigating the biological mechanisms behind disease resistance and adaptation to climate, knowledge that could be vital for protecting honey bees in a rapidly changing world," Webster says.

Alan Harman

STEVE ELLIS, FARMER OF THE YEAR, GRANT COUNTY, MN

Old Mill Honey Co. was founded in 1955 by Steve's father-in-law, James Dahl. In 1977, Steve came from Washington to spend the summer living with the Dahls to learn about commercial beekeeping. The next year, he married James' daughter Karen, and began working for James in 1979. In 1998, Steve bought out James' share and combined it with the operation he had started himself. Today Old Mill Honey operates 2,300 hives of bees. The hives are managed in Minnesota during the summer and in California during the winter months. In Minnesota, the hives are located in Grant, Stevens, Douglas, and Pope counties. Steve's brother-in-law Thomas Dahl is employed at Old Mill as well as 3-4 seasonal employees. Steve and Karen have two children; Kate and Patrick. Both children helped with the business while they were living at home. Now, Kate has a business of her own producing and selling hand-made candles using beeswax produced at Old Mill-Honey.

Steve is secretary of the National Honey Bee Advisory Board and works to influence a national pesticide policy reform in an effort to turn the tide of the ongoing pollinator decline. In addition, Steve is a speaker to a variety of audiences from 4-H groups to International Pesticide Symposiums, explaining the importance of honeybees to agriculture and wildlife systems through their contribution of pollination.

CANADIAN BEEKEEPERS SUE BAYER & SYNGENTA

Canadian beekeepers launch a class action lawsuit against the manufacturers of popular crop pesticides for more than C$400 million (US$367.3 million) in damages, claiming the pesticides are responsible for the deaths of bee colonies.

The Ontario Beekeepers' Association, which is not directly involved in the suit, says in a statement the class action has been filed by law firm Siskinds LLP to recover damages suffered by beekeepers due to the widespread use of neonicotinoid pesticides.

If successful, beekeepers who join the suit could recover losses and damages from as far back as 2006.

The statement of claim alleges that Bayer CropScience Inc. and Syngenta Canada Inc. and their parent companies were negligent in their manufacture, sale and distribution of neonicotinoids in Ontario that caused beekeepers to suffer significant losses and damage.

The London, Ontario-based law firm says in a statement it is seeking in excess of C$400 million in damages over the use of neonicotinoid pesticides, specifically those containing imidacloprid, clothianidin and thiomethoxam, designed, developed, marketed and produced by Bayer and Syngenta.

The losses include killed or weakened bees; non-productive queens and bee colonies; breeding stock; contaminated wax, combs and hives; reduced honey production and lost profits; costs incurred to meet honey and pollination contracts; and increased labor, equipment and supply expenses.

The class action seeks to recover these losses as well as C$50 million (US$45.9 million) in punitive damages.

"In the circumstances of this case, the defendants applied callous and reckless disregard for the property of the plaintiffs and class members," the claim states.

The OBA says beekeepers or companies in the business of honey production, queen bee rearing and/or pollination services who are interested in participating should contact Siskinds directly.

"While the OBA is not directly involved in this action, we support any effort that could help beekeepers recover losses caused by the overuse of neonicotinoids," OBA vice president Tibor Szabo says. "This action puts the blame where it belongs – on the pesticide manufacturers."

Neonicotinoid pesticides are applied to corn, soybean and canola seeds, among others, planted in Canada. The pesticides are designed to travel throughout the plant and attack the nervous systems of insects that come into contact with the roots, stems, leaves, flowers, fruit, pollen and nectar of the plant.

The Canadian Broadcasting Corp. reports the pesticides were also found in 70% of dead bees tested by Health Canada in 2013.

"This class action relates to the impact of these pesticides on the bee population and, consequently, on beekeepers who produce honey, provide pollination services and raise queen bees essential to the continued production of fruits and vegetables," it says.

The statement of claim alleges as a result of neonicotinoid use queens, breeding stock and colonies were damaged or died; beeswax, honeycombs and hives were contaminated; honey production decreased; and beekeepers lost profits, and incurred unrecoverable costs.

Siskinds partner Paula Lombardi says honeybees are of critical importance to the food chain:

"Without a vibrant and healthy bee population, so many of the foods we enjoy will simply no longer grow," she says. "We cannot afford to take the bees' important work for granted, nor can we ignore threats to their survival as a species."

The suit specifically names two big Ontario beekeeping operators, Sun Parlor and Munro Honey, as members of the suit.

Sun Parlor is a family owned and operated business that has been in existence for about 89 years and is one of the largest honey producers and hive product distributors in Ontario.

The statement of claim says that between 2006 and 2013, Sun Parlor incurred losses of $2,112,200 (US$1,939,728) from lost bee hives and lost honey production.

Munro Honey, is a family owned business that has been in operation for 100 years. It is also one of Ontario's largest producers and distributors of honey and hive products and is Ontario's first commercial meadery, producing international award-winning honey wines.

Between 2006 and 2013, its losses are put at $3,001,712.50 (US$ 2,756,742.25). – *Alan Harman*

Display Advertisers

I trade honey bears for breakfasts at a snappy little Aspen bistro. One day I walked in after a few weeks' absence, and I noticed that the honey in the bears was black. I said to the owner, "Did you find a new honey supplier?"

He said, "What do you mean?"

I said, "What happened to my honey? It wasn't black before."

He said, "Well, I heat it on the stove top when it granulates."

It was burnt. The flavor wasn't bad, really. You could get used to it. If you told people this was a rare honey from some endangered flower in Borneo or Botswana, you could charge a lot of money.

I traded out a couple of burned-up bears for fresh ones, but a week later the owner still had a burnt one out on the condiment counter. People seem to like it.

I generally get just a sprinkling of attendees at my weekly outdoor top-of-Aspen-Mountain honey bee lectures. At one July session, as I explained the difference between pollen and nectar, a pollen-laden bumblebee landed on the hand of the gentleman sitting right next to me. It was one of those bumblebees with the orange racing stripe across her back. The man's wife flinched, but I promised that our visitor wouldn't sting anyone. I pointed out the little darling's golden pollen load. Then she flew away.

My audience always wants to know "Why bees are dying," and I explain about the two prime suspects – neonicitinoid pesticides and *Varroa* mites. I point out that there's something of a divide within the beekeeping and bee science community. Some folks think the neonics are the smoking gun. The other camp brushes this off as environmentalist hysteria, bad science, even. They point to *Varroa* as the key vector for deadly viruses.

If you've ever gotten into a political argument, you know you can never convince anybody. Did you ever get into it and suddenly hear your adversary say, "Oh, I get it now. I was so wrong. Thanks for helping me understand the problem"? They just dig in their heels. In his hopelessly captivating Honeybee Democracy, Tom Seeley argues that it's the same with scientists. Hearkening back to Galileo and Copernicus, Seeley maintains that many scientists won't give up their dearly held beliefs, even when they've been conclusively proven wrong. They'd rather die than switch positions, and when they finally do pass on, a new generation of scientists embraces the ideas and theories that make the most sense. Today no educated person believes, as Ptolemy did, that the Earth is the center of our solar system.

I wish some of our Colony Collapse Disorder "experts" would stop bickering and instead search assiduously for the truth, no matter where that quest leads them. But I'm afraid they'll cling to what they already believe, to the grave.

Last month – July -- I started monitoring *Varroa* numbers, the first time since Spring. I sugar-shake tested half of my 100 colonies. Mite counts were higher than I anticipated, ranging from zero to 12 per 300-bee sample. Most hives had some mites. This surprised me. In April I treated all my colonies that had more than one mite. In past years, using the same treatment protocol, my July numbers have been much lower, with zero to two mites the norm.

Then yesterday – August 13 – I sampled a yard I'd neglected to test earlier. I sugar-shook 300-bee counts of one, five, 10, 19, 21 mites. Holy cow! Caught with my pants down, again! You can't ever relax. I dropped my hive tool, closed up the yard, and drove home to order formic acid Mite-Away Quick Strips (MAQS) to treat this 32-hive apiary.

I'm not fond of MAQs, as they can kill queens, but what am I going to do? Honey production has been a disaster for me pretty much everywhere this Summer, and this yard is on a wicked honey flow, finally. So I'm not going to pull the honey, call it a season, and then treat with thymol or Amitraz. But with MAQS, you can treat with the supers on. I'll use one-and-a-half pads per hive, rather than the recommended two pads, and I'll cross my fingers that all my queens survive, and that I get a mite knockdown. I have some nucs I can use to re-queen, if I need to.

I run one plastic drone frame per colony. The honey flow's been underway for a week or two, and the bees filled those drone cells with capped drone brood. These capped drone cells are the mites' favorite breeding ground. After I made my phone call to order MAQS, I hustled back to the bad mite yard and scraped into a bucket the mite-infested drone brood from nearly every single hive, before returning those frames to the hive. Katy, bar the door! That'll slow 'em down, but it won't stop 'em. For that, I'll need the big guns.

Ed **Colby**

An August Surprise