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Features . . . Culture . . . The Rest

The Last Bee

I loved Kim Flottum's article in April. The problem is, people do not take declining bee population. Someone said it the best, to paraphrase, "When the last bee leaves the Earth, mankind will follow in four years." I am a horticulturist at heart and plant anything and everything that bees love. I watch them, and that's all I can do except wish them well and do all I can to help their survival.

Thank you for a good article and for adding some education to this oblivious culture.

Karen A. Brin
Denver, CO

USDA & Land Grant

Having just read M.E.A. McNeil's article "Happy Birthday to the USDA and Land Grant Colleges" in *Bee Culture*, December 2012 (I'm slowly getting caught up on my reading!), I felt compelled to write to thank her for her service bringing this information to light for those of us (I suspect the majority of people) who were unaware of this history that is so vital to the well-being of our nation's citizens and the greater population of folks in the world community.

Thank you for your hard work. I'm certain the compilation of citations alone was considerable. That you have put this history out to the readers of *Bee Culture* perhaps those who have read it will be inspired to change the current psychology of the country to more enlightened times, such as those governed by the forward thinking individuals whose legacies live on in your writings. Perhaps that same spirit that led humankind to land people on the Moon will again be re-kindled in agriculture and the many other scientific endeavors of humankind with an eye towards making improvements for all of us, from the least of us to the greatest.

Steve Bamford

Easier Sugar Syrup

I just read "Sugar Syrup" in the Mailbox column of the April 2013 issue. And I have an easier and faster way to mix a five gallon batch of 1:1 syrup. This is perfect for the hobbyist to fill two hive-top feeders.

I mix syrup at the bath tub because there is a hot water source right there and the mess is contained for an easy clean-up! For convenience, use a five gallon bucket with graduated markings ($5 @ Lowes) or mark your five gallon bucket at the three gallon level (or 1½ gallon for 2:1 syrup). Fill the bucket with hot water to the three gallon mark. Then dump in a 25# bag of sugar. I use a "five-gallon Paint & Compound Mixer" paddle ($6 @ Lowes) chucked into my cordless drill to mix the syrup. Vary the drill speed to find the "sweet spot" between too slow and splashing out of the bucket. Mix for about two to three minutes and you're done!

NOTE: I use a 10 year old 12V DeWalt XRP three-speed cordless drill. I set the drill to speed #2, and one fully charged battery pack will mix three to four batches of 1:1 syrup. I'd guess the newer & fancier 18V Lithium brushless drills would mix a whole lot more! Of course a corded drill will mix all day. But unless you're using a slow-speed drill, they are so "torquey" that it's tough to maintain the sweet spot without splashing the syrup all over the bat tub!

Thanks for the great magazine!

Andrew Thiessen
Charlotte, NC

Thanks, Ross!

I have just finished reading your article in *Bee Culture*, and I want to thank you for addressing a topic that is long, long overdue in the beekeeping community. I deeply appreciate the thoughtful, non-combattive way in which you approached the subject.

I am into my fifth year of treatment-free beekeeping a la Dee Lusby and the Organic Beekeeping Yahoo Group. There is such a yearning, among new beekeepers in particular, for the "something more" that we all somehow know is available in beekeeping somewhere, and for a distancing from the research community/commercial model. I am hoping your article will begin a conversation that will spread far and wide and will finally inspire some compassion into how we think about bees and ourselves.

I came across a book a few years back about the series of conferences the Dalai Lama has been having with neuroscientists from all over the world. The discussions have to do with ways in which the science and spiritual worlds intersect/converge. It was riveting reading. I think that your article echoes that, and in my opinion it couldn't be more timely.

Laurel Beardsley

Author's Note: Thank you for your recent email message and for your kind words about the recent *Bee Culture* article. If you happen to remember the name of the book you refer to, please pass it along as it sounds like I may find it interesting.
Thanks again for taking the time to get in touch.

Dead Bees (Resurrected)

About the 15th of March (ides) I got a call from a friend where I have a couple of hives. He said one hive was flying while the other bigger one had no bees flying. I told him I'd come down the next day and take a look. When I got there I saw a lot of dead bees out in front and in the entrance. I knew it was not good.

This was a three-story hive that had given me five gallons of honey last year. I remembered that when I hefted them they were light. But then I forgot (old age). Anyway they were all dead with three frames still hanging on over a hand-sized bunch of brood which had been opened partially to help feed the bees.

I took the Three hive bodies to the truck and noticed the bottom board had a heap of dead bees. I

headed for home and on the way stopped at a friend's house. As I held one of the frames up we noticed a bee vibrating her wings. I didn't give it much thought.

I got home and put the boxes in the basement which has a wood stove. I went back a few minutes later and saw a bee flying around the basement light. And then I saw another and another. My wife is allergic to honey bees so I knew I had a problem. I put a screen on the top and bottom boxes. I mixed up some sugar syrup and sprinkled it on the screen, put another chunk of wood in the fire and went upstairs. A half hour later I noticed quite a few bees feeding on the syrup and the next morning a definite hum in the boxes.

With some help I moved the boxes out to the backyard, gave them a super with five frames of honey and I ended up with 2½ frames of bees. After a week I checked and found brood and eggs. The queen was alive. I moved them the next day and am quite sure they will survive.

Jim Cowan
Aberdeen, WA

Citrus In Trouble

Kim Flottum hit the nail on the head in the April issue. My bees have also been unthrifty the past few years and have completely died out this Winter – 70 hives, scattered from the mouth of the Mississippi River to the rolling hills of southern Mississippi. My customers are screaming for non-existent honey and I'm trying to capture wild swarms and buy just enough nucs to float through this year. But, is the time and expense worth it, or should I just pile up some hundred dollar bills with my woodenware and burn them together in my yard?

My particular situation is ironic and nasty. I am a beekeeper, my graduate training was in biological control, a 25-year member of the Entomological Society of America and I am a Louisiana llicensed commercial pesticide applicator with a long-standing, active client base. About eight years ago, Louisiana state extension people arrived at my citrus orchard and found the Homopteran vector for Greening Disease, which is affecting citrus worldwide. I use a proprietary fungus mixed with dormant oil to control Homoptera in my citrus, along with certain other insects – termites and bark beetles. To date, I have no greening disease, and minimal scale and whitefly and my bees have been healthy, with a bumper citrus crop from pollinated trees every year. But, apparently, the USDA has funded aerial spraying of neonicotinoids to all the commercial orchards in Plaquemines Parish – and possibly nationwide. All my hives in Plaquemines died quickly and I suspect that there is not a live bee in citrus country anywhere. Apparently, just enough of the poison gets into the bloom to affect bee behavior. Question is – how does this affect human behavior among those of us who drink the contaminated juice? Sadly, I've found that there is no connection between us peasants on the ground and the folks that run these government pest programs.There doesn't seem to be any possibility of dialogue or cooperation with government scientists. Those of us who use biological agents are marginalized and even threatened.

Mr. Flottum has hit the nail on the head. There is a lot more to this than meets the eye.

Adrian Juttner
Abita Springs, LA

Enjoys Inner Cover

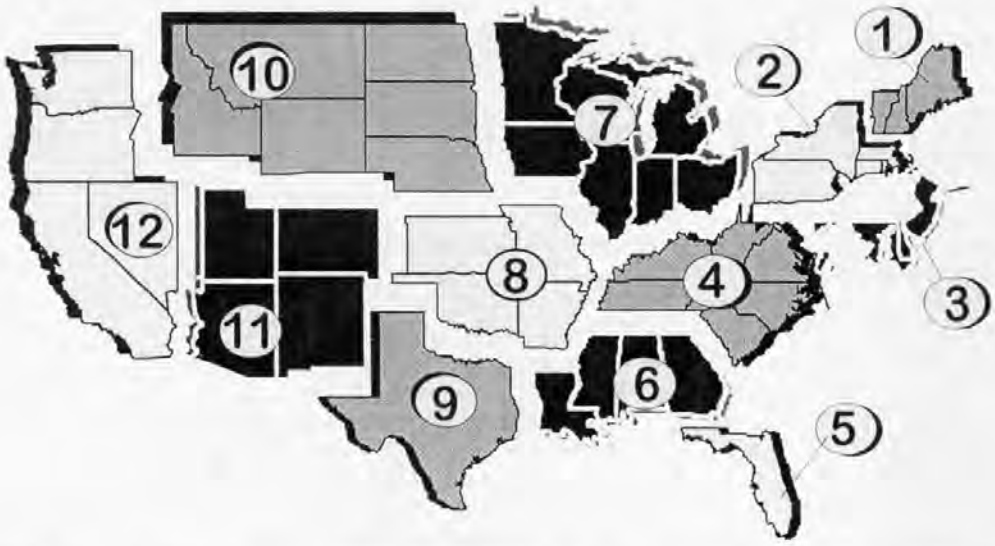
No other reason for mailing you then just telling you how much I love your editorial in April issue of *Bee Culture*. Nicely written with just the right amount of humor and irony I like on a very serious and difficult issue. I will translate it and use it somewhere.

A lot of dead outs in Sweden as well this Winter, a combination of things. A growing use of neonics and very cold in nights in March in a time when colonies had started out with brood. Many colonies have run out of food, whole colony or local starvation. Myself though 8% dead up til now. But expect a few more %. Some starvation, some queenless and the rest viruses. I'm using in average ¼ of the amount of thymol required for non selected bees for varroa resistant to go on. The potential breeders got none last year.

The main cleansing flight after winter we didn't have until April 16. Very late. But personally I'm happy as the later the spring the better the honey crop.

Erik Osterlund
Sweden

JUNE – REGIONAL HONEY PRICE REPORT



Past, Present & Future

What does the future hold, and how was Spring . . . that's what we wanted to know this month, so we went asking. Our hundred or so reporters are always willing to share what's happening, and because we work with them closely all year, can offer some pretty good information – information that you can use to make decisions in your operation.

Across the board, across the country this spring the weather was cold, some places cold and wet, but almost everywhere it was colder than normal. But you knew that. Regions 4 and 6 had cold and wet, while regions 5, 10, 11 and 12 were mostly just too dry. If you look at the USDA Drought Monitor for April, you can see that Regions 8, 9 and 11, plus the southern sections of 10 and 12 are dry, very dry to abnormally dry. The eastern part of the U.S. is in much better water shape than last year, but the west is still looking for a long, cool drink.

Given Spring, how does the honey crop for this season shape up? Overall, 21% of our reporters are looking at a good year. 64% see an average crop, but a quick look back says an average crop isn't going to be much to shout about. Interestingly, only 15% see a crop less than last year. I think that's encouraging, considering how bad it was last year. We'll see come October when we measure this again.

All things considered, and considering especially early build up and *Varroa* damage, we asked where spring was...early, right, or late. As you might guess, only 13% felt spring was early, only 25% said it was right on schedule, and 61% thought it was late. Regions 1, 2, 8, 3, 4, 7 were almost unanimous in that last choice, but regions 9, 11 and 12 were mostly early. The rest – like all beekeeping – it was local, and mixed.

	REPORTING REGIONS												SUMMARY		History	
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.94	2.10	1.94	1.82	2.00	1.88	2.08	2.00	1.80	2.00	2.00	2.10	1.60-2.20	1.97	1.98	1.75
55 Gal. Drum, Ambr	1.87	2.03	1.87	1.79	1.78	1.72	2.00	2.00	1.60	1.90	1.90	1.93	1.55-2.20	1.86	1.88	1.64
60# Light (retail)	183.75	182.00	157.50	161.20	160.00	172.50	192.67	157.50	225.00	162.00	195.00	215.00	136.00-300.00	182.19	169.00	154.17
60# Amber (retail)	181.25	161.67	157.50	165.83	160.00	157.50	183.17	147.33	171.67	135.00	180.00	183.75	100.00-270.00	169.47	164.77	152.26
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	77.48	79.51	50.40	65.65	71.46	60.00	60.15	71.46	71.46	49.20	75.84	87.00	45.00-102.00	69.42	71.48	61.80
1# 24/case	117.23	108.14	106.40	88.15	90.00	107.68	92.17	99.00	72.00	95.40	113.40	128.00	72.00-160.00	105.55	103.07	95.08
2# 12/case	112.62	92.64	82.50	83.07	84.00	87.36	80.12	99.00	71.00	91.92	144.00	109.00	63.60-144.00	93.76	92.63	82.41
12.oz. Plas. 24/cs	102.78	87.53	69.95	76.33	72.00	75.00	71.12	87.60	66.00	61.20	91.20	85.50	48.00-124.80	80.77	82.75	75.66
5# 6/case	124.64	109.28	100.50	85.85	105.00	104.41	94.53	112.50	48.00	95.40	140.00	111.50	48.00-162.00	103.81	102.95	92.90
Quarts 12/case	146.00	153.96	153.00	115.20	102.00	102.62	117.78	105.00	121.19	109.68	114.00	142.80	60.00-180.00	122.38	114.42	114.14
Pints 12/case	89.33	83.48	93.90	80.60	72.00	58.33	68.03	60.00	55.00	75.20	73.20	83.50	36.00-115.00	74.91	76.79	71.69
RETAIL SHELF PRICES																
1/2#	4.34	4.20	3.12	3.62	4.07	3.50	3.44	2.99	4.07	2.81	3.83	5.00	1.96-6.75	3.79	3.88	3.37
12 oz. Plastic	5.95	5.24	4.16	4.58	4.95	4.25	4.24	4.64	5.01	4.27	5.13	5.19	2.75-7.75	4.78	4.68	4.28
1# Glass/Plastic	6.89	6.03	5.75	5.53	6.50	6.37	4.99	5.89	5.99	5.84	5.51	8.00	3.00-9.99	5.98	6.01	5.52
2# Glass/Plastic	10.88	9.60	9.75	8.73	10.95	8.92	8.92	11.50	8.25	9.02	8.83	14.50	7.50-15.50	9.68	10.00	9.34
Pint	9.33	8.32	9.25	7.40	6.85	7.22	7.66	7.72	15.00	8.50	8.65	10.03	4.00-25.00	8.34	7.88	7.73
Quart	14.75	13.69	15.00	12.40	12.00	11.25	11.80	14.33	22.00	15.08	10.58	17.47	7.00-35.00	13.42	13.10	12.60
5# Glass/Plastic	25.92	20.81	23.56	21.25	23.00	22.48	20.08	23.00	21.99	18.56	16.77	25.00	13.62-33.50	21.41	2.62	19.76
1# Cream	8.50	7.03	8.10	6.83	7.71	7.71	5.96	7.71	7.71	6.95	8.13	10.00	4.29-12.00	7.27	7.20	6.51
1# Cut Comb	9.90	8.32	8.85	6.58	9.03	5.50	6.87	16.00	9.03	7.50	9.50	13.00	3.00-16.00	8.57	8.63	8.10
Ross Round	10.20	7.95	8.19	6.50	9.53	9.53	7.00	10.00	9.53	9.53	9.50	7.20	6.00-15.00	8.55	7.99	7.32
Wholesale Wax (Lt)	5.93	5.30	4.38	4.52	3.20	5.18	4.55	5.50	5.00	6.00	3.57	5.50	2.50-9.00	5.00	4.97	4.44
Wholesale Wax (Dk)	5.40	5.40	4.92	4.24	2.95	4.68	3.89	5.50	5.00	4.50	2.62	4.00	2.00-7.00	4.50	4.65	3.86
Pollination Fee/Col.	87.14	96.25	90.00	61.17	60.00	50.00	59.17	85.00	91.74	60.00	120.00	95.75	35.00-175.00	78.47	77.58	75.33

INNER COVER

The amount of honey from China that was illegally brought into this country by Groeb Farms and their owner Horizon Partners Ltd was so large, so fundamentally huge that it distorted the global sweetener market for nearly a decade. Every beekeeper on the planet was measurably injured by the actions of these common criminals.

Those 1,578 containers they are charged with purchasing, of course, are not the whole number they illegally imported. A bit ago, the Wolff Company importers got 600 containers (25.2 million pounds) held up by customs for not paying the tariffs that were on their way to the Groeb distributors. So how many more did they sneak in? But using just that 1,578 number, at right about 42,000 pounds per container of Chinese honey declared to be domestic honey, that comes to almost 70,000,000 pounds of ultrafiltered, adulterated with other sweeteners and antibiotics honey illegally smuggled into the U.S. Seventy million pounds of illegal honey imported with the full knowledge of Horizon Partners Ltd and Groeb Farms. They've admitted it. They are guilty.

But this theft affected not just the United States honey market, where these crooks had their headquarters. By selling that crap here at ridiculously low prices they cheated beekeepers everywhere – from Argentina to Uruguay, from Canada to Brazil. Beekeepers in every country make honey to sell to exporters in their country that are in the business to sell to the U.S. market, the biggest in the universe by the way, at the going U.S. price. But because the U.S. was buying at below market prices exporters in all other countries had to play by the rules set by crooks. So beekeepers everywhere were paid by their exporters less and less and less.

Now exporters don't care what the price is when they sell, as long as they can buy it for less than that. Meanwhile, beekeepers have fixed costs so they have a basement price they can sell at to stay even. Of course artificially low prices paid to beekeepers depresses the market for all things beekeeping in all those countries doesn't it? How much beekeeping equipment wasn't made and wasn't bought and wasn't used because honey prices were poverty low? How many trucks, forklifts, college educations, vacations, unfilled necessary positions, uncappers, extractors, bottlers and containers weren't bought because there was no market for expensive-by-comparison-honey. So expensive, in fact, that it couldn't be sold without losing money on every pound, and it still didn't pay the bills. How many bankruptcies, how many divorces, how many changed professions, broken promises, shattered dreams were caused by these thieves in broad daylight?

And because the tariffs weren't paid – to the tune of $78 million or so documented for this case (and much, much, much more not in this case), honey producers here were denied that Byrd money every year – think what hundreds of millions of dollars shot directly into the arm of beekeepers could have done to an industry as small as ours...more bees for pollination, more money for upgrades and expansions, more investments in technology, affordable pest and disease control. So this armed robbery stole from U.S. beekeepers *twice*. Both thefts were intentional, both because of simple, ugly greed.

But wait. There's more. They cheated honey packers everywhere, too, who were forced to either play by the same crooked rules or sell at unprofitable basement prices to their customers to remain competitive and stay in business. These crooks from Wisconsin and Michigan cheated every honey user and every honey producer and every honey seller on the planet. That's a pretty big crime but the punishment doled out by the government is miniscule in comparison. In fact, it doesn't even begin to consider the monumental damage this crime of greed and avarice has caused.

And now that they've been caught, now that they've admitted that they did this, that they did it on purpose for profit and more profit, now the beekeeping industry is going after them. The government's slap on the wrist got their attention. The class action lawsuit is going to make a permanent impression on what used to be these two businesses. Every beekeeper with more than 300 colonies is going to get revenge. And revenge, as you know, should always be served cold...and it's been a decade of pain slowly gathered and shared.

And you know who else should get a piece of this pie. Growers. Growers who had to pay higher pollination fees because beekeepers were getting screwed at the warehouse. Growers had to pass on those higher costs to their customers – let's see, who in this country doesn't partake of crops pollinated by honey bees for a fee – you know, pretty much everybody in this country got ripped off by this band of thieves. Everybody contributed to the honey money in their pockets, and everybody should get some of it back.

Thieves In Broad Daylight. The Convention. Corn.

That won't happen of course because just those directly injured by this sneaky act of avarice will get their piece, and maybe some peace. And as the lawsuit reads, that's going to be every beekeeper with 300 or more colonies that sold, or tried to sell honey during this depression. To be honest, I'm glad I don't have to play Solomon when it comes to figuring all this out – but there should be something of value for everybody once they sell off the assets of these conniving companies and the possessions of their owners, empty their pockets of the ill gained loot, and settle the sale of all their first born. Nobody will get enough, but I trust everybody will get a little bit of flesh.

But that won't bring back those that have been lost. It won't add enough to bottom lines to change the course of honey bee events for operations with heavy losses due to not enough funds. It won't ever be enough. The actions of these people leave a wound that won't heal, a pain that won't be stilled.

But let's hope the pain it causes them, the destruction of their businesses, the disruption of their families, their future, their children's future – just like what they did to beekeepers – is enough to make them pray to have it end, that the ultimate cost of these decisions is enough to make other thieves think again about committing this heinous crime of personal greed and moral depravity. Let's hope.

The BBKA Annual Spring Convention

We attended the British Beekeepers Annual Spring Convention in April this year. It was held at Harper Adams University College, the only Agricultural University in the UK. It's kind of like a fancy trade school would be here, with about 1000 or so students studying for two to four years. There are nice dorms, classrooms and all manner of labs, farmland, barns, animals and the rest. It even smells like a farm. We got to visit with some good friends before and after the three day affair, and saw some sights along the way, but the Convention was the center of attention and bears mention.

This Convention started years ago as a one day event, sponsored by the British Beekeepers Association (BBKA) held in conjunction with a much larger Agriculture event, where animal husbandry and agriculture of all types was showcased for a day. It was held at a place called Stoneleigh and basically the BBKA, using the space it was allotted, set up a major, very major vendor event. Every beekeeping business in the UK, and many from the continent came for one day only to set up their stands and sell, sell, sell at the lowest prices of the year. People arrived at dawn in trucks and brought carts to carry all that they bought. Queues were long and equipment moved by the ton. Our friend Peter Smith, who lives just out of London did a story on it a couple of years ago with some interesting photos of long lines and lots of equipment.

But as the attendance grew, so did the thinking that "Why, with all these beekeepers here, we should be doing something educational, and the meeting should be two days, and we need more room, right?" So they started on that trail somewhat small because indeed they did need additional room – though the stand area could hold the 2000+ people who visited during that one day event plus all the stands and then some, there were few class rooms or auditoriums for speakers. So they moved.

Where they are now provides many class rooms for workshops and auditoriums for larger gatherings. Maryann Frazier was there and of course her pesticides-in-beehives topic was popular, Norman Carreck was there, several university speakers, a large selection of workshop presenters, and me. And a couple thousand people over the three days.

But this year there was unrest afoot, it seems. Attendance was not quite what was anticipated, and the vendors were somewhat dismayed. It costs a lot to put up a stand as big as a city lot, like Thornes, the UKs largest bee supply company does every year. Even something a bit more modest like a couple of eight foot tables has a cost, and then to man it for the day it takes to set up and the day of the sale only adds to the cost. And now, with all the room the University provides, speakers are getting more and more responsibility and attention, perhaps taking away from the attraction the vendors once had during the one day sale of old.

Wait – one day only? Yes, only one. The convention starts Friday when the vendors set up – and nobody, believe me nobody gets in their building when they are setting up. There are talks on Friday so there are things to do for the hundreds and hundreds of BBKA members that can come that day. On Saturday, the mob of beekeepers arrives to take in the vendors, the speakers and the rest, and this day is open to everybody and anybody. Sunday is workshop-only day, with no big room speakers while the vendors have all packed up and gone home the previous night.

But the main reason for this Convention is to unite sellers with buyers. It did that this year but due to an incredibly horrible Summer last year pretty much across the whole country beekeepers were careful in what they were spending, if they were spending at all. The weather was so bad all across the UK last season that some had to feed all Summer long – too much rain, too cold, too everything except good-to-make-honey, so hardly any was made.

Interestingly, other things that go on show that the folks that run this meeting are much more formal than we are here regarding even the basics. When you register you receive a wrist band like those used in hospitals (something I'm somewhat familiar with) that are impossible to remove without destroying, and if you don't have one on you don't get in anywhere. Not a talk, not a workshop, not the vendors and certainly not for a speaker. And there are three sometimes four or five people, formally dressed in white coats at the door of classrooms and auditoriums to make sure you have a wrist band on. And if you don't, you don't get in. Period. Plus, there are different colored bands. Speakers, vendors, regular folks, workers are all different colors – but have one on, or go home. And if you're late you don't get in. I've been guilty of that numerous times over the years, arriving late, I'll barge right in and find a place, distracting members of the audience and even sometimes the speaker. Not there. They won't let you.

I really need to reiterate how big that vendor area is. Not quite a football field under one roof. Half has a solid floor, and half is a showring for horses that they cover with layers of boards and carpet. There aren't many

Continued on Page 89

It's Summers Time –

A Crazy April

Sometimes I think we can't possibly squeeze one more thing into a particular time-frame, but in April I managed to squeeze in more than a few extra activities. Of course you still have to keep up with the normal, everyday stuff too.

We got the May issue sent to the printer on time and then we headed off for England. A long journey but well worth the visit. Over the past few years we made some good friends over there on our visits to speak at the different bee meetings. We left Monday night and flew all night getting there around 10:00 a.m. their time. Off the plane, then through customs which is always a little intimidating, even though you know you haven't done anything wrong. We made it through that line and then started following the exit signs to get to where our friend Peter would be waiting. I'm sure we walked about four miles before we got to him, but there he was, patiently waiting for us. Peter is about 6'5" so easy to spot in the crowd.

This is our fourth or fifth trip over there in the last 10 years and we met Peter on our first trip to England. He had written an article for *Bee Culture* about finding queens. Then it turned out he was speaking at the National Honey Show the same year Kim first spoke there. After the meeting he sort of took us in and took us home with him and treated us like family. He drove us all around London and was a wealth of information. We have been dear friends ever since.

Peter actually came over to the U.S. in 2005 and was a part of EAS that year at Kent State here in Ohio. He did a couple of talks on the differences in English hives and American hives, and some swarm stories.

So this time we spent a couple of days with Peter and then he drove us up to the Spring Convention that Kim writes about in his *Inner Cover*. Peter stayed on for the meeting and we all had a great time. Kim's talks were very well received and we were treated with great kindness. It was a pleasure to be there.

At the end of our part of the convention on Saturday we said good-by to Peter and went home with two other close friends that we have made over the years, Ruth and Jeremy Burbidge of Northern Bee Books. They were part of the exhibitor group at the Harper Adams. A few days spent with them and then on the plane for the long flight home.

The chickens and the cats were well taken care of while we were away by one of our extra children, with help from our great neighbor. Although Matt did say that when he went out to gather eggs, which was at night because of his work schedule, all the chickens were already on the perches and they would literally turn their backs on him while he scooped up the eggs. It made him feel a little guilty.

All of the girls are happy now because they've been able to be outside. Our weather finally broke after a long and lingering Winter. It snowed on April 20 here in Ohio – not much – but snow.

After being home for three whole days I packed up again and headed for California, on another long flight (not as long as to England, but long enough). Along with me I took another cold, the second one in the last few months. I was sick the whole time and hot. They were breaking heat records while I was out there – unseasonably warm. In spite of being sick I had a good visit with my sister, my niece and my boy.

We went to the Monterey Bay Aquarium one day. A beautiful place. I had not been there since my children were very small. We took it slow and had a wonderful day, finishing up with dinner at Bubba Gump's Shrimp Place. I know – very cool!!

After that, a visit with my very best friend from High School, always fun to do. I find it comforting to be with her – someone who, after all this time, still remembers that you hate nuts and onions and still talks to you like you're both young and silly. She is a treasure.

Now it's good to be home with no more travel for a while. Company coming our way in a few weeks, but we get to stay home for a while.

Packages arrived yesterday. This is always a fun day. We pick up our packages at Queen Right Colonies just down the road about 20 minutes away. They brought in about 3,000 packages this year and try and have them all picked up in two days. So the day starts early and goes long. We went about mid-day and it was busy, not too crazy, but steady. It's fun to watch the people picking up bees. Many of them are first time bee owners and there is an air of excitement, but an air of nervousness also. We got in line and in front and behind were two gentleman that had taken Kim's beginning class just this Spring. They were both filled with questions as we all waited our turn.

Then home and got them installed with very little trouble. One package was a little feisty and Kim got several stings in the process. But all in all they're in their new homes and hopefully ready to start building up.

Spring has finally come to Ohio. And we're behind already, of course, but still looking forward to being outside and enjoying the warm weather, for however long it stays around.

June, finally really Summers' Time!

Happy Summers

Class Action Lawsuit Against Chinese Honey Smugglers

Alan **Harman**

When Groeb Farms Inc. of Onsted, MI, and Honey Holding (aka Honey Solutions) of Baytown, TX, agreed to federal fines totaling $3 million, they could have been excused for thinking they got out of the multi-million-dollar Chinese honey-smuggling scandal lightly.

Not any more.

A class action lawsuit filed in Chicago against the huge industrial honey suppliers seeks millions in damages on behalf of all commercial beekeeping operations with 300 or more hives that produced and sold honey in the U.S. since 2001.

The suit was lodged by three iconic domestic honey producers – Adee Honey Farms, Bill Rhodes Honey Co. and Hackenberg Apiaries – in the U.S. District Court for the Northern District of Illinois.

It has its roots in the agreement with the federal government that saw the importers admit to facilitating the importation and sale of mislabeled Chinese-origin honey to avoid U.S. antidumping duties.

The aim is to get compensation for all commercial domestic honey producers injured as a result of Groeb's and Honey Solutions' conduct.

"The domestic honey industry, critically important to agriculture, has suffered losses at the hands of these fraudulent shippers for far too long," attorney James J. Pizzirusso of the Washington, D.C. law firm Hausfeld LLP says in a statement.

"Through this class action, our clients seek to hold these entities responsible for the financial harm they have caused."

The suit follows a near five-year investigation code-named Operation Honeygate and led by the U.S. Immigration and Customs Enforcement investigative arm of the U.S. Department of Homeland Security as well as an investigation by the honey producers' own lawyers.

This focused on a massive conspiracy in which participants transshipped Chinese honey through third countries to disguise the honey's origin and then illegally imported it into the U.S. to avoid paying U.S. antidumping duties.

Massive Conspirary

The U.S. Department of Commerce began imposing the duties against Chinese honey after it had determined the honey was being sold at less than fair market value and was injuring the domestic honey industry.

The lawsuit asserts Groeb Farms and Honey Solutions intentionally purchased, packaged, distributed, and sold falsely labeled honey and, in doing so, deceived consumers and purchasers while subjecting consumers to potential health risks.

It alleges the Chinese honey was heavily adulterated, containing inexpensive sweeteners and sometimes blended with high fructose corn syrup and other additives, despite the fact that importers claimed it was pure honey.

The lawyers handling the case are among the most successful class action lawyers in the U.S., with wins and settlements in excess of $1 billion in the past two years alone.

The suit cites violations of the Lanham Act, involving false advertising and unfair competition, as well as violations of the Racketeer Influenced and Corrupt Organizations Act, (RICO Act) arising from defendants' involvement in an international scheme to purchase illegally imported and fraudulently labeled honey from China to avoid paying U.S. antidumping duties.

Honey Laundering

"This illegal behavior has suppressed domestic prices of honey, caused plaintiffs and the other class members to lose significant amounts of sales, deprived plaintiffs and the other class members of the benefits that they are entitled to receive from duties imposed on Chinese honey, and otherwise caused economic loss and financial harm to plaintiffs and the other class members," the suit states.

It says the three plaintiffs have suffered declining sales, lost profits, loss of goodwill, lost custom duties, and other injuries as a result of the defendants' scheme to purchase, package, distribute, and sell illegally imported and mislabeled honey.

"Defendant Groeb Farms . . . until very recently, continued to engage in the unlawful, misleading, and fraudulent conduct alleged herein, and has affected foreign and interstate commerce in the U.S.," the suit says.

Groeb, the world's largest industrial and foodservice processor of honey, packing about 85 million pounds of honey annually, was bought in 2007 by Horizon Partners Ltd., a Wisconsin private investment holding company.

"Groeb was under constant pressure by Horizon and its executives to produce more profits," the suit says. "Since its purchase of Groeb in 2007, Horizon has exercised actual and implied control over Groeb and the illegal scheme.

"Horizon used its control to commit the fraud and other illegal behavior . . . that caused plaintiff's injuries. The transshipping activities to which Groeb pleaded guilty all occurred after Horizon purchased and began to control Groeb."

As part of a deferred prosecution agreement, Groeb admitted the senior executives responsible for the fraudulent honey transshipping "served as management's primary point of contact to the board of directors and communicated directly to the board . . . regarding Groeb Farms' polices, positions, and practices on food safety and illegally transshipped and illegally misdeclared honey."

The court papers state Robert M. Feerick is the chairman of Horizon and is also a member of Groeb's board of directors.

"Horizon exercised its control over Groeb in such a manner as to commit fraud by knowingly, intentionally, and/or recklessly directing Groeb to purchase, package, distribute, and sell falsely labeled honey in order to increase profits for Horizon and its investors," the suit states.

The papers assert Groeb claimed to be completing audits of all foreign and domestic companies that provide honey to Groeb and formalizing standards with each source.

"Those audits would have revealed to Horizon and the board of directors that Groeb was purchasing honey from China," the suit says.

"The cost and volume at which Groeb was able to procure honey from foreign sources (including countries that had virtually no commercial beekeeping operations) would also have informed Horizon that the honey Groeb was packing was transshipped.

"As Groeb expanded and profits rose, Horizon either knew or deliberately chose not to inquire further to determine that Groeb was breaking the law and fraudulently importing, packing, and re-selling illegal Chinese honey."

While honey prices in the U.S. typically range from $1.40 to $1.80 a pound because of high production costs, prices for honey produced in China are significantly lower, as little as 22 cents a pound.

The suit states Chinese manufacturers have been dumping large quantities of low-cost and often low-quality honey into the American market since the 1990s.

"The wide discrepancies in price between domestic honey and foreign honey inhibited and continue to inhibit domestic honey producers' competitiveness," the suit says.

As Little As 22¢/lb.

It notes that before the DOC-imposed duties, China was shipping about 58.7 million pounds of honey to the U.S. annually.

Even though "official" Chinese honey exports to the U.S. fell considerably after the imposition of the duties, China's honey production capacity increased.

The court documents quote Jill Clark, vice president of sales at Dutch Gold as saying,"[w]e saw a flurry of honey starting to come into the U.S. from countries – Indonesia, Malaysia, Taiwan, the Philippines – that had never been exporters to the U.S. before. . . . All of a sudden they had millions of pounds of honey to sell, at very cheap prices."

It cites a honey-laundering scheme uncovered in Australia (reported on these pages in May 2008!) involving a shipment of "Singapore" honey bound for the U.S. Singapore, at the time, had no domestic honey operations. Investigators traced the shipment back to China.

The lawsuit states after the duties were placed on Chinese honey, the defendants began a scheme of illegally importing honey into the U.S. through a process known as transshipping.

Participants sent Chinese honey to a country where the honey was not subject to U.S. import duties. There it was relabeled to make it appear to be the product of the trans-shipper's country. The mislabeled and disguised Chinese honey was then shipped to the U.S.

In Order To Create Profit

"This transshipping process illegally circumvents U.S. antidumping import duties and substantially harms the domestic honey industry," the suit says

It claims the defendants falsified Bureau of Customs import entry documents via the wires and mail. These entry documents include fraudulent information regarding the contents and country of origin of their honey imports.

"Defendants knowingly (and admittedly) engaged and transacted with importers who used foreign transshippers located in countries that are not subject to the U.S. honey import duty to cause the illegal importation of Chinese honey into the U.S.," the suit says.

"Defendants knowingly and intentionally purchase, package, distribute, and sell illegally imported [transshipped] Chinese honey containing antibiotics, including the antibiotic chloramphenicol, which have been banned in the U.S."

It says the defendants also knew the Chinese honey was also heavily adulterated, containing inexpensive sweeteners and sometimes blended with high fructose corn syrup and other additives.

Between 2008 and 2010, the suit says, illegal transshipping cost the U.S. government about $200 million in uncollected import duties.

As a result, the U.S. government brought charges against 14 individuals, including executives of Alfred L. Wolff GmbH and affiliated companies for avoiding about $80 million in antidumping duties on Chinese honey.

During the investigation, customs agents tested samples taken from nine seized shipping containers of honey that were being held by ALW Food Group and found the honey originated in China, despite ALW Food Group paperwork that claimed that the honey originated in Russia.

Almost $200 Million

The Department of Justice investigation uncovered 600 loads of mislabeled Chinese honey.

The class action lawsuit says the defendants were players in the conspiracy, knowingly purchasing, packaging, distributing and selling the illegally imported, transshipped honey from ALW Food Group.

In fact, it says, after ICE seized transshipped honey from ALW Food Group, Groeb sued ALW because the honey had been destined for Groeb.

The second phase of the Honeygate investigation focused on the demand side of the honey industry and resulted in charges brought against Groeb and Honey Solutions, and five individuals for their roles in avoiding more than $180 million in antidumping duties on Chinese honey.

Groeb was charged with purchasing 1,578 containers of Chinese-origin honey between February 2008 and April 2012, knowing that it was illegally imported into the U.S. to avoid more than $78.9 million in duties.

During the second phase of the Honeygate investigation, an undercover agent took the role of director of procurement at Honey Solutions. This investigation resulted in charges brought against Honey Solutions as well as five individuals for their roles in avoiding antidumping duties.

Mail And Wire Fraud

Chin Shih Chou, president of Fina Food Trading, Inc.; Qiao Chu, secretary/manager and "unique agent-in-charge" of Demeter Group Inc.; and Wei Tang Lo, were indicted in the Middle District of Florida with intent to defraud by smuggling into the U.S. honey from China worth more than $1 million.

In the criminal complaint, the warehouse manager identified 29 bills of lading as the shipments received into the warehouse as rice syrup. The warehouse manager then identified another 29 bills of lading as the ones that Wei Tang Lo gave to truck drivers as they came to pick up the barrels naming the commodities as drums of honey and honey drums.

The suit also notes that in 2006.

Douglas A. Murphy and Honey Solutions were charged together with violating the federal Food, Drug, and Cosmetic Act for purchasing discounted Polish-origin honey containing the prohibited antibiotic Chloramphenicol from Alfred L. Wolff USA.

It says Murphy caused Honey Holding to buy the adulterated container of honey at a discounted price of 65 cents a pound knowing the honey was adulterated with Chloramphenicol.

Racketeers

"Honey Holding sold the adulterated honey to customers without disclosing its adulterated nature and by falsely representing that it did not contain a prohibited antibiotic," the suit says.

These shell and front companies included AHCOF USA Inc.; Bo Bay Corp.; Chengda Trading Ltd.; Glory Spring Enterprise Co. Ltd.; Pineco Import/Export Ltd.; Silver Spoon Int'l Inc.; and Sweet Campo Co. Ltd.

Between about 2007 and 2011, with the undercover law enforcement agent in place as Honey Holding's director of procurement, Tran was involved with bringing in Chinese honey without paying the antidumping duties. The loss of tariff revenue to the U.S. was put at $33,403,125.

Heavily Adulterated Chinese Honey

Tran accepted $330,941 in undisclosed payments from Chinese honey producers and manufacturers in exchange for brokering transactions with their companies knowing they were illegally transshipping and misdeclaring Chinese-origin honey being bought by Honey Holding.

The lawsuit says that as a result of the illegal acts by the defendants, and other similar practices not yet admitted, the plaintiffs were wrongfully deprived of the opportunity to sell their domestically produced and honestly labeled honey to retail and industry customers.

Illegal Behavior

"Furthermore, the price of honey in the U.S. was unlawfully suppressed, causing plaintiffs and the other class members significant monetary damages."

Piling on the pressure, the suit says that in addition to mislabeling the country of origin of the transshipped honey, the defendants also delivered adulterated honey into interstate commerce, in violation of Federal Food, Drug, and Cosmetic Act regulations.

"They caused customers to unwittingly purchase and consume adulterated honey and delivered ultra filtered, pollen-free 'honey' into interstate commerce, marked and labeled as 'honey' when it was not, in violation of Food and Drug Administration regulations.

The suit says the defendants' acts constituted a violation of the Lanham Act and entitles plaintiffs to recover the defendants' profits, three times the damages to each class suit member, the costs of the law suit and reasonable attorneys' fees.

It also points to the RICO Act, which makes it unlawful for any persons to conduct interstate or foreign commerce through an enterprise using a pattern of racketeering activity.

The suit says Groeb, Horizon, Honey Solutions, Alfred L. Wolff, Inc., the multiple suppliers of Chinese-origin honey and other entities involved in the illegal transshipment, mislabeling, and importation of mislabeled "honey" meet this definition.

"Since at least 2006, however, defendants have used this enterprise to conduct the related acts of mail and wire fraud comprising the pattern of racketeering alleged herein.

"They knowingly and fraudulently conducted and participated in the conduct, the management, and the operation of the enterprise's affairs, directly or indirectly, through a pattern of racketeering activity."

"Each defendant has conducted, participated in, and operated its respective business through a pattern of racketeering activity. Each defendant has done so with the purpose of evading the duties applicable to Chinese honey products, underselling domestically produced honey products, and enhancing its own profits."

"The enterprise existed and operated continuously since at least 2006 and likely going back much further," the suit says. "The enterprise can be expected to continue indefinitely and engage in the same pattern of racketeering activity, unless this court intervenes."

The plaintiffs are seeking a trial by jury.

"It is important that American beekeepers and honey producers get to play on a level playing field, untainted by this international transshipping scheme that has damaged them for far too long," attorney Adam J. Levitt of Grant & Eisenhofer says. BC

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A Closer Look

NAVIGATION, LEARNING & MEMORY

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

Honey bee navigation is significantly more sophisticated than is apparent.

Foraging is essential to a honey bee colony's survival. To forage successfully, a bee has to learn and remember not only the color and shape of flowers that contain nectar and pollen, but also how to get to them (Menzel et al. 1996). Honey bees must find their way between the nest and distant feeding sites that may be hundreds or thousands of meters away. Over such distances, a forager is unlikely to be able to detect its goal directly. To set and maintain its course, it must therefore determine its position relative to the goal and then choose the appropriate direction of travel, in relation to environmental features detectable at its starting point and along the way (Dyer 1996). Foragers have to learn the celestial and terrestrial cues that guide their foraging trips over long distances and allow them to find their nest sites (Hammer and Menzel 1995). They learn to relate the sun's position and sky pattern of polarized light to the time of day and landmarks are learned in relationship to the nest site within the framework of the time-compensated sun compass.

Bees primarily use learned visual features of the environment to guide their movement between the nest and foraging sites. Past studies suggest that learning occurs during orientation flights taken before the start of foraging. Capaldi and Dyer (1999) investigated what honey bees learn during their initial experience in a new landscape by examining the homing of bees displaced after a single orientation flight lasting only five to 10 minutes. Homing ability was assessed using vanishing bearings and homing speed. At release sites with a view of landmarks immediately surrounding the hive, 'first-flight' bees, tested after their very first orientation flight, had faster homing rates than reorienting foragers', which had previous experience in a different site prior to their orientation flight in the test landscape. First-flight bees also had faster homing rates from these sites than did 'resident' bees with full experience of the terrain. At distant sites, resident bees returned to the hive more rapidly than reorienting or first flight bees; however, in some cases, the reorienting bees were as successful as the resident bees. Vanishing bearings indicated that all three types of bees were oriented homewards when in the vicinity of landmarks near the hive. When bees were released out of sight of these landmarks, hence forcing them to rely on a route memory, the 'first-flight' bees were confused, the 'reorienting' bees chose the homeward direction except at the most distant site and the 'resident' bees were consistently oriented homewards.

Landmark memories are stored as images arranged in sequences as they occur during outbound and homebound flights. Image memories are formed when the bee looks at the goal from a guide post at a selected distance and direction (Collett and Baron 1994). Sequences of landmark memories are established for multiple feeding places visited successively (Menzel and Müller 1996) and en route when bees pass landmarks on a continuous flight towards a food source (Chittka and Geiger 1995b). Landmark and cue memories are linked to time (von Frisch 1967). Bees learn to fly toward a particular feeding place at a particular time of

"Landmark memories are stored as images arranged in sequences as they occur during outbound and homebound flights."

day and to expect reward at a particular set of clues (Bogdany 1978, Gould 1987). The vector memories attached to each feeding place are retrieved specifically by the time of day and the landmarks surrounding the feeding place.

Navigation in honey bees between the nest and feeding sites is governed by several orientation strategies and forms of memory (Wehner and Menzel 1990). Path integration provides the bee with a home-directed vector at any given time during its twisting search flight. This integration requires only a short-term, or working memory, in which the calculation of home direction is updated from one moment to the next. The contents of this working memory are short-lived, that is, its contents from a minute ago are no longer accessible and have been replaced with the present estimate of home direction. Familiar sites in a bee's flight range can also be stored in long-term memory, so that the information can be retrieved after several hours or days. Several locations can be stored in the long-term memory at any one time. Such sites are specified in the bee's memory by means of goal-directed vectors (Chittka et al. 1995a). The vectors, both in path integration and orientation along familiar routes, are computed by relating the directional components to celestial cues (sun, polarized light pattern) (Menzel et al. 1998) and landmarks (Chittka and Geiger 1995a; Chittka et al. 1995b). The distance components are calculated using visual distance measuring routines (Esch and Burns 1996; Srinivasan et al. 1996) and, again landmarks (Chittka et al. 1995a; Chittka and Geiger 1995b). Snapshot memories of the visual scenes at the goals allow for precise location of the nest entrance and the flower (Cartwright and Collett 1983; Collett 1992, 1996).

Using harmonic radar, Menzel et al. (2005) demonstrated that honey bees navigate according to a map-like spatial memory. They recorded the complete flight paths of displaced bees. Their test bees foraged at a feeder or were recruited by a waggle dance indicating the feeder. Flights were recorded after the bees were captured when leaving the hive or the feeder and they were released at an unexpected release site. A sequence of behavioral routines became apparent: 1) initial straight flights in which they fly the course that they were on when captured (foraging bees) or that they learned during dance communication (recruited bees); 2) slow search flights with frequent changes of direction in which they attempt to "get their bearings"; and 3) straight and rapid flights directed either to the hive or first to the feeding station and then to the hive. These straight homing flights start at locations all around the hive and at distances far out of the visual catchment area around the hive or the feeding station. Two essential criteria of a map-like spatial memory are met by these results: bees can set course at any arbitrary location in their familiar area, and they can choose between at least two goals. This finding suggests a rich, map-like organization of spatial memory in navigating honey bees.

"Navigation in honey bees between the nest and feeding sites is governed by several orientation strategies and forms of memory."

Memory formation proceeds in temporal phases which differ in their effectiveness in controlling subsequent behavior and in their susceptibility to amnestic treatments. The initial phase of memory formation, frequently termed short-term memory, is generally considered a necessary precursor to long-term memory (Menzel 1979). Experiments using honey bees in a behavioral learning situation suggest that the greatest significance of short-term memory is its function as a mode of memory storage which may be altered effectively by new and contradictory information. Freely flying honey bees were presented two color alternatives and rewarded on first one and then the other in a reversal learning paradigm. Subsequent color preference was dependent on the interval between the two trials.

Classical experiments demonstrated that honey bee foragers trained to collect food at virtually any time of day will return to that food source on subsequent days with a remarkable degree of temporal accuracy (Moore et al. 2011). This versatile time-memory, based on an endogenous circadian clock, presumably enables foragers to schedule their reconnaissance flights to best take advantage of the daily rhythms of nectar and pollen availability in different species of flowers. It is commonly believed that the time-memory rapidly extinguishes if not reinforced daily, thus enabling foragers to switch quickly from relatively poor sources to more productive ones. On the other hand, it is also commonly thought that extinction of the time-memory is slow enough to permit foragers to 'remember' the food source over a day or two of bad weather. In a series of field experiments, Moore et al. (2011) determined that the level of food-anticipatory activity directed at a food source is not rapidly extinguished and furthermore, the time-course of extinction is dependent upon the amount of experience accumulated by the forager at that source. They also found that food-anticipatory activity is prolonged in response to inclement weather, indicating that time-memory extinction is not a simple decay function but is responsive to environmental changes.

Amnestic treatments (cooling, narcosis, weak electroconvulsive brain stimulation) erase the memory trace if applied within minutes of the single-trial learning. Several trials within a minute or longer time intervals after a single trial render the memory trace immune to amnestic treatment (Menzel 1993).

Associative learning is an essential component of the bee's foraging behavior and dance communication. Hive mates attending a dance performance learn the odor emanating from the dancing bee and seek it at the indicated food site. The odor, color, and shape of flowers are learned when the bee experiences these stimuli shortly before it finds food (nectar, pollen). This appetitive learning in bees has many characteristics of associative learning (Hammer and Menzel 1995). It follows the rules of classical and operant conditioning, respectively, so that stimuli or behavioral acts are associated with evaluating stimuli. Since associative learning, especially of the classical type, is well described at the phenomenological and operational level it provides a favorable approach in the search for the neural substrate underlying learning and memory. In particular, associative learning in bees is a fast and robust process. A single associative learning trial, even under conditions

when the bee is immobilized for the taking of intracellular recordings from brain neurons, leads to highly significant changes in its behavior and in the response characteristics of identified neurons. Memory induced by a single learning trial lasts for days, and by three learning trials in a free-flying bee, for a lifetime.

Plant defense compounds occur in floral nectar, but their ecological role is not well understood. Wright et al. (2013) provide evidence that plant compounds pharmacologically alter pollinator behavior by enhancing their memory of reward. Honey bees rewarded with caffeine, which occurs naturally in nectar of *Coffea* and *Citrus* species, were three times as likely to remember a learned floral scent as were honey bees rewarded with sucrose alone. Caffeine potentiated responses of mushroom body neurons involved in olfactory learning and memory by acting as an adenosine receptor antagonist. Caffeine concentrations in nectar did not exceed the bees' bitter taste threshold, implying that pollinators impose selection for nectar that is pharmacologically active but not repellent. By using a drug to enhance memories of reward, plants secure pollinator fidelity and improve reproductive success.

Matilla and Smith (2008) examined learning and memory in honey bee workers reared by colonies exposed to varying degrees of long-term pollen stress. Pollen provides honey bee workers with almost all of the proteins, lipids, vitamins and minerals that they require as larvae and adults. Colonies were created that were either chronically pollen poor or pollen rich, or were intermediate in pollen supply; treatments altered colonies' pollen stores and brood-rearing capacity. Workers from these colonies were put through a series of olfactory-conditioned assays using proboscis-extension response (PER). PER thresholds were determined, then workers learned in olfactory-conditioning trials to associate two floral odors (one novel and the other presented previously without reward) with stimulation with sucrose and a sucrose reward. The strength of the memory that was formed for the odor/sucrose association was tested after olfactory-conditioning assays ended. Colony-level nutritional status had no effect on worker learning or memory (response threshold of workers to sucrose, acquisition of the odor/sucrose association, occurrence of latent inhibition, or memory retention over 72 hours). They concluded that potential effects of chronic, colony-wide nutrient deprivation on learning and memory are not found in workers, probably because colonies use brood-rearing capacity to buffer nutrient stress at the level of the individual. BC

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NORTH CAROLINA'S BLUE HONEY

Lower Mold Levels In Blue Honey From Some Bee Colonies In The NC Sandhills Region

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While conducting a fungus screening on blue honey from North Carolina, we recognized a need for further analysis of these samples for possible fungicide contamination that could have a negative impact on the bees. In particular, blue honey has lower levels of fungi *Aspergillus* spp. and *Penicillium* spp., molds that make a natural defense shield that protects the colony against fungal diseases such as chalkbrood and stonebrood (Yoder et al., 2012). The lower amounts of these molds probably has little to do with the honey's blue color, rather the reduced mold amounts are likely related to specific regions (samples from Sandhills and Central Piedmont regions) where these bee colonies are located, which on occasion produce blue honey. For example, the amounts of fungi, mainly spores (conidia), in the environment that stick to nectar and pollen that the bees collect in these areas of North Carolina may be less. This substantial mold reduction is possibly the result of fungicide spraying as well as miticide use inside the colony. Our experiments were not able to discern why the color of blue honey is dark other than suggesting that the blue honey is not a type of honeydew honey that is characteristically dark, because none of the blue honey samples had a high mold count (in fact, it was quite the opposite) and none of the blue honey samples contained sooty molds by fungus culturing. This indicates that the cause of the blue honey is not due to a shift from nectar to honeydew collection by the bees.

Background: There is a distinctive, blue colored, dark honey that sometimes appears in honey bee (*Apis mellifera*) colonies mainly known from the Sandhills region of North Carolina. The fruity flavor, unusual color, and rarity make this blue honey highly prized by beekeepers and consumers. How, when, or why a colony will produce blue honey is not known. The blue honey appears to be gathered well after the blueberry flow is over. Gallberry may still be involved, but other sources available would include sumac, Summer titi, cotton, sourwood (to a lesser extent) and other (unidentified) sources based on observations from local beekeepers. Finding molds in honey is typical, due to mold spores (conidia) and mold fragments sticking to nectar and pollen grains that bees collect, carry back into the colony, and then use to make honey. One type of honey that is produced from honeydew, with or without floral nectar, is called honeydew honey, forest honey or fir honey (Sabatini and Spina, 1972; Diéz et al., 2004), and this kind of honey is characterized by having a dark color due to the presence of sooty molds (gives dark color and grows on honeydew) as well as an overall high mold content (Diéz et al., 2004). Sooty molds are generally associated with honeydew, and these molds make the common black, powdery residue that covers plant surfaces on honeydew-producing trees (fir, oak, chestnut, beech, elm, and ash), on understory plants under honeydew-producing trees, and on plants having a lot of sap-sucking aphid and scale insect activity. Common sooty molds are *Aurebasidium* spp., *Capnodium* spp., *Cladosporium* spp., *Epicoccum* spp., *Fusarium* spp., *Glomerella* spp., *Nigrospora* spp., *Limacinula* spp., and *Scorias* spp., and any of these, alone or in combination, give honey a dark color when honeydew is used as an alternate or supplemental sugar source rather than floral nectar by bees for honey production (Mwenje et al., 2003).

Objectives: To test a beekeeper's hypothesis that the dark color of the honey samples from North Carolina (Fig. 1, far left to compare color of non-blue honey to blue honey) may be due to the presence of the sooty mold *Nigrospora* sp. within the honey. Blue honey sampled from honey bee colonies located in the Sandhills (Montgomery, Richmond, Scotland Cos.) and Central Piedmont regions (Iredell Co.) were sent to us for fungus culturing. Figure 2 is an image of *Nigrospora* sp. from our fungus library of standards that is grown in pure culture in a Petri dish showing its natural black color due to the presence of numerous black conidia. Non-blue honeys from the Triangle region (Wake Co. and Alamance/Orange Cos.; Fig. 1) were sent to us as controls, anticipating an absence of *Nigrospora* sp. in these samples. D. Hopkins (Raleigh, NC) provided the samples from Wake, Richmond, and Scotland Cos., H. Nooe (Troy, NC) from Montgomery Co., J. Lee (Mebane, NC) from Alamance/Orange Co., and R. Lippard (Statesville, NC) from Iredell Co. All of the honey samples that we analyzed had been stored in the refrigerator at 15°C and were less than one year old, except for the one from Iredell Co. (Blue 4; Fig. 1) that was 12 years old but still retained its dark blue color after all this time. Laboratory culturing was performed on potato dextrose agar and incubation at 25°C for seven days, which has been shown to be

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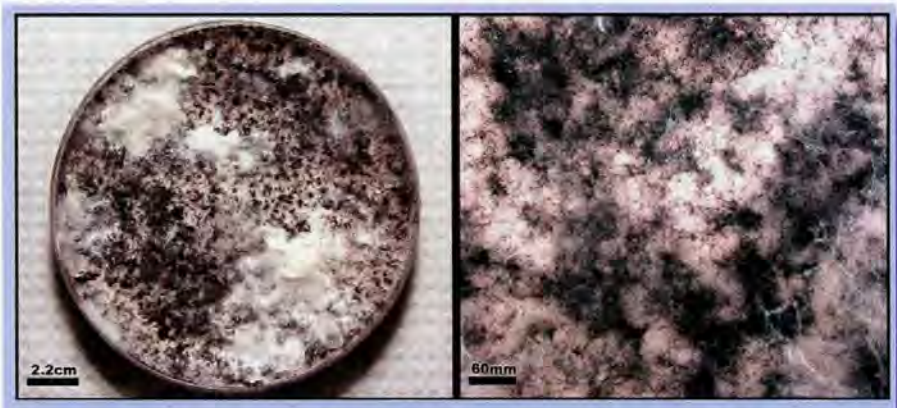
suitable for recovering sooty molds from honeydew honey (Mwenje et al., 2003). Using this standard culturing technique, we report the number and kinds of culturable molds that were recovered from blue and non-blue honey.

Methods: In the laboratory, honey was diluted serially in deionized double-distilled (DI) water and mixed with a vortex (Scientific Industries, Bohemia, NY). One milliliter of the diluted honey was transferred to a 100 x 15mm Petri plate (Fisher Scientific, Philadelphia, PA) using a calibrated glass micropipette (accuracy ± 0.25%, precision CV < 0.6%; Fisher), the honey was covered with cooled molten agar, gently swirled, and then allowed to solidify as outlined previously (Benson, 2002). Different dilutions (0.1, 0.01, 0.001) were used so that the fungi could be isolated and counted. Three different agar media that are routinely used for mold culturing were used: Sabouraud agar, potato dextrose agar, and corn meal agar (Difco, Fisher). The main goal was to obtain as many molds as possible in the event that they had different nutrient requirements. After inoculation with honey samples, the Petri plates were incubated at 25 ± 1°C in a computer programmable incubator (Fisher) for seven days (Mwenje et al., 2003) in complete darkness. Plates were examined daily by light microscopy (100x) for signs of developing hyphae. The number of mold colonies in Petri plates was counted with an automatic colony counter (Bantex Co., Burlingame, CA). To obtain pure cultures of the mold for identification, subcultures of the mold colonies were made by cutting a $1cm^3$ block of agar from the edge of a growing mycelium of a mold colony with a scalpel under a microscope at 100x. The agar block then was placed on to a plate of fresh agar, incubated, and then examined daily for the presence of conidia. Identification was based on macroscopic colony (i.e., obverse and reverse pigmentation) and microscopic (i.e., structures of conidia and phialides) characteristics of the fungal mycelium by light microscopy under oil (1000x) with taxonomic keys (Barnett and Hunter, 2003) and by comparison to previously identified molds in pure culture. Molds that did not yield readily identifiable structures were called *Mycelia sterilia*. Sterility is anticipated for bee colony fungi because of the unchanging conditions, stability, and darkness of the colony environment (Chapman, 1993; Yoder et al., 2012). Uninoculated Petri plates (agar and DI water but no honey) served as controls. Each sample was set up ten times and replicated in triplicate for a total of N = 30 plates per sample. Data were compared using an analysis of variance (ANOVA; $P < 0.05$; SPSS 14.0 for Windows, IBM, Armonk, New; Excel, Microsoft, Redmond, WA; Minitab, Chicago, IL; Sokal and Rohlf, 1995). Images for figures were taken with a SPOT digital camera (Diagnostic Systems Laboratories, Webster, TX) using an Olympus stereoscope (Olympus America, Center Valley, PA) and Adobe Photoshop CS (Adobe Systems, San Jose, CA).

Results: The amount of molds recovered in blue honey samples was 2-3x less than the amount of molds in non-blue honeys ($P < 0.05$; Table 1), and this can also be visualized in the images of the culture plates in Figure 1. None of the mold colonies looked like *Nigrospora* sp. (Fig. 2). Also from Figure 1, nearly identical results were obtained regardless of the kind of agar that was used for culturing, indicating that molds we were observing have similar nutritional requirements and no one particular kind of agar selectively enhanced mold growth. Geographically, samples that had similar amounts of molds in them were the blue honeys from Montgomery (B1) and Richmond (B2) Cos. ($P > 0.05$), blue honeys from Scotland (B3) and Iredell (B4) Cos. ($P > 0.05$), and the non-blue honeys from Wake (NB1) and Alamance/Orange (NB2) Cos. ($P > 0.05$). Ranked statistically ($P < 0.05$) from highest to lowest mold quantity by location: Wake Co. = Alamance/Orange Co. > Scotland Co. = Iredell Co. > Montgomery Co. and Richmond Co. Out of the total 30 untreated control agar plates that were inoculated with DI water but no honey, one plate had a colony of *Rhizopus* spp. and a colony of *Trichoderma* spp. growing on it, indicating that there was minimal contamination as the result of our experimental manipulations and that contamination had little effect on the differences in mycoflora among honey samples that were observed. Upon identification, molds from nine genera were recovered from the honey samples, consistently with *Aspergillus* spp. (pooled) and *Penicillium* spp. predominating as the major isolates regardless of whether the honey was a blue honey or non-blue type (Table 1),

Table 1. List of molds and proportion isolated from North Carolina non-blue and blue honey samples. Honey sample origin (left to right): Wake Co. (Non-blue 1, NB1), Alamance/Orange Co. (Non-blue 2, NB2), Montgomery Co. (Blue 1, B1), Richmond Co. (Blue 2, B2), Scotland Co. (Blue 3, B3), and Iredell Co. (Blue 4, B4). The honey from Iredell Co. (Blue 4) was 12 years old and all others were one year old. Results were similar with Sabouraud agar, potato dextrose agar (given here), and corn meal agar. (mean percentage ± SE ≤ 2.7; N = 3 replicates of 10 plates each).

	No. isolates (%) from honey sample:						
	Non-blue	Blue					
Fungi	NB1	NB2	B1	B2	B3	B4	Untreated control
Alternaria spp.	2 (8)	0	0	0	1 (11)	0	0
Aspergillus flavus	1 (4)	0	0	0	0	1 (13)	0
Aspergillus niger	1 (4)	3 (16)	0	0	0	0	0
Aspergillus spp.	9 (36)	7 (37)	1 (25)	2 (33)	4 (44)	3 (38)	0
Aurebasidium spp.	0	1 (5)	0	0	0	0	0
Cladosporium spp.	1 (4)	1 (5)	0	0	0	0	0
Mycelia sterilia	1 (4)	0	0	0	1 (11)	0	0
Paecilomyces spp.	1 (4)	0	0	0	0	0	0
Penicillium spp.	8 (32)	6 (32)	3 (75)	1 (17)	3 (33)	4 (50)	0
Rhizopus spp.	0	0	0	0	0	0	1 (50)
Scopulariopsis spp.	0	0	0	2 (33)	0	0	0
Trichoderma spp.	1 (4)	1 (5)	0	1 (17)	0	0	1 (50)
Total	25	19	4	6	9	8	2



Pure culture of the sooty mold Nigrospora *sp. (decaying plant isolate) taken from our Wittenberg University Microfungus collection grown on potato dextrose agar, 25°C, darkness, for 72 hours, in a Petri dish (left) and a closer view (right) showing its characteristic black color. This culture is not from a honey sample but from our fungus library of standards.* Gribbons photo.

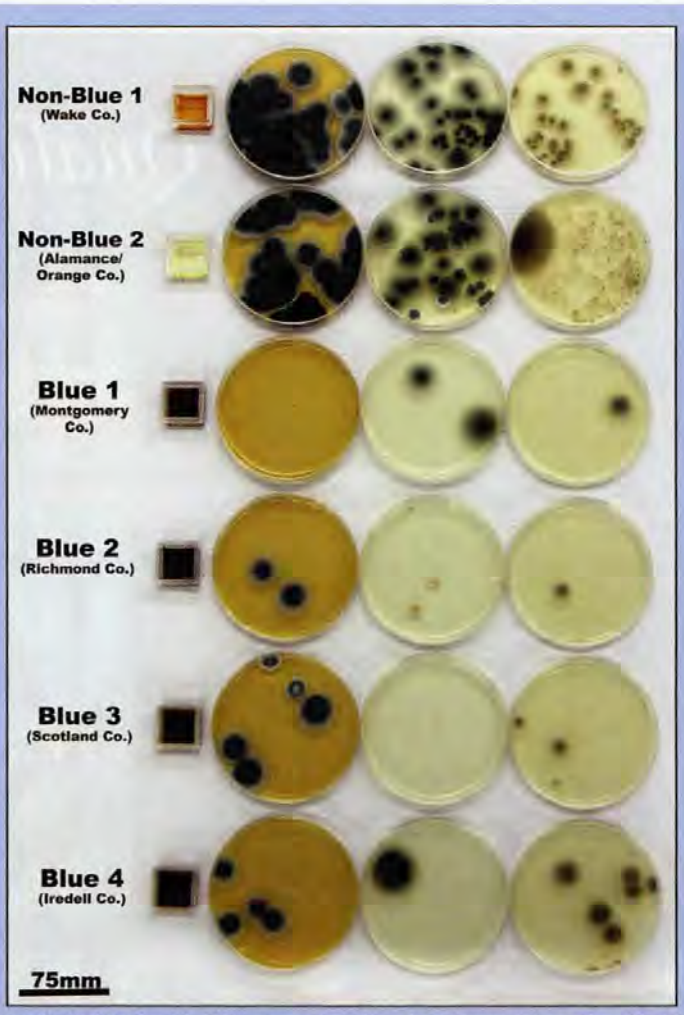
and the other molds were present as minor components. Molds that were missing from blue honeys were *A. niger*, *Aurebasidium* spp., *Cladosporium* spp. and *Paecilomyces* spp. (Table 1); the non-blue honeys had these molds as minor components. The blue honey sample from Richmond Co. (Blue 2) contained *Scopulariopsis* spp. that was not found in any of the other honeys (Table 1).

Conclusions: No *Nigrospora* spp. molds were found among any of the present blue honey samples that were analyzed by fungus culturing, and neither were any of the other common sooty molds, *Aurebasidium* spp., *Capnodium* spp., *Cladosporium* spp., *Epicoccum* spp., *Fusarium* spp., *Glomerella* spp., *Limacinula* spp., *Scorias* spp., typically seen in blue honey. Some of these molds, namely *Aurebasidium* spp. and *Cladosporium* spp., however, were recovered from non-blue honey, but these species apparently were not responsible for dark color because of the non-blue honeys' lighter color. Examination of the culture plates in Figure 1 shows that none of the mold colonies from blue honey samples were black in color, and there was even an absence of the well-known black mold *A. niger* in the blue honey samples (*A. niger* was present in a non-blue honey sample however). Also noteworthy is that the blue honey samples did not contain more molds than non-blue honeys; in fact, it was quite the opposite in that the number of mold colonies growing from blue honeys was considerably less. Honeydew honey is notoriously dark in color, even if honeydew is not the sole sugar source for the honey. Even when honeydew honey is mixed with floral nectar, the mixing simply gives a different intensity to the dark color. We conclude that none of the blue honey samples that were analyzed fit the mycological profile of a honeydew honey in that: (1) there is not an unusually high mold content and (2) there is not the presence of sooty molds in the honey that would otherwise give the honey a dark color (Sabatini and Spina, 1972; Mwenje et al., 2003; Diéz et al., 2004). The source of the dark color in the blue honey samples that we analyzed cannot be directly attributed to molds, specifically the sooty molds that could be present in the environment from feeding activity of honeydew-producing aphids and scale insects on plants, or from honeydew-producing trees. Our experiments suggest that these blue honey samples are not a type of honeydew honey. The blue color of the honey is thus not due to a shift from nectar to honeydew collection by the bees from where these honeys were collected.

Nearly identical molds dominated the composition of the molds in the honey samples, blue and non-blue alike, as over half consisted of *Aspergillus* spp. and *Penicillium* spp. Molds are common in honey as the result of spores that stick to nectar and pollen grains that the bee collect, none of the molds that were isolated were unusual, all are naturally-occurring, and they are commonly found in honey and the bee colony environment, with the *Aspergillus* spp. and *Penicillium* spp. molds predominating (Batra et al., 1973; Gliński and Buczek, 2003; Gilliam and Vanderberg, 1997; Yoder et al., 2012). All of these are mitosporic molds, common soil saprobes (except for certain *Trichoderma* spp. that could be mycoparasitic), known for their heavy spore production that leads to their wide dispersal and spread though habitats and the bee colony environment. The slight differences in mold composition among all the honey samples analyzed likely reflects differences in fungal composition in the different habitats that bees use to collect pollen and nectar within their 3 km flight range (Yoder et al., 2012). We emphasize that the sampling represents single sites in North Carolina and the mold composition that we report is unlikely to reflect broad similarities across different bee populations that are exposed to different fungi depending upon the type and seasonal fluctuations in habitats. That is, the minor fungal components are anticipated to vary, but the predominance of *Aspergillus* spp. and *Penicillium* spp. seems to be a consistent feature for the majority of bee products, honey included (this study; Batra et al., 1973; Gilliam and Vanderberg, 1997). Functionally, the importance of *Aspergillus* spp. and *Penicillium* spp. molds to the bee colony is that they play a role in maintaining a healthy balance of fungal components in the bee colony and play a preventive role toward protection of the colony against potential diseases. Bee colonies that have lower levels of *Aspergillus* spp. and *Penicillium* spp. molds tend to show increased incidence of chalkbrood and stonebrood (Yoder et al., 2012). Fungus screening of the honey samples from Montgomery, Richmond, Scotland and Iredell Cos. suggests that these bee colonies are at elevated risk for disease, particularly those from Montgomery and Richmond Cos. that show the least amount of molds in the honey. Bee colonies that have less than regular amounts of *Penicillium* spp./*Aspergillus* spp., or that have chalkbrood, do not regularly produce blue honey (Yoder et al., 2012), thus, the blue color should not be used as a signal of an unhealthy colony.

The major finding in this study was that the mold composition profile seems to be fairly consistent between blue and non-blue honeys from different geographic regions, except that the amount of molds in the blue honey samples is reduced in

overall quantity, particularly reduced is the quantity of *Aspergillus* spp. and *Penicillium* spp. kinds of molds. If storage age of the honey were a factor, then we would anticipate that mold quantity would be similar, because all of these samples were a year old and the 12 year old sample from Iredell Co. would be 'moldier', because it had been in storage the longest, but this was not observed. Furthermore, all honey samples had been stored the same way and in the same place at low temperature, 15°C, thus the reduction effect (conversely, the enhanced growth effect for non-blue honey) cannot be attributed to differences in storage conditions. Because the honey was collected by different beekeepers from geographically separate areas, and all blue honeys still showed the same reduction in mold effect and composition (likewise non-blue honeys shared a similar mold profile), the method of honey collection and handling is also not a factor that contributes to the differences in mold quantity that we observe. We see the same reduction effect in the honey molds although different beekeepers collected the honey. One possibility is that there is some natural compound in the blue honey or that its water content is lower, which would have a suppressive effect on mold growth, but the fact that the blue honey from Iredell Co. still has active molds in it after 12 years of storage argues against this. Thus, it seems reasonable to suggest that in the foraging habitats used by bees where the blue honey was produced that the amount of fungi in the habitat is less, and, perhaps this is related to heavy fungicide spraying or miticide use in the colony (Yoder et al., 2012). The important information for beekeepers from this study is that blue honey from North Carolina is not a type of honeydew honey (the dark color is not due to molds) and bee colonies need to be monitored for low levels of *Aspergillus* spp. and *Penicillium* spp. molds that could point toward the potential for at-risk colonies in regions where blue honey can sporadically occur.



Agar plates inoculated with NC honey samples showing number of mold colonies present in honey samples, comparing non-blue to blue honeys. From left to right, square container with honey to show color difference, culture of honey on Sabouraud dextrose agar plate, culture of honey on potato dextrose agar plate, culture of honey on corn meal agar plate. The sample from Iredell Co. (Blue 4) is 12 years old and all othes are one year old. Incubation conditions: 25°C, darkness, seven days, dilution factor 1000. These Petri plates were randomly chosen and are not the ones that contained the most or the least amount of mold aomng the samples. Gribbons photo.

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Of Trees & Bees

Examining The Factors That Contribute To Bee Diseases (Part 2)

Michael **Johnston and** Michael **Griggs**

Last month we introduced a common-sense method of looking at the interactions of disease factors taught to us at the NY State Forestry school in Syracuse (SUNY ESF) in our Forest and Shade Tree Pathology course. Different disease factors do not necessarily act alone and disease factors can be both living organisms such as bacteria, viruses, and funguses or abiotic factors such as drought and pesticides. Very often, the effect of disease factors working together is greater than the sum of the individual parts. A convenient and easily understood method of sequencing disease factors is to divide them into the categories: predisposing, inciting, and contributing factors. This method that we used to look at tree disease seems to be particularly applicable to honey bee disease problems today. While there are competing theories on the causes of current bee die-offs, there may not be just one answer as to the cause of these problems, indicated by the name Colony Collapse Disorder (CCD). So here are some lessons learned in forest pathology class to help describe how the many disease factors currently facing our bees are interacting against colony health.

Predisposing factors

Bees are often stressed by environmental factors like drought or by an unusually rainy season. This may not have a direct effect on the colony per se but can prevent normal access to nectar or pollen if the weather prevents normal development of tree and forb that are an important food source. In the example of a drought, this abiotic factor will predispose a colony to poor nutrition if bees are not able to collect the diversity of pollen needed to supply a complete source of the protein needed for their diet. This may even force bees to collect pollen from anything available, like corn, which turns out to be a very poor source of protein lacking in essential amino acids and minerals needed to maintain healthy bees. Poor weather, either too wet or dry, often predisposes colonies to other problems simply because of poor nutrition.

A beekeeper's own actions can also exacerbate the effects of drought. The Southern Tier of New York experiences a honey dearth during mid-Summer. If a beekeeper pulls honey too hard after the early Summer flow, leaving too little for the bees to feed on during this dearth, a bee colony can starve during mid August, prior to onset of the goldenrod flow. This can also predispose a colony to disease just at a time when mite levels spike.

As a result of drought or lengthy periods of rainy weather, bees experience poor nutrition. Clarence Wenner in Glenn, California figured out in the 1970s that "Fall collapse" could be avoided by feeding his bees pollen supplement. Today, some beekeepers are using a similar strategy in trying to combat *Nosema ceranae*. Improving nutrition can help fight an infection in bees because a healthy colony will have a stronger collective immune system. Healthy nurse bees contribute to healthy replacement workers by feeding high quality brood food and a colony that has had proper nutrition will be less predisposed to a more serious bacterial, fungal, or viral infection than one cannibalizing larvae to meet its protein needs.

Whether your bees are going to the almonds or being put to bed for the Winter, an important time to feed pollen supplement is in the late Summer or early Fall. A colony can go from a good-sized population in September to a fist-sized cluster of bees in January if they have poor nutrition. Once a colony is reduced to below quorum it does not have time or resources to grow to be an almond pollinator between January and February no matter how much you feed it. If weather has been good and plenty of natural pollen has been coming into the hive, it shouldn't be necessary for northern beekeepers to add supplemental feed. If weather conditions have been bad and there has been very little pollen, feeding a high quality supplement in the Fall could be a lifesaver for your bees, saving expensive replacement costs.

Inciting Factors

An **Inciting** factor exacerbated by poor nutrition is the detrimental effects of the ever-present *Varroa* mite. In 1987 when *Varroa* first appeared in the U.S.A. it could kill beehives all on its own. Since then, our most susceptible bees have died and breeding has provided some tolerance. Now it seems that *Varroa* gets a little help to kill off its' host by combining with bacteria and virus. Remember, mites puncture the protective chitin of our bees while feeding, kind of like those beetles boring into the side of evergreen trees in our previous article. During feeding, mites inject salivary proteins into the wound weakening the host immune system, while vectoring virus. Meanwhile bacterium and virus normally excluded can enter these wounds causing additional turmoil to their immune system. A healthy colony can tolerate some of these insults much

better than a stressed one. Let's not forget to throw in some miticide for good measure. A weakened colony treated because a well-intentioned beekeeper sees rocketing mite levels, may not tolerate this very well. If it'll kill mites, it will at least stress the bees. Ever lose a queen when trying to reduce mite numbers in a colony showing signs of Parasitic Mite Syndrome (PMS) in late Summer?

Contributing Factors

Other **contributing** factors causing symptoms associated with colony decline could include the many viruses we are learning about, like PICORNA, IAPV & others, that are vectored during mite feeding. *Nosema ceranae*, an exotic disease agent that has spread through North America seemingly replacing *Nosema apis* is also affecting our apiaries. Beekeepers report high *N.ceranae* levels in colonies that seem to be producing honey fine, with no other apparent problems, yet others report colonies with high mite loads with crawlers in front of a hive, indicating high virus loads, that stop taking feed or succumb readily to *N. ceranae* in Winter.

The end result of all of these disease agents ganging up on our hive is a dwindling population of bees that can no longer maintain all of the functions of a proper bee colony. It has been suggested time and again that any self-respecting bee that is nearing death may fly off to die some place else so as not to burden the colony with having to clean up the corpse or contributing pathogens back to the super-organism. Could it be this self-sacrifice of bees of really sick hives be causing the dwindling of colony numbers? What can you as a beekeeper do to prevent it?

Once A Colony Is Reduced To Below Quorum It Does Not Have Time Or Resources To Grow To Be An Almond Pollinator Between January And February No Matter How Much You Feed It.

How can this model of disease factors describing tree disease concepts written many years ago affect how we manage our bees today?

First and foremost we need to look at the big picture. Today's keeper needs to include good knowledge on how climate, newly introduced parasites, bacteria, fungus, pesticides, viruses and predators and management might combine to adversely affect colony health. Sound a bit overwhelming? There is a lot to learn to be successful. Early detection of individual factors that predispose, incite or contribute to colony health can be separated out, to be acted on immediately and with precise the tool for each problem to simplifying your job.

There are two main **predisposing** factors weakening hives to resist subsequent inciting and contributing disease factors. Poor nutrition, particularly lack of a complete protein regimen, can be overcome by feeding pollen supplement. It is better to do this in late Summer or early Fall; remember this is a *predisposing* factor. It is certainly counterintuitive, but in northern climates, bees in a weakened state that have just made it through the Winter don't do well on pollen supplement in very early Spring. The second common predisposing factor is the soup of chemicals present in the environment. These chemicals could even include toxic honeys such as buckeye and rhododendrons. Insecticides, with the advent of the systemics, seem to becoming even more common than before while in many cases the dosages are becoming reduced. Farmers may not be spraying these chemicals and there is less danger of drift so you may not see a "bee kill" but your bees may be weakened by exposure. We never used to fear fungicides but now Penn State is telling us that fungicides in combination with insecticides can be synergystically harmful. The answer to the chemical problem would be: location, location, and location. It may not be obvious initially, but over the long haul, some locations will have much better survival than others. It is better to abandon locations where the bees "just don't do well" when all other factors are just about equal.

Our most important **inciting** factor is the endemic *Varroa* mite. There are no treatments for viruses yet, but if you've got black hairless bees running around or bees with shriveled wings you probably have mite problems. Considering that the *Varroa* mite is the main vector for viruses, high mite levels is the sign that you need to consider treatment. Whether you are trying to be a "chemical-free" beekeeper or applying the entire arsenal of treatments, there are effective strategies to be employed. In

either case, we need to buckle down and start monitoring mite levels with an alcohol wash or sugar roll. Just about all of the other farmers have learned to employ Integrated Pest Management (IPM) so it's time that we do also. IPM tells us that if mite levels are low you may forgo a mite treatment and save some money but you need to know what this threshold is for mites. Only monitoring will provide you with the needed economic threshold to know if you should treat or not. The chemical free beekeeper (or all bee breeders for that matter) can use monitoring to select stock worth reproducing whether by grafting queen cells or raising naturals.

Nosema can be considered to be a **contributing** factor. The strategies for dealing with Nosema are similar to those employed for *Varroa*. Monitoring of disease levels can help you decide to treat your bees and determine which queens make good breeders, based on low Nosema counts using a microscope. You can start squashing bees to monitor levels in workers yourself or you can send your samples to the USDA Beltsville Lab and they will give you spore counts. We need to select for *Nosema ceranae* tolerant bee stock as no treatment has proven to be completely effective and cost effective against this gut pathogen.

It is also true that treatments for mites and Nosema are best applied in late Summer before it is too late in the Fall. Manufacturers of mite away quick strips, apiguard, and fumagillin advise that these products are best applied at that time of year. Though correct application temperatures and the peak of mite populations play a role in these recommendations, it is very important that you knock down mite populations and Nosema levels before your bees go into the time of greatest stress caused by abiotic factors. Cold temperatures, nights longer than days, no fresh food or water, inability to defecate, and moist conditions inside a hive promote the spread of disease. Conversely, northern beekeepers need to be cautious about applying medications too early in the Spring. The bees that would have overwintered are at their absolute weakest in March before their first natural pollen flow. Both miticides and fumagillin can stress bees. Many of us are most excited to get out and help our bees in the spring but this may actually be a good time not to mess with them too much beyond making sure that they have an adequate amount of stores.

Fortunately, in New York right now, The Empire State Honey Producers Association has received a grant to "Train the Trainers" in bee disease diagnosis. With money from the USDA Beginning Farmers and Ranchers Program, a program has been set up whereby different NY Bee Clubs have sent representatives to be trained at three bee disease diagnosis training sessions this past Summer. Participants just have to promise to go back and teach their fellow beekeepers back home how to do it. The Ontario, Canada, Beekeeper's Association Tech Transfer Program is well ahead of us in this approach and has in fact assisted the New York beekeepers in this training program. With cuts to the New York State Inspection Program as well as Federal cuts to the Cooperative Extension Program, a gap in bee disease management has appeared at a time when there are many new beekeepers starting up. This gap in assistance leaves it up to us, the beekeepers, to become more knowledgeable and better managers of our hives and also educate our fellow beekeepers that are further behind on the learning curve.

So there you have it, borrowing from lessons learned in forest pathology, we can have a good understanding of how diseases work together to damage the health of your bees; we also have the means to become aware of the status of disease in our own bee hives; and finally we also have the means to treat our bees at the most beneficial time to improve their health. While all of this monitoring and treating can be time consuming and a bother, it will certainly be a benefit to you and your bees. Wherever you are, we hope you will soon become predisposed and incited to contribute to your bees health.

Next time we compare how trees and bees adapt to the challenges of new diseases and changing environmental factors. BC

Michael Johnston and Michael Griggs raise bees and trees near Ithaca, NY.

Develop A Business Plan

Larry **Connor**

In late March I coordinated a day-long program on *Bees for Fun and Profit.* Co-teachers Sheldon Schwitek, Rich Wieske and I covered a wide range of topics following the theme of bees for fun and profit, and I took on the task of discussing 'Writing a Business Plan.' While I emphasized the need for such a document in any business, including beekeeping activities, my presentation was, admittedly, light on technical detail. Instead, it focused on the broader subject of making goals and using a business plan as a tool to keep those goals reasonable and in focus. For the layman, I described the basic plan as:

1. Produce Honey
2. Sell Honey

If you have a business or background, I know you think I missed the target by a wide margin. Indeed, that was part of the intention. My point is and was that most beekeepers I know do not have a true, detailed bee business plan. They may have a highly polished, greatly detailed business plan for their other source of income, but nothing for their beekeeping activities.

A West Virginia beekeeper uses a hand-painted display and hive bodies as a marketing display for several lines of honey products.

Many of us grow our bee business organically from the first colony and its expansion. We start out small but the nucs we make and the swarms we catch increase our colony numbers. Suddenly, we are at 25, 50 or 500 colonies and our lives are forever changed. We continue to fumble along, trying to make it all work, but a clear business plan may not develop as organically. This creates conflicts of purpose. What are we trying to do here? Make beehives or make money? A good plan will help focus our efforts and hopefully reduce our confusion.

Why have a business plan?

The primary reason most beekeepers actually take the time to write a business plan is to obtain financing from a bank. You may need money to grow your business and you hope a banker will loan you money to keep bees. Most bankers do not understand anything related to agriculture, let alone beekeeping, unless they specialize in agriculture.

Even if it is just for yourself, it is a good idea to write out key aspects of your business. Many beekeepers are good goal setters: 'By the end of 2013, I want to have 48 colonies in two deep boxes and filled with honey.' Where they fall short is taking the time to develop the details needed to determine answers to the inevitable how, when and who of such a statement. How will you expand your operation? When will you actually do the work? Who is doing the work, especially if you already have a job that pays your routine bills.

If you already operate an existing beekeeping business, summarize your business onto one page.

Key information for an existing beekeeping business should include the following. This information should be concise, and presented on one page.

A Mission Statement – This should explain what your business is about. Use a few sentences to explain the scope of your business. For example, you might explain that you keep bees to raise queens to sell to local beekeepers and estimate how many queens you sell each year.

Business Information – A bit of history is useful. Include the year you started beekeeping, the growth of the firm and the key members of your business and your staff. Add your business locations if there are more than one.

Growth Highlights – How did you get where you are? Include key financial and market highlights, such as 'Produced 500 mated hygienic queens in 2012 with a net profit of $4.77 per queen.'

Products and Services – Describe all the products you sell and the relative size of the sales, such as 'Produced 500 queen bees (25% of net income) and 1500 pounds of honey (75% of net income).'

Financial Information – If you have a loan or are seeking financing, include your current banking information, outstanding loans (including company credit cards), investors and any other financial information.

Future Plans – Outline any plans for the future, explaining how any new activities will fit into your current

operation. For example, if you are entering into crop pollination, explain how this will fit into your queen rearing and honey production activities. If you plan to hire help, identify potential employee(s) by name or intended job description.

If you are a new business, focus on the decisions you have made to build a company.

Building a New Business Plan

Here are some basic questions that need to be answered in a business plan that describes your new activities:

1. What is the nature of your business? What is the market you are selling to?
2. Explain what your products are and how they will fill this market.
3. List customers you have and those you will try to satisfy.
4. Explain your competitive advantage in developing your business. Include the obvious – your business location, your experience in other endeavors, key employees and business partners, and anything that brings value to the business.

Make Goals And Keep Them In Focus. Your Plan Will Help.

A. Conduct a Market Analysis

Include a market analysis for your products and services. If you are in an area where nobody sells creamed honey and you plan to do this, look at this as both a challenge and an opportunity. Who are your target customers? How many customers are there in your marketplace? What are they willing to pay for this product? What will be your pricing structure for wholesale (if you are selling wholesale) and retail? If you are selling by Internet and mail order, explore the success and sales volume of similar businesses.

What challenges will you face with this market? Will you need special equipment? Will you need a food-approved kitchen that is not currently available? Will you need staff with special experience for the production of these products?

B. Summarize your Organizational Structure

Is your business set up as a proprietorship, Limited Liability Company, Corporation (what kind?) or a Partnership? Who owns the company? If there are investors and others, who are they and what do they bring to the operation decision making process?

Most beekeeping operations are set up as family run proprietorships or Limited Liability Companies. These are the easiest to set up. The LLC offers individual members of the business protection in liability issues, as well as a method of organizing the company as a separate entity with ownership outside the family.

C. Services and Product Description

List each of your products and services as seen by your customers. What is the life cycle of each product?

When in France in 2008 I was able to visit a small-scale beekeeper with a deluxe honey sales display, with clean tile floors and stainless steel containers filled with his honey. Customers were able to visit and fill bulk containers.

When is it produced and offered? When are payments received?

If you have intellectual properties, include copyright and patent filings. What new products do you have in development?

D. Marketing and Sales

How do you market your products? You may not need to do much marketing if people come to you for your products or services, but you need to explain your sales efforts. Do you pick up new customers by word-of-mouth or do you take a few weeks every year to visit potential new customers to discuss sales? You should have a clear pricing plan and wholesale discount schedule tailored to your product(s). If you do not collect payment at the time of sales, you must explain your payment and credit policies.

E. Finance and Funding Requests

If you are looking for an investor or a loan, add information that outlines your current funding, the amount of funding you will need over the next five years, how you plan to use these funds to build the business and any plans for growth. If you plan to buy out a retiring commercial beekeeper, you should have excellent financial data on the sales and expenses this business experiences. State how you will benefit by making this purchase.

Project your income into the next year and every year for five years. If you have been able to grow your honey sales by ten percent every year since you started, use this as the basis of future growth projections. Unless you are adding a new product or service, keep the growth rate at a stable level. The exception would be if you expect a large increase in income due to the addition of new products and, even then, keep the projection conservative. If you cut your projected profit in half and increase your expenses by four times, would you still make money? If not, you either need to revisit your product pricing or not expand this business. Anticipate extra expenses and reduced income.

What happens if you loose your bees due to pesticides or a drought? What contingency plan do you have that will allow your business to survive and recover from extreme loss?

Co-teacher on the Fun and Profit workshop was Sheldon Schwitek (Left) here with Craig Fuller, my queen rearing partner. Both are at a sales booth for Wicwas Press.

F. Appendix

In an Appendix at the end of the Plan, include information about your credit history, resumes of key people, photos of the operation, letters of reference, customer satisfaction survey results, marketing studies, articles you have written, special training you have completed, licenses, legal documents, leases, contracts, and a list of business consultants such as your attorney and accountant.

Create a Niche and Stand Out!

As you present your business plan, clearly explain how you fit into a niche market and you are unique in this sales opportunity. By making your business unique, you will develop a following that makes you different from other well-established beekeeping business in your area. Point out that you are providing products and services that they do not.

Size of your business

If you are going to make a honey-and-beeswax based hand cream and sell it on the Internet, you may be able to start you operations small and let it grow as customers respond. You may add additional production as you grow, and expand into commercial resellers and agents for your product once it is established. Or you may decide to reach a certain size and level of sales and keep the business at that level where you can handle all the details of production and sales without the need to hire extra help. If you are generating an adequate level of profit for your efforts, you may have found something that fits you and your other interests. BC

Prepared with the assistance of Robert Muir.

Check out ***www.wicwas.com*** *for information about the release of the fully revised edition of* Honey Bee Biology and Beekeeping *by Dewey M. Caron with Lawrence John Connor. This is a popular college textbook that has been used in many bee schools. The new edition is in color with many new items.*

HOW I DO IT – Honey Bee Swarms Part 1

Arrow points and bee swarms

During my youthful years, I have clocked several thousand hours of wandering the hills and meadows of both our family farm and that of our neighbor's land. I don't recall the first arrow point I picked up, but somewhere along the way, I began to watch for arrow points (called *arrow heads* by many of us). At the time, they were common in a rare way. In all honesty, I have written about these experiences in past articles and no doubt, I will write about my arrow point searches again in future articles. I deeply enjoyed the moment of the find. In my early days, I had high standards. I would only keep the perfectly formed ones and would toss the broken or poorly shaped points back where I had found them. All those years ago – about 50 years back – it never crossed my mind that anything would ever change. But, in fact *most* things have changed. My immediate family and I have always enjoyed nature *walkabouts*. Watching for arrow points is always high on everyone's list. Several times during the past thirty years, I tried to take my family to the area where I had found the points. Everything has changed. The tree line is gone having been replaced by a row crop field. Fences are in different places and electric fences are everywhere. Nothing looks the same. How I long to find just one of the broken points that I so cavalierly tossed away all those years ago. We have found nothing....absolutely nothing on these hikes. In fact, I have not found a point in about thirty years. All those years ago, stumbling upon a point protruding from the ground was exhilarating. Even as a kid, I savored the moment. I thought these finds would last forever.

Years later, the adrenalin rush reappeared in the form of honey bee swarms. About 10 times in my life, I have come upon a swarm completely unexpectedly. The rush felt exactly the same as the feeling I had when spying an arrow point. I have driven through two swarms that I was able to stop and hive. A third one eluded me. Many years ago, Spring swarms were far more common, and I would occasionally find one just hanging there – seemingly waiting for me. Don't get me wrong. I went into high gear when I got an unexpected swarm call from another, but *someone else had found it first.* It was as though someone left an arrow point for me to find. The swarms I legitimately found – without help – were special to me. Few things can amp up a beekeeper faster than free bees. So, what do arrow points and bee swarms have in common? They both cause a fulfilling adrenalin rush.

Swarms happen

Reproduction is a powerful instinctual force. To expect anything – including honey bees – not to reproduce is asking a lot, even too much. As beekeepers, we try to limit the behavior. As scientists and observers, we study the behavior. In wonderment, we watch the swarm issue from the colony. And heaven knows that a beekeeper will risk everything to retrieve a swarm. Odd isn't it that we try so hard to prevent something that we enjoy so much?

Spring swarming

A few years ago, I realized rather abruptly that I had grown old. I have been doing this bee thing for about 40 years and still have a clear love/hate relationship with honey bee swarms. I love to pick up *your* bees but I hate for *my* bees to swarm. For me, it is now just the beginning of swarm season. For many of you, it is already over. Yet for others, the snow is still neck deep. All beekeepers get their swarm season – just not at the same time.

About this time of the year, I usually write a swarm article. It's part of my beekeeping ritual. In a way,

A nice, accessible swarm.

A swarm, but not a very pretty one.

swarming is not fair. If we as beekeepers do all we are told to do to keep our hives vibrant, then about 70% of them will fly away in a reproductive swarm, taking the honey crop with them. Our reward for reversing brood chambers, keeping colonies apparently disease-free, leaving plenty for Winter stores, fiddling with queens and preparing the colony for Winter, is to have a big swarm try to escape during early Spring. But my concept of a colony reward is from my view as a human beekeeper. Bees apparently see the same situation differently. Honey bees have been doing their thing for a long time – probably longer than 30 million years. We have only been keeping bees in artificial domiciles for about 200 years or so. That's nothing. Bees are hardwired to take care of themselves. They were doing it long, long before beekeepers showed up. Indeed, humans have played a major role in scattering honey bees all over the world. It makes one wonder. Are the bees working for us or are we working for the bees?

Some swarm biology characteristics

The biology of swarming can only be described as mysteriously elegant. After years of observation and research, we now have a broad overview of the process; but it seems that with each advance that is made, plentiful new questions are posed. It would be easy to assume that the discovery and learning process will never really end.

The swarm can be divided into three events: (1) in-hive preparations (2) bivouac and site searching, and (3) new site acquisition and secondary swarms.

In-hive activities

The overwintered colony survives and Spring pollen flows arrive. House and nurse bees busy themselves cleaning and preparing cells in which the queen will lay eggs. The queen's food rations are greatly increased and honey stores are rapidly consumed to provide food and warmth. The Winter bees are being retired, and the new class is assuming responsibility. Everything is urgent. The colony needs to start swarm preparations as soon as possible in order for the departing swarm to have time to build combs, develop a brood nest and accumulate stores – all in preparation for the first Winter. The brood nest becomes increasingly crowded and frame upon frame of capped brood is developed. Seemingly based on space, pheromone levels and genetics, the queen begins to put eggs into queen cups. As the brood nest matures, pollen collection wanes. Much of the brood is in the pupal stage. With many questions unanswered, the selected bees (probably foragers now serving as scouts) begin raucous runs about the brood nest agitating the bees. The queen is treated roughly with bouts of biting and jostling. Usually, sometime between 10 am and 2:00 pm, the swarm pours from the colony and hangs in the air for a bit. If all goes well, the queen also departs and the swarm is on the move.

Bivouac and site searching

The queen was recently put on a strict diet by nurse bees so she is now able to sluggishly fly within the chaos. Make no mistake. For beekeepers, this is a biological moment. Both exhilarating and challenging at once. Seemingly, the tired queen randomly plops down *somewhere* on *something* near the parent colony. At this point in our understanding, there seems to be neither rhyme nor reason to where she lands. But experienced beekeepers have long known that specific tree limbs or other locations where previous swarms have pitched are attractive to subsequent swarms even in later years. The flying mass

begins to accumulate in the vicinity of the queen. On average, about 50-70% of the bees will leave with the swarm or just a bit more than three pounds of bees. Before leaving the parent colony, the swarming bees load up with honey stores.

Now at the temporary bivouac site, the swarm will have enough food for about seven to 10 days. The hanging cluster will regulate its internal temperature. Some bees probably forage from the swarm cluster, but how much is uncertain. It is not uncommon to see foragers loaded with pollen running about on the swarm surface. If there is no brood, then why collect pollen? With so much Nasanov secretion in the area, these foragers are attracted to the swarm activity. Due to all the confusion, they may not even be from the swarm colony. During this tumultuous time, some of the bees will return to the parent hive. There is a window of decision-making for the bees . . . do I go or do I stay? Throughout the entire event, worker bees are remarkably gentle, and generally only sting if they become entangled in your hair or clothing.

The swarm cluster begins to shape up – or not. Some clusters are neatly formed while others are ragged and entangled in vines and limbs. Maybe far from the ground or maybe on the ground. Maybe on the TV camera at a professional baseball game (true story). Maybe on the handle bars of a motorcycle (true story) or maybe on the hive of another colony (not uncommon). The location where the swarm temporary resides is sometimes odd and sometimes not.

Time is critical and short! Food is limited and winter is only a few months away. Experienced foragers have been re-purposed to become scout bees. They are flying all about the community searching for suitable nest sites. Ten liters (a bit less than ½ of a cubic foot) is as small as they will consider and anything more than 100 liters (about 3½ cubic feet) is too large. Somewhat like the temperature of Goldilocks's soup, 40 liters (a bit less that 1½ cubic feet) seems just about right[1]. For comparison, the scouts are looking for an ideal cavity a bit larger than an Illinois depth super but not quite as large as a deep hive body. They want a defendable entrance that is about a yard from the ground. They want the cavity to be dry and tight with nothing else living there (birds, squirrels). They particularly like for old combs to be there already[2] and, ideally, for the entrance to be at the bottom of the cavity. This cavity design can only be considered to be perfect. In the natural world, homeless bees often fail to find such a location and are forced to accept cavity spaces that can only be regarded as desperate. But the alternative – building an exposed nest -- would be even deadlier.

Then an amazing thing happens that T. Seeley has described in his book (cited elsewhere). The scouts that find a potential nest site return to the cluster and dance with greater or lesser degrees of eagerness. Other scouts are enticed to go have a look for themselves, and look, they do. They walk off the cavity dimensions and fly closely about the outer surfaces. This seems to be a serious decision not made in haste. If they approve, they return and dance in support of that particular location. Over time (and an abbreviated time it is), pure democracy rules. There is only one queen. Food is limited. The Spring nectar flow is passing. This is not a time to be a persistent sore loser. If the crowd is clearly agreeing to a particular site, the scouts promoting lesser sites give it up and become quiet. Until now, probably about 5% of the bees have actually seen the new site and know how to find it. These experienced foragers had better know what they are talking about. The decision is final; and once the cluster has raised its temperature to about 95°F, the scout bees rally the crowd to take flight. It only takes 60 seconds. The cluster breaks apart, slowly becoming airborne, and begins to respond to the directional instructions given by the scout bees. Seeley has reported that these directional bees fly at much higher speeds, above the moving swarm, in a back/forth direction. Against the sky, these fast moving bees seemingly draw directional lines for the swarm bees to follow. If a beekeeper were to show up at this moment with a swarm box, it would be too late. The decision has been made and the bees are on the move – at about 10 mph. Closer is better, but they may very well be moving to a place a few miles away.

For now. . .

This swarming thing is a dangerous event for bees. Only about 50% of the swarms that depart will result in successful colonies that can survive the first Winter. For now, I need to leave the swarm in transit. Next month in the second part, I will write about the big move-in, population recovery in the original parent hive, the production of secondary swarms, the use of swarm traps, and what the queen has to do with this biological event. Additionally, I will pose a few comments and observations on why some swarms don't stay where we put them, and offer some comments on hiving difficult swarms. Clearly, swarming is a big deal in the bee world – both for bees and beekeepers. BC

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

[1]Descriptive information on swarm behavior and mechanic taken from Seeley, Thomas D. 2010. *Honey Bee Democracy.* Princeton University Press. 273p.

[2]A swarm being attracted to a cavity with old comb has always struck me as odd. Clearly, the previous colony had catastrophically failed. Why would the second colony think they would fare any better? Even so, I agree that old combs are particularly attractive to scout bees.

Getting Started With Your Own facebook Page

Jessica **Dally**

Last month we talked about getting started with Facebook and how to create a personal account. Now it's time to create your business or club account on Facebook. This page will allow you to keep your personal life with your friends and family private while still promoting your business or club to the general public.

Your business or club page is similar to your own profile. You can share pictures, post status updates and link to interesting articles and websites. But unlike your personal page your business page isn't "friends" with anyone; your business page has "fans." This keeps you from having to approve friend requests and allows your fans to easily share information about your business or club.

Create Your Page

To get started you'll want to create your Facebook page.

You'll create your business or club page by going to **https://www.facebook.com/about/pages**. Make sure you spell your business name correctly and don't add any extra information here. For example you'll be able to put in location information in other areas.

Once on this page you'll be asked to choose a category for your business or group. For most of you you'll want to choose "local business" for any small businesses or "cause" for any nonprofit group, for example a beekeeping organization, assuming that your organization is indeed a 501c3 registered organization.

From here the site will ask you for a bunch of information about your business or group. While it's tempting to leave this blank, your customers and fans will use this to learn more about you and to insure they're on the right page for your business. It also helps people who aren't certain if they want to be a fan determine what your business or club is about and how to find your products or meetings if they wish to in the future. While putting in a mission can seem strange to most small businesses it can help distinguish you from other big honey producers. Do you cater to a local area? Is there something specific that sets you apart from your competitors? Put it in! Your customers want to know!

Add Content

Once the page is set up it's time to add some content. Your fans want to know a bit about you and an easy way to tell the story is to upload a few pictures. Give folks a feel for your farm or apiary, for what you do and, if you're up for it, who you are. Pictures are viewed far more than any other type of post on Facebook or on the web so this is a great way to grow a following quickly.

Now post a "welcome to the page" post. Something like "Welcome to the new Facebook page of Circle A Honeybee Ranch. We're here to answer your questions and let you know more about the work we do." works really well as a starting post.

Set up your thumbnail and cover photos

Your thumbnail photo is the small photo that shows at the beginning of every status update and post you create, just like your profile pictures shows when you post from your own personal page. When you pick a thumbnail image make sure to pick something that fits in the little square. Alternately if your photo doesn't fit completely, position it so what does show makes sense. Don't have just part of a logo or some other incomplete word as this image is what represents you visually every time you post anything on Facebook.

For your cover photo on your timeline (this is the BIG photo that shows up on your page), make sure you follow the rules set out by Facebook regarding the image:

All covers are public. This means that anyone who visits your Page will be able to see your cover. Covers can't be deceptive, misleading, or infringe on anyone else's copyright. You may not encourage people to upload your cover to their personal timelines.

*Covers **may not** include:*

i. price or purchase information, such as "40% off" or "Download it on socialmusic.com";

Create a page.

Thumbnail and cover photo.

ii. contact information such as a website address, email, mailing address, or information that should go in your Page's "About" section;

iii. references to Facebook features or actions, such as "Like" or "Share" or an arrow pointing from the cover photo to any of these features; or

iv. calls to action, such as "Get it now" or "Tell your friends."

You can find more about the rules surrounding Facebook pages at **www.facebook.com/page_guidelines.php**.

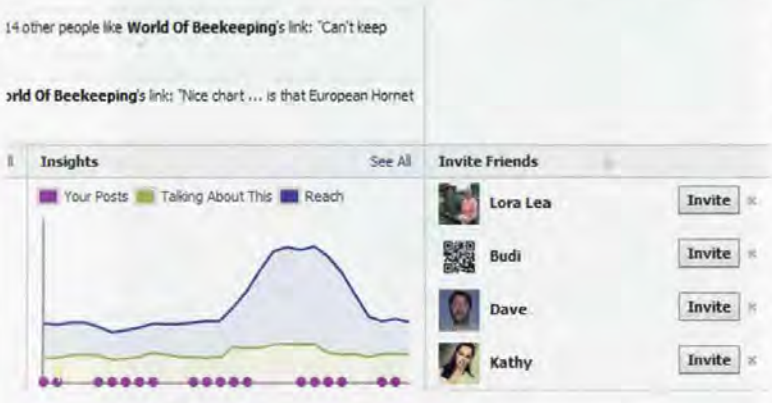
Keep in mind that you will find other pages that are breaking these rules. While you can choose to ignore the rules Facebook has shut down pages for rule violations. If that happens you've lost contact with the entire customer base you've established. There are plenty of ways to follow the rules and still hold giveaways, market and promote your business so why risk the work you've done just because "everyone else is doing it"?

Grow Your Following

Facebook, like other forms of marketing, is not "if you build it they will come." To grow a following on Facebook you have to reach out to potential fans and get their attention. Don't worry, this does not need to be a difficult step and if you manage your page well, eventually increasing your fans will happen without much effort at all. Here's some easy ways to get started:

Bug your friends to follow you.

They're your friends. If they really like you and your products they'll become a fan of your page. Also ask them to post a link to your page on their own personal profile so their friends can join and find your business. Remember that word of mouth (or in this case word shared by type) is the way to grow your business easily and for free on Facebook. A lot can be done without money especially as you grow a base of fans that are passionate and excited about what you do.



Invite friends.

Invite your email followers

If you have an email list and you regularly send emails it's time to let your followers know that they can find you on Facebook as well. Let them know that you'll be posting pictures and other information on your Facebook page and you'll find that many of your email followers will also become fans. While it may seem silly to reach out to these folks since they're already following you, Facebook will allow them to broadcast messages about your business easily, in a way that doesn't require them to forward an email and maybe annoy their friends.

Promote your page in real life!

If you sell products at your home or at a farmers market let people know that they can also find you on Facebook. By encouraging people to follow you after making a purchase your posts will show up in their regular Facebook stream. When people are reminded of your business regularly they're far more likely to remember your business when it comes time to make their next purchase. If these folks see you regularly and get to know you through posts, pictures and links they'll be far more likely to buy from you again rather than purchasing from someone else. It's simply a matter of repetition!

Now that you're setup, post updates!

Pictures

Pictures are the easiest way to share with your fans without requiring a lot of work from you. Pictures also gain a lot of attention from busy fans and help promote your page better than any other type of content. Giving your picture a brief title helps explain what the picture is about so make sure to include that information for your customers. Don't let the professional photos you see in print marketing and ads dissuade you from posting pictures that you've taken of your hives. On social media people don't expect professional quality photos and much prefer the candid shots you can take easily to retouched photos that seem fake.

If you have a smart phone you can post directly from the phone to your page. Applications like Instagram or Photoshop for your phone let you change the look of the picture to make a less than perfect picture a bit more "arty" and the Facebook Pages app lets you post pictures and status updates right from your phone. This can be

Update a photo.

especially useful if you're at an event where you don't have a computer handy.

Personal Information

You may want to post personal information including information about not making it to a farmers market due to illness, vacation or something similar. You absolutely don't have to post this type of information but it is good to let clients know they shouldn't expect you at a usual place so they're not disappointed when they show up to buy your honey and you're not there. Also remember that part of your page is growing a community that feels connected to you so some personal information may make your fans more passionate about what you're doing.

Politics?

Many small businesses and organizations want to post information about politics, however, as you can imagine this can be a very sticky subject and you run the risk of alienating some of your customer base should you decide to get political.

For businesses you'll want to ask yourself if you really want your business to have a political party affiliation. If you decide that you will post politics you'll have to be prepared for heated political debate on your page. This may not be what you're going for when it comes to marketing. Remember, you can always post your personal political views on your personal page. When you post political views on your business page you're stating that the business itself has these political views.

A good best practice is to limit post to topics relevant to your actual business. Politics around bees, beekeeping and agriculture are topics your customers might find interesting. Politics that have nothing at all to do with your business or beekeeping may well annoy your fans to the point that they stop paying attention to your page. You can always post controversial topics without taking a stand by posting the link or resource with a "What do you think?" title rather than "We believe this" type of stance.

If you're an organization the rules and regulations are a bit different. Depending on your organizational structure you may be prohibited from posting anything that would be seen as a call to action to influence regulation or lobbying. If your beekeeping organization is a 501c3 organization you are absolutely prohibited from participating in any campaign activities and that means you simply cannot post that sort of information on your page. You can find more about what you can and can't do by doing a Google search on 501c3 lobbying.

Why Bother?

Why do people follow you? Usually because they want to hear updates about your apiary, farm or group without having to sign up for an email. They like that Facebook status updates are short and easy to read while on the go. They also like that they can have regular updates about what's happening right now rather than recap or what's coming emails that take longer to read.

In fact, research has shown that the majority of people don't read more than the first paragraph of any article or marketing email. While you might be spending lots of time writing great emails and blog posts to your fans, many of them aren't being read by your customers. When you post pictures and tidbits of information about your product, group or life on the "farm" you're reaching people in a way they can easily digest and you're building a stronger following for that reason. You've also given them an easy way to share what you're doing without being a pest to their friends.

Why do you want to do it?

The biggest benefit of Facebook is that you can easily update your customers and build a strong fan base who will buy your products without having to spend a lot of money on traditional marketing. More importantly, you're providing an easy vehicle to get your customers to brag about and sell your products FOR YOU! BC

Jessica Dally is a professional in the social media business, running the social presence for Wildlife Media (Chris Morgan Wildlife and BEARTREK), World of Beekeeping, Seattle Free School and recently assisting with the Puget Sound Beekeepers. She has worked with TechSoup, an international nonprofit, assisting and teaching other nonprofits on the use of social media.

An Urban Accident Report

Dear Insurance Claim Adjustor:

I'm writing in response to your request for additional information concerning my beekeeping accident. Please notice that in block #3 of the accident report form I put "**trying to do the job alone**" as the cause of my accident. You said in your letter that I should explain more fully, and I trust that the following information will be sufficient.

I am a hobby beekeeper living in the heart of my city. The only place I can keep my hives is on top of the six-story apartment house where I live. When I harvest honey I am not allowed to carry the supers on the elevator or down the stairs because I never seem to get all the bees off the combs. Besides, dripping sticky honey down six flights of stairs creates an ant problem. So I designed an ingenious method, utilizing a pulley mounted at the edge of the roof, and a rope attached to a platform that enables me to lower the heavy honey supers down to the ground so they can be taken to a friend's house where there is extracting equipment. This past year my hives produced far more honey than usual so I had a bountiful crop to harvest.

On the date of the accident, I was working alone on the roof of this six-story building. I first secured the rope at ground level, then I went up to the roof and harvested eight supers of honey that weighed a total of 600 pounds. I moved the platform over the edge and carefully stacked the supers on it. Then I went back to the ground and untied the rope, holding it tightly to insure a slow descent of the 600 pounds of honey supers.

Now, you will note in block #2 of your accident report form that I weigh 150 pounds. Due to my surprise at being jerked off the ground so suddenly, I lost my presence of mind and forgot to let go of the rope. Needless to say, I proceeded at a rapid rate up the side of the building! In the vicinity of the third floor, I met the platform coming down . . . this explains the fractured skull and broken collar bone. Slowed only slightly, I continued my rapid ascent, not stopping until the fingers of my right hard were buried four knuckles deep in the pulley.

Fortunately, by the time I had regained my presence of mind, I was able to hold tightly to the rope in spite of my great pain. At approximately the same time, however, the platform with the honey hit the ground and the honey supers fell off. Devoid of the weight of the honey supers, the platform now weighs approximately 50 pounds. (I refer you again to the weight in block #2 of the accident report form). As you can imagine, I began a rapid rate of descent – down the side of the building. Somewhere in the vicinity of the third floor, I again met the platform coming up. This accounts for the two fractured ankles and lacerations of my legs and lower body. The encounter with the platform slowed me enough to lessen the injuries I received as I fell onto the scattered pile of honey supers and frames. Fortunately, only three vertebrae were cracked.

I am sorry to report that, as I lay there in unbearable pain, my body embedded in the broken, mushed honey combs wet with honey, and unable to sit up, and watching the empty platform six stories above me, I again lost my presence of mind and let go of the rope. The empty platform, weighing more than the rope, came immediately down upon me, breaking both legs. In the confusion I barely noticed the 50 or so bee stings I received on the face. That explains my closed eyes and puffy ears.

In conclusion, I sincerely hope I have furnished the information you required as to how the accident occurred. Because you see, I was trying to do the job alone.

Anonymous, and Norm Gary

All The Buzzz in...

Hello Friends,

Have a joyful summer celebration.
Don't forget to thank a pollinator.

Bee B.Queen

Tell us how you celebrated Pollination Week.

Rebecca Flora, 12, OH

Mason Cummins, 8, MA

James Cummins, 4, MA

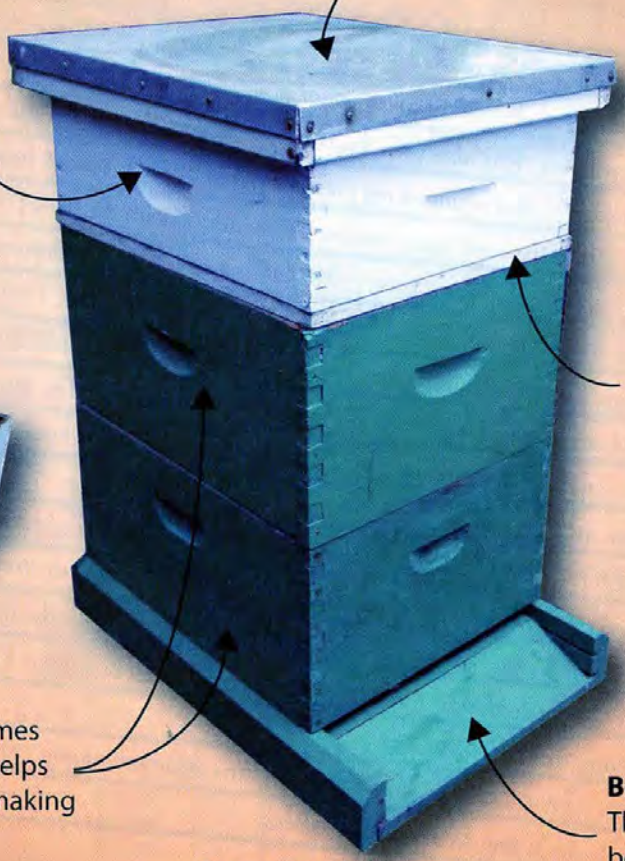
The Beehive Break Down

There are a number of different kinds of beehives. The hive you are probably most familiar with is the Langstroth hive named after the creator Lorenzo Lorraine Langstroth in 1852.

Let's take a look at each section of this hive.

Outer Cover
Every house needs a roof. This cover protects the hive from rain, snow and wind.

Honey Supers
Inside are frames where the bees make wax comb to store their honey. These supers are shallower than the brood supers. Honey is very heavy so having a smaller box is easier to lift. As the bees fill each box with honey, another super can be added.



Inner Cover (under the cover)
This cover keeps bees from attaching comb to the outer cover. It makes an air gap to help protect the bees from cool and hot temperatures and helps remove moisture in the winter months.

Queen Excluder
This metal or plastic rack is placed between the brood nest and the honey supers. The slits are big enough for the worker bees to pass through but too small for the larger queen. It is used to keep the queen from laying eggs in the honey supers. Not everyone uses an excluder.

Frames and Foundation
Each of the wooden or plastic frames holds sheets of foundation. This helps the bees to build straight comb, making it easier to work the hive.

Bottom Board
This is the floor of the hive. It can be solid wood or screened mesh. A screened board provides ventilation and aids in the control of Varroa mites.

Langstroth Hive

Hive Body or Brood Chamber
These large wooden boxes are filled with wooden or plastic frames. The worker bees build the comb in the frames so the queen has a place to lay her eggs. This is the part of that hive where most of the action is.

... Bee kid's corner

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

Perfect Pollinator Friendly Treat

Eat this yummy salad and thank the pollinators that helped make flowers into food.

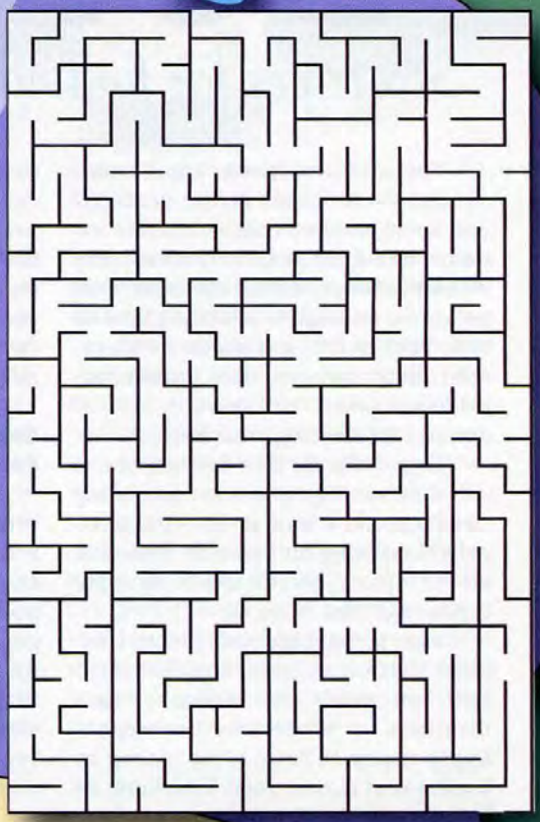
5 medium plum tomatoes, sliced
1/4 red onion, peeled and thinly sliced
1 cucumber, sliced
Put in a bowl.

Dressing- Use your favorite dressing or make this dressing yourself.
1/2 cup safflower oil
1/4 cup cider vinegar
3 tablespoons fresh lemon juice
1/2 teaspoon salt
1/4 teaspoon black pepper
Put all the ingredients in a bottle and do the shaking dance.

Who Pollinates What?
Tomatoes - bumblebees, solitary bees
Onions - honey bees, solitary bees
Cucumbers - honey bees, squash bees, bumblebees
Safflower oil - honey bees, solitary bees
Lemons - honey bees

There's Always Room for One More

Split one of your honey bee colonies and add another beehive to your bee yard.



Celebrate Pollinator Week June 17 – 23

Learn more about this special week by going to www.pollinator.org. There you will you find events and activities taking place all around the country. Plan and submit your own event. One thing you could do is prepare a pollinator friendly menu for your family and friends. Wikipedia has a very easy to read list of plants and pollinators. Search the Internet for "crop plants pollinated by bees."

Bee Buddy

My name is Rachel Hodson. My grandpa is a beekeeper, so when my mom and uncles were growing up they had bees in their backyard. Since I am related to beekeepers, I have always been fascinated with bees. I would run outside and climb up a tree that was next to the bee hives. I would sit there for the longest time and just watch the bees fly in and out of the hive. The fact that they knew to pollinate the flowers, bring the pollen back to the hive and then make it into honey amazed me. If I tried to sit in that tree now I would probably break the branch. So instead, I help my uncle and grandpa to extract the honey from the combs and package it in cute plastic bear containers. When I grow up, I think I will become a beekeeper too, just like my uncle and grandpa.

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 questions, photos and artwork to: beebuddies@hotmail.com or mail.

DOWNTOWN

Strategies for finding exactly the right spot for your bees.

We urbanites live in small spaces, often with back yards, gardens, and even porches that do double- or even triple-duty as activity areas, and we can't always stretch our home real estate far enough to include a hive or two. Take heart, you condo dwellers, apartment owners, and roommate-ridden masses: you have A LOT of options for hosting your hives.

Especially for new beekeepers, it can take some guts to start pounding the pavement and (even electronically) knocking on doors in search of an out-apiary, but I'd like to strongly encourage you to do so.

Just as background, please consider that cities coast-to-coast have both non-profit and business organizations for which non-beekeepers apply or pay to have hives placed at homes and commercial locations. In Baltimore, hive hosts get memberships that entitle them to a share of the honey produced. In other cities, individuals and businesses contract with experienced beekeepers to maintain the hives on their premises. I used to casually ask "Would you host a hive?" at local businesses, and had to stop because – too many times – I got an excited "When can you start?!" and ended up bruising feelings. Clearly, beehives are very much in demand.

Also, as the dreadful news about this Winter's bee losses gets more and more press, your fellow citizens are even more receptive to people trying to place a colony or two.

Finding Your Urban Out-Apiary

All beekeeping is local, and your needs for proximity and access and the right physical site for the bees makes urban beekeeping even more so. Therefore, there is almost certainly an alternative for you that I might not include here.

Suggestion One: Use your local beekeeping community

My first out apiary came to me through a local beekeeping club! The Franciscan Monastery here found its extensive gardens could use some pollinator support, and the Montgomery County Beekeepers knew I was nearby and interested. Since then, the Monastery has become a strategic linchpin for all sorts of local beekeeping activities, and I did not even have to ask.

Connect with a network: Usually, a beekeeping club has at least one person who fields requests from folks who have a place for bees, but do not themselves want to become beekeepers. Sometimes it's a community garden, sometimes it is a church or a park or a business. Stay in touch with beekeeping groups in person and online, and seek out that person at the center of the network and make sure they have your contact info.

One of the benefits of getting an apiary through this network is that the location and its owners have probably been questioned a little about what they are offering and what they expect, so truly inappropriate situations won't pass muster.

Ask for help with your pitch: by connecting with your community you may also be able to locate a more senior beekeeper who will accompany or vouch for you as a responsible club member with access to continuing education and beekeeper support should issues arise. You don't have to go it alone.

Suggestion Two: Consider Locations Near Where You Already Spend Time

When hearing from a beekeeper in search of a downtown apiary, I first try to learn in which neighborhoods they live and work. Especially for beginners, a convenient and accessible colony site is the key to being able to spend time observing and admiring, experience that builds a great beekeeping sixth sense.

If your home won't work, what about your employer? Nowadays, many commercial buildings are LEED certified and most businesses have endorsed green values and practices. There are more green roofs, and most of those have fairly decent access for maintenance purposes. Even if your employer is just a tenant in a managed building, the management company may already have experience with hives at another location, or have its own green projects in mind. Check with your boss about your company's interest before approaching the landlord, of course.

When beekeeping at work, it pays to discuss expectations, access, and exit strategies up front: after all, few of us expect to retire from the job we are holding right now! It might be worthwhile to execute an agreement that outlines when and how either party can terminate the arrangement, who owns what, and who has liability/insurance.

Also, many at-work beekeepers can discover they have a new job on the side: hive tours and public education. You are doing a tremendous thing for the bees if you take the

latter on, but make sure you set up guidelines ahead of time.

Closer to home: Sometimes mixing work and pleasure is not such a good idea, so it might pay to explore an apiary at an organization in your neighborhood. You might be surprised how many candidates there are! Here's a short list of organizations near me which host or would like to host beehives (from easiest to most complicated):

- Hotels
- Restaurants
- Community Gardens
- Churches
- Garden Centers
- Organic grocery stores
- Cemeteries
- Environmental activist organization
- Bookstores & Libraries
- Apartment buildings
- Recreation Centers
- Schools
- Arboretum
- National Park

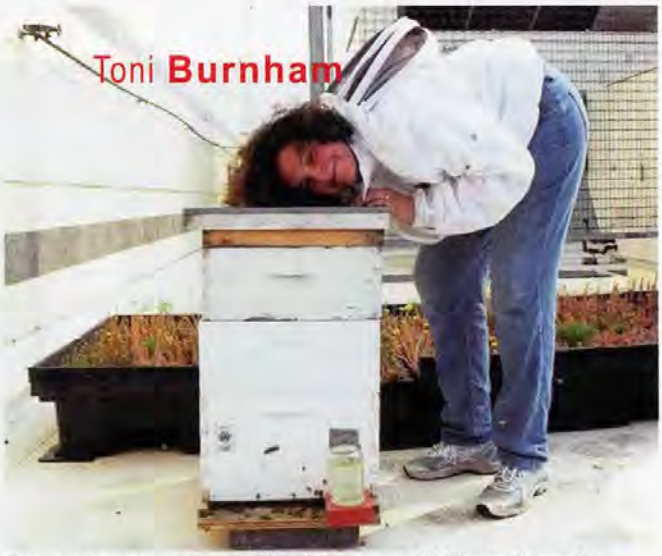
And don't forget the neighbors! If you have good relationships with folks on the block with a better yard or roof, send out some feelers. But remember, you don't want to lose a friend or peaceful neighborhood relations over beekeeping misunderstandings, so you might want to proceed even more carefully there!

Suggestion Three: Urban "Wasteland"

Some apiaries are not beautiful to the human eye, but they work just fine from the honey bees' point of view! Many urban areas have "waste" or vacant parcels, or less used industrial or warehouse areas, which make great bee yards.

Less than a mile from Nationals Park in DC, local beekeepers have partnered with the Earth Conservation Corps to place bees at a former industrial site on the riverfront. The bees share the premises with a raptor training center, and the neighbors include electrical generators, U-Haul storage, parking lots, and some kind of government facility. The riverfront is full of bee-friendly plants, as are many of the cracks in the pavement.

For years, the Chicago Honey Coop hosted dozens of hives at a deserted Sears Roebuck and Co. parking lot on West Fillmore Street. They had to move when development



came to that part of the city, an event for which any beekeeper on borrowed property should plan.

Don't just ask for prime real estate: especially If you approach a park or a public facility, consider asking them whether there is a roof of a garage, or an equipment storage/repair facility where bees could live: they don't have to be in a public right of way. If your city has an industrial belt with a lot of "For Lease" signs, it costs you nothing to call some of the realtor phone numbers and ask.

Suggestion Four: The Craigslist Approach

No urban beekeeping tip list would be complete without suggesting a look at social media, though some misgivings apply! There is probably no way for a private beekeeper citizen to reach so many potential hive sites at once, but do you have the tools and experience to sort through and weigh them?

The businesses and non-profits that place beehives use tools like Craigslist, neighborhood bulletin boards, Facebook, and Twitter to get out word about their offerings, and so can you. However, you need to be ready to vet closely both the seriousness and the appropriateness of the offer, because the folks who reply are potentially your partners over the long term. They are probably interested in helping, but know next to nothing about bees, and may not really want to know.

The Matthew Henson Earth Conservation Corps Center is at the end of an industrial access road (above) near the Potomac.

Bees fly with hawks and owls from the roof at right.

The folks in beekeeping organizations have been at this for a while, and know what questions to ask and what the trade-offs are between one situation and another. A new beekeeper might have a harder time evaluating an urban apiary site and educating a potential hive landlord about what to expect. You will also get replies from over a wider geographic area, and have to gauge how easy it would be for you to regularly monitor and look after your bees – remember, many cities require minimum best practices, and you have to be there to meet them. But you might score a nearby opportunity that you never knew was there: consider what you are up for, and go for it.

Suggestion Five: Watch Out for the Weenie Factor

Especially when approaching a large organization, you might need to watch out for a "yes," that is really a cowardly "no:" something I refer to as "The Weenie Factor."

This happens a lot more than you might think, and it is important to discuss because these folks can sandbag you long enough to leave you holding a package of bees with no place to put it, or just cost you a whole season while waiting for a final go ahead. And it is not easy to predict who will be the weenie!

My friends at the Fairmont Hotel needed a temporary apiary for their hives a couple of years ago when their roof was being upgraded, and they thought they had the perfect arrangement. Close by was a world-renowned environmental group with its own building, and they sounded glad to lend a hand. Guess what?

An interminable process ensued. In February, it seemed everything would be fine by April, just a little check with the lawyers. Then there was a human resources concern that needed to be chased down. And, oh! Did anyone talk to the insurance company? Um, wait, does the building maintenance team need to be checked with again? . . .

By early May, the beekeepers had run out of time. Soon the hives would be difficult to move, or the entire apiary might be lost. Emergency decisions had to be made, and help found, with little chance to explore better alternatives. All because a potential partner did not have the guts to 'fess up to some hesitation at the outset. This has happened in parks and schoolyards here as well: look for an almost too-enthusiastic "Yes!" or just move on to the next idea.

Suggestion Six: Don't Give Up Too Easily

Your bees deserve a place in the urban environment, and don't let the first few turndowns stop you – if you even encounter them. Continue to talk to other beekeepers, to tell anyone who will listen what you are trying to do, and to brainstorm a hundred creative alternatives that should have been mentioned here. Do you belong to a garden club? Is there a museum you go to a lot?

You get the picture.

And I am completely shameless about this: feel free to reach out to me if you want to hone your pitch! BC

Toni Burnham keeps bees and rescues swarms in the Washington, DC area where she lives.

At-Work Bee Nirvana

One of the volunteers at the San Francisco Chronicle's apiary says, with little hesitation, that it may be the most perfect roof for beekeeping in one of the most idyllic cities for bees in the world. Meredith May, a Chronicle staff writer who grew up with her grandfather's bees, responds after a moment, "Well, you know, I guess that's right!"

The Chronicle hives are on a flat roof used by food and gardening journalists to grow garden plants, flowers, and even fruit trees as background for their articles. The hives are reached through a locked door, are located in a windbreak, and can't be seen from the street.

An antique elevator goes straight there, where a structure housing a cookbook library also holds the beekeepers' gear. The next stop down on the elevator is the test kitchen, where the beeks and many interested volunteers harvest the honey in between pre-publication recipe tests. The hives have been welcomed enthusiastically by the whole staff, with May remarking, "There's a joy about the bees in the building."

The bees are at the Chronicle for many of the reasons that you would install a hive or two at a building where you live, work, or volunteer. First, it took a person with a connection to the site who became curious about beekeeping, in this case House & Garden editor Deb Wandell. Second, the organization recognized the importance of bees and the perils facing the green world, and decided (however uneasily) to share space with stinging insects.

But this is an adventure in the public life of bees in even more ways! May and Wandell lay out their joys, discoveries and a few informative mistakes via a monthly column featured at the newspaper's site at **www.sfgate.com** and the bees' own Facebook page at **www.facebook.com/BeekeepingHoneybeeChronicles**. There are also Bee Tweets.

May is open about lessons learned and mistakes made, as well as the ongoing educational and environmental journey which beekeeping becomes.

The Chronicle apiary started with two eight-frame hives of a single deep each, and two three pound packages of bees purchased from a local bee business. First mistake: May and Wandell did not realize that they would need more gear until the bees swarmed a few weeks later: into the newspaper's parking lot!

The next lessons they learned were about beekeeper kindness and generosity, and the importance of connecting with local bee groups full of helping hands and important information. An experienced beekeeper collected the swarm and gave them the lowdown on how many more frames and boxes they needed, ASAP. As time went on, others helped them monitor queen health, combine hives, and harvest honey.

And enthusiasm for the bees can create an ongoing demand for apiary tours and hive inspections, all while Wandell and May still have to look after their day jobs.

May emphasizes that everything they have learned so far is just the beginning of what seems to open up to them in each season. She shares concerns that beekeeping seems very cool and easy to get into, but that new beekeepers need to respect the bees and the knowhow it takes to keep them healthy and well-integrated into urban environments. Even in a location that is so, so right for bees, May and Wandell discovered that habitat features, gear planning, swarm control, public relations, queen management, and many other dimensions of apiculture deserve careful consideration, in advance and as sweet seasons continue to pass.

Nutrition & Mite Control

60#s Of Feed/Colony, And Good Mite Control With Formic . . . Healthy Colonies

Wendy **Mather**

An 8% loss on 2988 colonies coming through the Winter of 2012 in an Idaho potato barn is a darn good ratio, when loses of up to 50 and 70% have been reported. So what does this second generation beekeeper from Halliday, North Dakota do to bring his bees through the winter with such a low winter mortality rate? Brent Woodworth, with humility and humor, generously shares his management practices which successfully support him and his crew in raising and maintaining healthy bee colonies.

Nutrition, nutrition, nutrition! Apart from his labor costs, feed is Woodworth's second biggest expense. Brent and his crew feed each colony approximately 60 pounds of feed each year! As a migratory beekeeper, it's a must. "You reap what you sow," says Brent, "and if you're expecting an eight-frame average cluster by February 12th for almond pollination, you've got to feed!"

After three months inside the Winter refuge in southern Idaho, the bees are carefully loaded and trucked to a staging area in the San Joaquin Valley where they finally get to take their cleansing flight. The crew works tirelessly for the next couple of weeks to grade, feed and place the colonies in their respective orchards. Consistent, healthy nutrition and proactive mite control are Brent's equation to maintaining healthy bees. He believes it's best to do a cursory check and pop lids to get an idea what the load looks like the day after the bees arrive in California. That first day is mayhem for the bees after being locked up in the calm darkness of their Winter building!

The following day, Brent and his crew feed Pro-Sweet Liquid Feed to any light weight colonies, and he and his crew begin grading the strength of the hives and giving each colony a pollen substitute patty. He believes this step is crucial in minimizing the stress on already stressed bees. It's at this point when dead outs from the long haul to California are culled. This year he only lost 6% on the trek to the almonds, so his total Winter loses for 2012 are 14%.

As the crew works diligently at cracking open each hive to assess cluster size and feed a pollen patty, they look to see if the bees have taken the syrup. If the syrup is still on, that's a clue that something is wrong in the hive. It could be anything from a queen problem to a missed mite treatment from the previous Fall; anything is possible when you run a lot of colonies. If some hives are below grade, a number is recorded on the lid with a grease pencil indicating the amount of frames a colony needs to bring it back up to the eight-frame average. Weaker colonies are enhanced with bulk bees from colonies marked as having more than the eight-frame minimum. Brent uses a few sheets of paper towel between the boxes to help the bees transition to their new home. When all of the bees are fed and graded they are carefully placed in the orchards.

Brent believes if we're asking the bees to start work earlier than what is natural, he must give them a boost and push them into production by feeding lots of carbohydrates. Some of his strongest hives take two rounds of feed before being placed in the almonds. After petal fall in late March, all of the colonies are fed again. As it is also brood splitting time, nucs are established with two frames of brood and a mated queen. The nucs are fed right after the splits are made, and again before they leave to return to North Dakota. Brent feeds his bees between four and five times in California before bringing them back in early May to Summer in North Dakota.

Mite treatment begins in the almonds too. After petal fall and feeding, Brent feels a mite treatment is extremely important. This spring, he is committing to try the MAQS formic acid single strip, otherwise known as the "Knockdown" treatment. It has a 70% efficacy if used per the label directions; an effective way to knockback the mite load until he's ready for his double strip MAQS "Knockout" treatment in early May. With very low mite numbers in early Spring in California, Brent feels that a single MAQS treatment strip will keep the mites under control for two months.

The moment Brent's bees are safely returned to their Summer foraging home in Halliday, North Dakota, they are fed again. Approximately one week later, the crew works all of the yards, cracking open the story and a half hive boxes, carefully placing two MAQS formic acid treatment strips across the top bars of the bottom brood box so that each top bar comes into contact with one of the strips. He follows the label directions precisely.

After the honey flow ends, it's feeding time again! The colonies are prophylactically treated with Fumigillan at this time of year. Once the feeding is done, it's time for the final double strip MAQS "Knockout" treatment which has an efficacy of 90% and kills mites under the cap, when used per label directions. The colonies are then

Staging area in the San Joaquin Valley.

Photo taken February 13, 2013. Hive treated with two MAQS Formic Acid Treatment strips in the Fall of 2012. "Knockout mites."

Brent Woodworth happy to grade a healthy hive: Nutrition+MAQS=Healthy Bees.

rounded up and wrangled safely back into that potato barn in Idaho where they spend a quiet cozy couple of months before they are expected back to work in California in early February to help pollinate the 760,000 acres of almonds.

For Brent Woodworth, Nurtrition+Mite Contol= Healthy Bees. It is an easy equation comprising timely, consistent and healthy feeding, as well as proactive *Varroa* management. Brent humbly admits the challenges embedded in the equation for him at this point are mostly physical, but he's got a strong younger crew he's mentoring to ensure healthy bees for almond pollination and honey production, and to secure the future of beekeeping for the next generation. BC

Wendy Mather is the resource person for Mite Away Quick Strips (MAQS™) for the southwestern U.S. She has also been a beekeeper since 2007.

Glass Bottles & Jars, Part 2

Jim **Thompson**

Honey and compounds found in these types of jars tend to be very dark. This is a very common trait of honey darkening with time. To determine the date when the bottles were made you may find a date from the glass company that made the bottle, when the patent was granted, the style of the bottle lip, the date of the advertising literature, an indication of the date by the label on the bottle, or sometimes the level or layer in the ground where the bottle was found.

It is interesting to read about all of the claims that were made about the mixtures and one can see where the term "Snake Oil Salesman" may have come from.

Dr. Bell's – Pine Tar Honey, was sold as early as 1898 and was produced by the E. F. Sutherland Medicine Co., Paducah, KY. There were at least two different sizes of jars. People have tried to place a date when these bottles were made, as reports mention that several houses during the civil war that were used as hospitals had these jars. Another dating factor indicates that the bottles were made prior to 1906 as the Food and Drug Act was passed making the list of ingredients, the label law. This made a change in the way the manufacturers made their bottles. Dr. Bell's Pine Tar remedy was used to treat many ailments from colds and coughs to skin treatments.

Pine Tar is actually extracted from pine trees. In the South this is sometimes called a Fat Pine. The trees are usually located in a damp places and the tar is lemon colored and greasy. Once the tar is obtained it could be made into a cough syrup similar to Dr. Bell's by using a ratio of 1 part pine tar to six parts of honey. Pine tar could also be used in making a cough candy by using water, sugar, pine tar dissolved in alcohol, capsicum (hot pepper), and wintergreen.

Hale's Honey of Horehound and Tar – was made by C.N. Crittenton of New York. The bottle is embossed on three sides and uses a cork stopper. The bottle lip is the style that was used in the time period of 1880 to 1910. The bottle is 7" tall, 2" wide, and 1-1/8" thick. An advertisement in 1865 stated "Hale's Honey of Horehound and Tar, A certain cure for coughs, cold, influenza, hoarseness, difficult breathing, and all affections of the throat, bronchial tubes and lungs, leading to consumption. The Honey of Horehound soothes all irritation. The Tar of Balm of Gilead penetrates, cleanses and heals all parts of the throat and lungs. There is nothing like it. Fifty cents per bottle. For sale by all druggists. Charles Downer, General Agent, No. 44 Cedar – St., New – York. "An advertisement in the Weekly Hawkeye newspaper, January 4, 1883 further states what the ingredients are and do: "Honey of the plant horehound, in chemical union with Tar-Balm, extracted from the Life Principle of the forest tree Abies Balsamea, or Balm of Gilead." "Five additional ingredients keep the organs cool, moist, and in healthful union." An 1899 advertisement was similar but described physical symptoms.

Hale's Horehound & Tar

Kennedy's Laxative Honey and Tar – was made by E.C. Witt & Company, in Chicago. It is 7" tall and made of blue glass. It is approximated to have been made about 1900. It is rather interesting that the formulation for coughs and bronchial problems is now a cure for laxative problems.

Kennedy's Honey & Tar Laxative

Honey Tolu – This bottle required research as to what Tolu was and what it was used for. I found Tolu is a fragrant yellowish-brown balsam obtained from a South American tree. It is used in medicine, as a stomachic and expectorant or a common cough ingredient. My bottle is rather plain, but on other bottles there is an embossed skep in between the words Honey and Tolu. It was marketed to help coughs, colds, consumption and affections of the throat and lungs. It was manufactured by Gilbert Bros and Co., Baltimore. Because there is no listing of ingredients, the product was made prior to 1906. The bottle is 7-3/8" tall, 2-7/16" wide, and 1¼" thick. The bottle lip is consistent with those made in the 1880 – 1910 time period. The bottle mold marks are on the diagonal corners.

Honey Tolu.

Hinds – Honey and Almonds skin cream, making various creams for the face, hands, and skin in 1875. In 1907 Aurelius Stone Hinds sold his business sold to Lehn & Fink, maker of Lysol. However the A.S. Hinds honey almond cream was still marketed until 1948. A.S. Hinds did much of the early formulation and marketing work in Portland, Maine. Because the cream was such a success, production was shifted to a company in New Jersey. In fact there was a Hinds Honey & Almond Cream radio program on CBS starring George Burns and Gracie Allen from 1939 to 1940. It is difficult to date the bottles of the cream as the early bottles did not carry a date. There were several sizes of bottles. The smallest one that I have is 2½" tall and embossed on all four sides. The 5½" bottle and the 6-5/16" bottle has embossing on one panel and the bottom. Therefore the taller bottles were probably produced after 1906.

Hine's Honey & Almond Skin Cream

Honey Hop –hand blown bottle standing 5¼" tall. Clear square bottle and embossing on all sides. "Manufactured by Henning-Wennersten Co., Chicago, U.S.A.," "An Extract of Malt & Hops" and "Makes Gals of a delicious drink." The bottle lip indicates that the bottle was made in the 1880 to 1910 time period. It's hard to tell if they were talking about Root Beer or regular beer.

Foley – Honey & Tar – was available in several jar sizes and embossing. The smallest jar 3-7/8" was a trial sample jar and has the edges embossed with Foley & Co. and Chicago, USA. Another trial sized bottle is 4¼" tall and carries the same embossing but has the paper labels on both sides. The paper label states that Foley's Honey and Tar compound contains seven percent alcohol, so keep the bottle sealed with the cork when not in use. On the paper label on the other side indicates that M.L. Corel of Horseheads, NY sold this bottle. The regular sized bottle (5-3/8" tall) has flat sides and the same embossing on the edges. Whereas on another Foley's regular bottle there is no embossing on the edges but embossing on one side. That embossing is "Foley's Honey and Tar, Foley & Co., Chicago, U.S.A." Thereby indicating that this bottle is the earliest one as it didn't have the list of ingredients that were required in 1906. The bottle lip on all of the bottles that I have, are of the flat tooled variety so they were made in the 1880 to 1910 time period. However I have seen advertisements from different magazines that were in 1918 and 1941.

Jesse's Cough Medicine (paper label) – Pine Tar & honey cough medicine. This is estimated to have been made about 1920 as it has the "Kork-N-Seal" cap which is listed in the 1920 catalog. The bottle was made by the Illinois Glass Company. The Cough Syrup was prepared by Old City Drug Store, Prague, Oklahoma. The ingredients are: Mentholated Pine Tar, Honey, Cod Liver Extract, Eucalytus with Chloroform, and Alcohol.

Hobson Hive & Cough Syrup (paper label) – is used for coughs due to colds and minor bronchial irritations. This bottle was made August 1933. It is cork type bottle rather than a screw on cap and has a label on three sides. There is no embossing on the jar. The active ingredients are: Tartar Emetic, Senega, Tolu, Spruce Gum, honey, and 5% alcohol. It was made by Pfeiffer Chemical Company, NY and St. Louis.

K-IT, Cough syrup – white Pine tar & honey. This medicine is to provide relief from coughs and throat irritations. The mixture contains: white pine, wild cherry, spikenard root, balm Gilead Buds, Sassafras blood root, cudbear, Oil of sassafras, oil of tar, oil of orange, Guaiacol, honey, sugar, and Gum Arabic. It was prepared by Balch Products Company, N.S., Pittsburgh, PA. The estimated date of manufacture is 1935.

Beehive Beverages (soda pop) were made about 1948. The beverages were produced by the Beehive Red Rock Bottling Company, Brigham City, Utah. You would expect this beverage to come from the Bee Hive State! The ingredients were: Sugar, plain or carbonated water, True or artificial flavor and color, Citric Acid or other essential acids and oils. The bottle is labeled to hold 10 Fluid Ounces. The bottle is approximately 9-3/8" tall.

Watkins – Honey & Almond Lotion – is in a bottle that has a reverse machine made top crown, thus indicating that it was made in the time period from 1903 to the present time. The bottle is 8-3/8" tall, 3" wide, and 1-5/8" thick and embossed Watkins on one side. The paper label further states that there were 11 Fl. Oz. of lotion and it was made by Watkins Products, Inc., Winona, MN 55987. Because there are no ingredients listed this is an indication that the bottle was made before 1906, however there is a zip code listed indicating that is was made after July 1, 1963. This is probably a violation of the labeling law. We can assume that it is very similar to the Hines skin cream.

A. Davis Ashley – made a Honey Balsam for colds, all coughs, and croup. It was manufactured in Boston.

Jesse's Pine Tar Honey.

Hobson Hive & Cough Syrup.

K-IT Cough Syrup.

Beehive Beverages.

Watkin's Honey & Almond Lotion.

Bottles & Jars That Look Like Honey Containers

"Bee Hive" Ink Bottle – is estimated to have been made in the 1860s and has registration diamond embossed under the base. It is 2.8 inches in length and about 2.5 inches tall.

Root Mason Jar – was made in Terre Haute, Indiana by the Root Glass Company from 1906 to 1909. It was made in pints, quarts and ½ gallon jars. If the zinc cap on the jar is printed "Root," you can add $300 to the value of the jar as the lids were only made for three years. Ball bought the Root Glass Company.

Canadian Bee Hive Jar – was made in midgets, quarts, and half gallon jars, and in clear and aqua colors about 1910 and the current (2012) selling price is approximately $200 per jar for the quart size. It looks like a Mason jar that has an embossed skep, flying bees and the words BEE HIVE. The bottle dealers have told me that the midget jar sells for over $1000. If you can find one. I put this jar in this category as it is actually a fruit or canning jar and not classified as a honey container.

Octagon quart jar – was made by the Owens-Illinois Glass Company, Perrysburg, Ohio in 1954. This jar looks like a possible honey container even though it is not six sided or round like the regular honey jars.

"Bee Hive" jar – some people have their own idea of a bee hive looks like. In a certain position, the bottom of this container reflects giving the illusion that there is an entrance and this jar looks like a skep. It was made by the Jeannette Glass Company, Jeannette, Pennsylvania. The company was in business from 1889 to 1983.

Vase – was advertised as a honey jar as it has a honeycomb pattern on the top portion of the "jar." The problem comes when you look at the lid being made out of wire and having an open grid. Then you realize that the top is actually a flower frog for holding flowers in their arrangement and the "jar" is actually a vase. It is made by THT in 2003.

Left to right – Octago Quart, "Bee Hive" and Vase.

Fly trap is an ingenious idea. This again is an item that one would think it is just a glass bee hive. Then you notice that it has three pegs for feet and a wire harness for hanging. So it may be placed on a table or hung from a support. You put a small amount of sugar water into this jar or pieces of fruit. Insects may enter the trap through a one inch hole in the center bottom but cannot remember the exit and drown in the syrup. There was no manufacturers mark on this fly trap, so I cannot place a date. However I have seen some that were made in the 1900 time period and others that are rolling off the assembly line today. I have a feeling that this one is old, due to the beaded hangar.

Skep Diffuser bottle – is three inches tall and holds four ounces of diffuser oil. There are many fragrances that could be used. Select any of the aromatic fragrances or essential oils and pour into the glass bottle. Insert an all-natural reed that will act as a wick and the oils or fragrance will be released into the air. BC

Jim Thompson is a beekeeper, collector of all things related to bees and beekeeping, and a honey judge, living in Smithville, Ohio.

First Thoughts – Hobby To A Business

Roseanne **Purvis**

Have Realistic Goals, A Budget And Commitment

My goal here is to provide you with some objective viewpoints that may help you make decisions in your new business venture, or redefine your old one.

Defining Your Goals and Counting the Costs

Bee-related **hobbies** are on the rise. More than ever, people are being enlightened about the honey bee's impact on our environment, and they are looking for individual ways to help and have fun doing it!

As in any venture , it is wise to have some realistic goals and put yourself on a budget concerning how much time, energy and resources you should spend doing your hobby. Some hobbies are simply something that you expect to spend money on, with no return in dollars. However, if you would like your hobby to be "self-funded" then it is essential that you stick to a budget and count the costs. Run-away hobbies have a way of causing dysfunction in relationships and in the economy of mental, physical and spiritual energy. When hobbies have some budgetary parameters, they can be, and remain fun! After all, this is the objective, is it not?

Many **businesses** have started out as hobbies. Oftentimes a hobbyist will be so successful at their "fun" that they will be encouraged to turn their fun-venture into a business-venture.

In my travels in life, one of the things that I have found truly heartrending is seeing a Mom and Pop Business fail. It really grieves me to see someone's dream collapse and their finances crash and burn. I can somehow *feel* their pain. I always wonder: What happened? Did something tragic occur? Did the founders perform due diligence in research and count the costs? I am talking about **realistic** projections that are devoid of emotion. Buying and selling can be a very emotional affair, especially when our *dreams* are involved. When a person commits to starting a business , that person is, in a sense, *buying* that business. When you start from scratch with a new operation, you have to possess (or buy) some "scratch". In any enterprise there are some startup costs, production costs, maintenance costs and always some unexpected costs – even if this is only your ***time***.

We Started As A Hobby, But It Quickly Grew Beyond That

Purvis Bees, Inc. started a family business many years ago when our boys were young. It began as a hobby that our oldest son, and my husband tinkered with and experimented on. It quickly grew and the young boys are now all adults, and doing their own thing. Having been saturated by a hobby-turned-business that was no longer "fun", their desires in life are not much bee-related anymore. That is part of life, and we support all of their current individual efforts. When a hobby becomes a business, it can take the "fun" out of it, but it doesn't have to. The goal is to like what you are doing and make some money doing it or you may not be able to afford or desire to do it for the long haul. The key here is to have some *realistic budgetary parameters* for all of your resources, including *you*!

Projections and Keeping Count

I am not an accountant, but have had some formal education, training and experience in accounting and business administration. I am thankful for the things that I have learned, as it has certainly been helpful. I am one that believes that it is never too late to continue your education. I have attended five colleges and universities and I must say that my most memorable, or better said, "valuable" information was received (and retained) from a technical school. I love small tech schools and community colleges because they are so much more personal and hands on. If you are planning on starting a business and do not have any education in business administration or accounting, I highly recommend that you get at least some basic overviews. Community centers also offer seminars that are oftentimes well worth taking. Understanding principals of record keeping is essential for counting costs and making projections.

Our business started out be-

fore the age of accounting software programs and internet banking, so I have kept records both ways, manually and electronically. For those considering starting a business or expanding your "hobby," I strongly recommend that you get a QuickBooks Accounting Software Program or something similar. It is so much easier to keep up with your cash flow when you have it on the computer. Hidden costs are hard to hide this way! Again, if you have no experience in accounting or business administration, a basic accounting course at your local community college would be very, very helpful, as well as a good "How to/Dummies" book for your selected software program.

Counting the costs: Here is just a basic list of costs to consider that affect your bottom dollar (PROFIT!):

If You Don't Know Business Accounting, Go Back To School. Local Tech Schools Are GREAT!

Start up Costs: Basically what I am talking about is ALL of the things that you will need to obtain to start your business. Of course, they will vary according to your particular endeavor, but remember to include the non-tangibles such as deposits for utilities, web-related costs and fees, merchant account fees, etc.

Fixed Costs: Accountants love "fixed costs", because these are fairly easy to project and calculate. These costs are not dependent upon production or sales volume. For example, rent, insurance (property and vehicle), and a salary are easy to predict.

Variable Costs: These vary according to how much business you do. For example:

Utilities – If you are working out of your home, how much of that electric bill is actually being used on your business? Figure the same for gas, water, trash collection, phone bills, etc.

Gasoline expense – Production, transport and errand costs: when mileage records are kept, you can begin to figure how much money you are spending on gas. If nothing else, a monthly total on gasoline expenditures is invaluable. Having a designated vehicle(s) makes record keeping very simple in factoring how much your actual business-related fuel costs are. Don't forget the maintenance and repair factor as well (oil changes, tires, tags, etc.) One way to get a basic idea of what you are spending overall, per mile, is to take the federal business mileage reimbursement rate of 56.5 cents per mile, which takes into consideration: gas, oil /maintenance and depreciation.

Time – As stated earlier, I emphasize this point: What exactly do you think your time is worth? Based on your age, education, training and experience, could you be doing something else that would draw more income? **Your time** is one of the MOST overlooked costs in most start-up bee-related businesses.

Labor – hourly wages paid for "help", to include unemployment insurance, taxes, etc..

Maintenance – Equipment maintenance, vehicle maintenance, bee yards, hives, paint, replacement costs for lost hive tools, torn bee suits, etc. Lots of unexpected costs can sneak in here, so it is wise to budget in some monthly savings for things that may be unforeseen.

Cost of Goods Sold (COGS) – all costs for supplies should be factored in, to include shipping charges and taxes paid. Every facet of your supply list should be included. If you are doing honey production, you should consider everything that goes into, or onto the honey bottle. Sometimes people forget to consider the costs of the labels, lids, seals, boxes and tape.

Office Supplies – business machines, label makers, paper, printer ink, business cards, cleaning supplies, trash bags, toilet paper, etc. Think *hard* on these last two variable costs, COGS and Admin Supplies; things can easily be overlooked here.

Professional costs- bookkeeping and/or accounting help, legal assistance, etc.

Fees- how much does it cost to display your honey in a fair or trade show? Parking fees? (Remember to factor in your time and gasoline to and from the fair)

Advertising expense: Magazine ads, banners, business cards, web-related expenses, domain name fees, web-design and web-hosting fees (if you chose to have a website)

Dues and Subscriptions: Networking associations, information gathering materials.

Income and Various Taxes: no further explanation needed on this one!

Production Costs: How much does it cost to: Feed the bees, work the bees, pull and extract honey, bottle the honey, etc.?

Travel and Convenience Costs: Working long hours can make one rely on eating out more often, lodging etc.

Unexpected costs: As I stated earlier, there are a lot of things that can fall into the Murphy's Law category, but in an effort to stay in a positive light, just remember to factor these costs (savings for) on a monthly or yearly basis to arrive at accurate numbers.

Counting the Costs vs. the FEAR Factor

We all can be prone to fear-based thinking at times. When we, at Purvis Bees, Inc. decided to take a seemingly radical turn in our scope of business, I truly had to take fear out of the equation when objectively looking at our goals. Fear can have the potential to negatively affect all of your interpersonal relationships and business relationships, including how you see yourself! Because beekeeping, as a business, is so dependent upon things completely out of our control like weather, trees, and bugs, fear can creep its way into your life and corrode your

momentum if not kept in check.

I truly believe in the power of positive thinking. I have seen the fruit in my life of adopting a positive attitude, come what may. There is a law in God's infinite universe called the Law of Attraction. To me, this is a very sound and proven principle, as is the Law of Gravity. You will attract the things in your life that you think upon. Fear and negativity are toxic to the body, spirit and your environment (your business, hobby, etc.). Bottom line: Hang on to the positive thoughts and get rid of the negative ones!

Keep Thinking Positive

Finally, remain objective

If you are looking to enter into a new bee venture or to simply step back and re-evaluate your current situation, I urge you to look at it as *objectively* as you possibly can, **taking emotion out of the equation**. Remember that your life, or self-worth is not defined by your business or hobby.

In final words I will challenge you with this goal:

Look at your plan objectively, taking due diligence to count the costs. Formulate your strategy and then go forward and visualize it happening! Staying positive is a key to success in any venture or relationship. Reject those fearful and negative thoughts and turn that fear into success! If we can do it, YOU can do it! Thanks for reading! BC

Roseanne, along with her husband, Dann, ran Purvis Brothers Apiaries, and are now living in Colorado Springs, CO.

Got A Question?

Ask Phil

Phil **Craft**

He Knows!

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

A beekeeper in Kentucky writes:

Do small hive beetles fly, crawl or both? My hives are 15 inches off the ground on legs of 2" steel pipe with an oil moat 5" below the hive. (Phil's note: moats are cans of oil in which the legs of the stand are placed.) If they crawl, they have to pass through the oil moat. I have no ant problem.

Any information you can give me on this would be greatly appreciated.

Phil replies:

Small hive beetles (SHB) are a destructive pest of beehives which were first seen in the United States in the late 1980s and now, unfortunately, are fairly common. The adult beetles enter hives and lay eggs which produce larvae – sometimes in large numbers – especially in colonies weakened by mites, disease, swarming, etc. The larvae consume honey and pollen, damage the wax comb, and cause great destruction in the colony.

The quick answer to your question is that the adult forms of SHB – the actual beetles – fly, and their larvae – the destructive phase – crawl. SHB, like bees and many other insects, go through an adult-egg-larva-pupa-adult reproduction sequence. The larva to pupa stage of SHB (pupa being the cocoon phase) takes place outside the hive in the soil – normally within a couple of feet of the hive. Your barriers should, therefore, prevent the beetles in your hives from producing new adults, since they will make it difficult or impossible for the beetles to crawl to the soil to pupate. This should reduce the number of beetles in your hives. However, since the adults can fly into your hives, your barrier will not prevent infestation by SHB or problems related to them. Adult beetles are capable of flying long distances and, depending on the number and proximity of other honey bee colonies to your bee yard (be it hives of other beekeepers or feral colonies), your hives can still be infested and re-infested by beetles from these colonies. SHB are prevalent in most parts of Kentucky, as are beekeepers and feral hives, so you will still need to practice SHB management. That means maintaining strong colonies and, if you observe large numbers of beetles, possibly using SHB traps.

A beekeeper in Missouri writes:

I seem to keep having queen problems in my hives. The queens just seem to disappear. I've also have had hives with laying workers. So I have two questions, in general - what can I do to prevent queen problems and can I requeen a hive that has laying workers? I have tried before, but then the new queen disappears. I've heard you can shake the bees out in front of the hive and the laying workers cannot fly back? Will that work?

Phil replies:

Your question is a pertinent one. One of the talks I do from time to time is entitled: "Beekeeping's Greatest Challenges." *Varroa* mites are always number one on the list, but queen problems are right up there. I think there is general agreement that queen issues (queenless hives, rapid supersedure of introduced queens, queens that run out of stored sperm), and related problems such as laying workers, have greatly increased in recent years. I'll be honest; I used to blame it on a lack of quality control by those rearing and selling queens. Though that may be a factor in some cases, I've come to think that something else is going on. What, I really don't know. Perhaps it involves some of the same unidentified issues that are contributing to increased colony losses.

In answer to your first question about preventing

Multiple eggs in a cell means a laying worker.

queen problems – there are no failsafe strategies, but I can offer some suggestions. First of all, create an environment that is as healthy as possible for the colony. That means preventing and controlling disease and *Varroa* mites, as well as making sure that there are always adequate food stores in the hive. Honey bees, as social insects, seem to lose control when disease or starvation occurs, and queens as well as workers are susceptible to disease, which can lead to supersedure. Secondly, *keep an eye on the queens in your hives.* Queen loss becomes a much more serious issue when it is discovered weeks after it first occurs instead of soon after, when it is more easily dealt with. We may not be able to prevent the loss of a queen, but by inspecting our hives on a regular basis (at least every ten days to two weeks) we can detect the situation early and prevent even bigger problems, such as laying workers. Monitoring the queen does not mean that you have to see her every time you open the hive. If you are seeing eggs and brood in all stages – eggs, larvae and pupae (capped brood) – you can be confident that she is there. The presence of eggs alone, without larvae or capped brood, may be indicative of supersedure, whereas the absence of both eggs and larvae could mean queen loss detected at an early stage. The presence of only drone brood, without any worker brood, should raise an alarm. It most likely indicates either laying workers or a drone laying queen (a queen who has run out of sperm and produces only drones from unfertilized eggs.) An indicator which helps distinguish between the two is the presence of multiple eggs in cells. Hives long queenless usually contain several laying workers, each of which may deposit an egg in the same cell, whereas a no longer fertile queen will lay in a normal pattern, one egg per cell.

I caution beekeepers, especially at this time of year, to pay close attention to hives that have swarmed. Because the old queen leaves with the swarm, the remaining bees MUST produce a replacement. Sometimes, the process breaks down. The virgin queen may be prevented by bad weather from making mating flights during her window of fertility; or she may be injured or killed on one of the flights. Whatever the reason, the result is a queenless hive. I know this happens, not only from observations in my own hives, but also from calls and emails from beekeepers who have discovered a queenless hive or a hive with laying workers. The frequency of these frantic appeals for help always increases late in the swarm season.

That brings me to your second question: how to re-queen a hive with laying workers. Workers are capable of laying eggs, but because they are not physically able to mate, any eggs they lay will be unfertilized. Unfertilized eggs, having only a single set of chromosomes, produce drones – never workers or queens. In a normal, healthy hive, the workers' urge to lay eggs is suppressed by the presence of queen pheromones. Only after a hive has been queenless for a several weeks will workers begin laying. I refer to such hives as hopelessly queenless – queenless long past the time when the bees might have reared a new queen, and queenless for so long that all of the brood from the last eggs laid by the old queen have emerged. (In addition to queen pheromones, substances produced by brood also play a role in suppression of egg laying by workers, hence laying workers do not develop until after the emergence of all the brood in a queenless hive.)

Once a hive has laying workers, it is extremely difficult to re-queen - possibly because of the disruption to its normal social order, or because of the aggressiveness that is characteristic of queenless hives. Many years ago, a more experienced beekeeper told me that the

only way to deal with such a hive is to combine it with another containing a healthy, fertile queen. A full sheet of newspaper placed between the hive bodies will delay the mingling of the bees from the two colonies, but allows pheromones from the queen to permeate both hives. By the time the bees eat through the newspaper, they are one big, happy colony. I use an adaptation of this method. Whenever I re-queen existing colonies, I begin by introducing the new queen into a few frames of bees in a "nuc". Once she has been accepted, I combine the nuc, using newspaper, with the hive to be re-queened (after first removing the old queen, if she is still present, from the hive to be re-queened). I find this works with laying worker hives as well.

The idea you refer to, of shaking bees out in front of the hive in order to induce a colony with laying workers to accept a new queen, has become part of the lore of beekeeping – often repeated, but ineffective. I call it an old beekeepers' tale.

A beekeeper in Ohio writes:

Is nosema a microscopic parasite or a spore? If it is a spore will sunlight solve my concern for harboring the disease in stored comb? I am very grateful for this resource you provide.

Phil replies:

Nosema is a fungus, more specifically a microsporidian, which is a parasitic type of fungus. If you read old articles about nosema you may see it described as a protozoan, but it has now been reclassified as a fungus. It is a spore forming organism. Think of the spores as seeds, which are released by the parasite in its growth stage. See this link (**http://www.extension.org/pages/27064/nosema-ceranae-the-inside-story**) to an article by Dr. Tom Webster, who is the extension beekeeping specialist here in Kentucky, and a nosema authority. How widespread nosema infection is in the hives of beekeepers is unknown; we need more sampling and survey data. Even the degree to which it is lethal (nosema *ceranae*), is questioned by some, but we know it can be deadly. In Spain it is said to be the cause of widespread colony loss. As a result, either testing of colonies or preventative treatment for nosema is recommended. Many state apiculture extension programs will test samples submitted by beekeepers for nosema, as will the USDA bee lab in Beltsville, Maryland **http://www.ars.usda.gov/Services/docs.htm?docid=7473**. Recycled comb from dead hives can be a source of nosema spores, but fortunately they are much easier to kill than other disease spores, such as American Foulbrood (AFB). Extremely high heat (as in fire), or very caustic chemicals are required to destroy AFB spores, which is why burning of AFB infected hives is normally recommended. Dr. Webster tells me that one hour in sunlight will kill nosema spores in comb (in the wax, but not in stored honey or pollen). Diluted bleach is also effective, 1 part bleach to 10 parts water, applied to the comb for five minutes. Rinse the comb well afterwards. BC

Sterilizing brood comb in the sun.

Phil Craft served as the Kentucky Department of Agriculture's State Apiarist from 1999 to 2011. He is a graduate of Oberlin College in Ohio and the University of Kentucky. A native of the mountains of Eastern Kentucky, he now lives out in the sticks in the Bluegrass Region of Kentucky near Lexington with his family, a very old dog and some beehives.

REFLECTIONS ON THE PAST SIX YEARS

Ross **Conrad**

The Changes Are Difficult To Comprehend

As I sat down to write this article I began thinking about all the changes that have occurred in beekeeping in recent years. In reflecting back, it's hard to believe that it has been only six years this month since *Natural Beekeeping: Organic Approaches to Modern Apiculture* was first published, and I wrote my very first article for *Bee Culture* just a few months after that. Since then, it is astonishing how much has changed in the world of beekeeping.

Colony collapse disorder (CCD) seems to be the driving force behind most of the changes that have occurred. It has become a household word and has thrust beekeepers and the beekeeping industry into the national consciousness. The challenge of CCD has spurred research into all manner of honey bee biology, bee behavior, and beekeeping management. Remarkable strides have been made in our understanding of honey bees and their behavior in the areas of swarming, disease and pest resistance, and the beneficial bacteria, yeast, and fungi that coexist within honey bee colonies. The colony-wide impacts of all kinds of agricultural chemicals, electromagnetic radiation, and viruses and diseases have been aggressively pursued. Beekeeping organizations and agriculture commodity groups such as the Almond Growers Association have contributed financially to support on-going research. Leading honey bee researchers have observed that the threat of CCD has even prompted university, private sector, and government researchers to work together much more collaboratively than ever before. Such collaborative efforts have even transcended national boundaries as researchers from various nations around the globe are coordinating their activities and even working with each other.

Numerous new pest and disease treatments have resulted from the increase in research. These include new treatments for American foulbrood (Tylan), new trap designs for small hive beetles, and a host of varroa mite controls from formic acid pads that were available for a short period of time before being replaced with the Mite Away Quick Strip (MAQS), to the essential oil treatment ApiGuard, the organic acid treatment HopGuard, and the new chemical treatment ApiVar. Many beekeepers have turned to emulsified essential oil products (Pro Health from Mann Lake Ltd., and Honey-B-Healthy) to keep bees alive in the face of Nosema and the symptoms of CCD. (an update on this to come in the near future) Our increased understanding of the importance of honey bee nutrition in colony health has led to newly formulated feeding regimens.

Bees that exhibit some level of mite resistant genetics have been further refined and made available to U.S. beekeepers through groups such as the Russian Bee Breeder's Association. The manipulation of gene activity within the bee is being explored for its potential to control hive diseases by Monsanto, one of the largest Agricultural/Chemical corporations in the world.

There has been a huge renewal of interest in beekeeping among the general population, with many former beekeepers coming back into the fold, and large numbers of new beekeepers picking up a hive tool for the first time. Many of these new beekeepers are women and a large number of parents have made beekeeping a family activ-

In recent years, more beekeepers than ever before have starting to experiment with all kinds of hive styles and designs, both new and old.

HopGuard strips for Varroa mites are just one of the latest treatments that have been developed for pests in recent years."

ity, involving their children in beekeeping activities.

The general renewal of interest in local food and small-scale agriculture has benefited beekeepers as beekeeping is increasingly recognized for its important role in providing essential pollination services. Beekeeping associations, classes, and workshops are flourishing with the influx of new energy and ideas. Quite a few new beekeeping clubs and associations have sprung up all around the country since 2007, especially in cities, and well established beekeeping associations such as the Vermont Beekeepers Association have seen membership more than double in the past six years. Apiaries are popping up on college and university campuses across the country. City dwellers are getting involved in beekeeping in record numbers. Interest in alternative hive styles and designs (e.g. Top Bar, Warre, home made) and alternative hive management techniques (e.g. natural, organic, treatment free) is at an all-time high. Some veteran beekeepers who teach classes have noted that unlike the new beekeepers of 10-20 years ago who expected beekeeping instructors to simply teach them how to keep their bees, today's newbees are coming to the craft with pre-formed ideas of how they want to keep their bees. They are expecting that today's bee courses, teachers, and mentors can show them how to keep bees the way they have decided to keep their bees, and how to use the type of hive they have already chosen.

In the past half dozen years both the U.S. and world have experienced the greatest economic down turn in almost a century and yet beekeeping related businesses continue to do well. Beekeeping supply companies responding to a large increase in the number of backyard beekeepers and have bulked up their inventories and are offering more equipment and supply options than ever to serve this market. Some beekeeping suppliers have expanded by opening new locations. New beekeeping equipment and supply companies have sprung up. In fact, bees and beekeeping equipment is in such high demand that many suppliers struggle to keep inventories from running out. Even non-beekeeping industries that are otherwise related, such as those that make and sell beeswax candles have seen a significant growth in sales, and it seems honey can be found on the label of more food products than ever before – even on products (e.g. some brands of honey mustard) that do not even include honey as an ingredient! Now before you get the idea that beekeeping is a recession-proof business, there have been some setbacks. New England Farms for instance, located in Granville, New York, near the Vermont border went out of business a few years ago. However, for the most part, bees and beekeeping is a thriving industry.

One aspect of the beekeeping industry, keeping bees alive and healthy in the face of CCD, has been very difficult for many, and the large migratory beekeepers have been hit the hardest with colony losses. Despite our ability to clearly identify and confront this phenomenon, the situation appears to have stabilized somewhat at a level of yearly losses that is hoped will not increase over the 40 percent threshold. Meanwhile, pollination fees and honey prices have reached record levels and demand for both remains strong which is putting further upward pressure on prices. Numerous beekeeping books have been published in the last six years and the circulation of beekeeping periodicals has grown. *Bee Culture* magazine is now available on hundreds of newsstands throughout the U.S. and Canada.

The marketplace has adjusted to the public's increased awareness of the plight of the honey bee and the resurgence of the beekeeping industry. Most pest control companies will no longer kill swarms of bees and instead encourage the public to contact a local beekeeper to remove the unwanted guests. This in turn has encouraged enterprising individuals around the country to start bee removal businesses, or add bee relocation services to their service options.

The breadth and scope of the changes that have occurred in the world of beekeeping in the past six years, is so vast it is hard to believe at times. The big question is, are these changes setting the stage for continued industry growth and evolution? Given the challenges of climate change, economic unpredictability, and growing pesticide issues the challenge many beekeepers have to confront today is to simply be able to stick around long-enough to find out. BC

Ross Conrad is author of the newly released Natural Beekeeping: Revised and Expanded 2nd Edition, that delves into many of the changes in the industry that are mentioned in this article.
www.dancingbeegardens.com

BIGGER PICTURE

Jessica **Lawrence**

Fresh, Favorite Fragaria

I'm sure most of ya'll have a favorite fruit. My guess is that at least half of you would "pick" strawberries as your number one. Strawberries are pretty, delicious and available at virtually any time of year . . . but what do we really know about strawberries? Let's take a closer look at one of the favorite bee-pollinated fruits.

Two tasty strawberries from California.

Botany

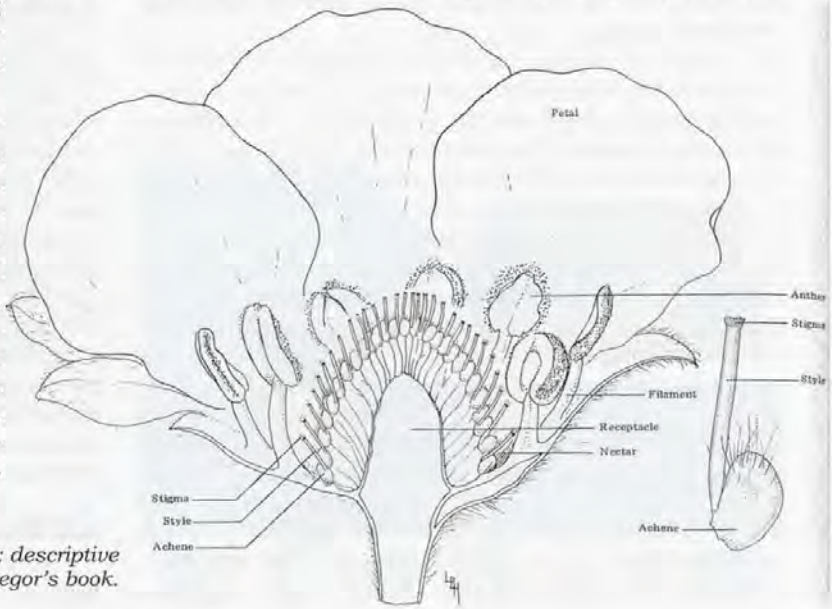
Strawberries as you know them are scientifically a cultivar of *Fragaria x ananassa*. Strawberries are descended from the rose family, Rosaceae. This makes them a sort of "plant cousin" to other similar fruits such as apples, raspberries, pears, peaches, apricots and cherries. The characteristics of this family include a symmetrical, showy flower with five petals and five sepals and a spiral of multiple stamens. The flowers are perfect and complete, meaning that they have all the "normal" parts of the flower and that they have the male (stamen) and female (pistil) parts.

At the bottom of the flower, the petals and sepals and stamen fuse together to create a cup called the hypanthium. As the strawberry grows into the fruit as you know it, most of the "meat" is actually from the hypanthium. The strawberry itself is actually a receptacle, so the fruit is an aggregate of achenes. What does this mean? Well, the actual fruit produced by a strawberry is called an achene. There is one for each egg in the carpel (the lady parts of the pistil). It is a sort of little dry fruit that has the seed inside. What you see on a strawberry as the seeds are actually all of the fruits of the plant. The actual berry is just the receptacle, or holding bin, for all the fruit. Basically, the plant wanted something eye-catching so that birds would carry off their fruits and spread them around, because those achenes are not really appetizing.

When the wind (or a bee) pollinates a strawberry flower, it has to pass along enough pollen for each of those achenes to grow. If they don't all get pollinated, then the fruit will grow abnormally, because the receptacle doesn't need to have a stage presence on the side that has unfertilized eggs. This is a key reason that berry growers, especially u-pick farms, like to have bees available for fruit set even if they are not as attracted to the plants as everyone would like. It takes up to six to eight hives per acre so that the area is over-saturated with honey bees for strawberry pollination. Bees will also help produce a larger fruit from their presence. If a berry is not attractive, most people are not going to pick it. We are a vain culture, so we don't even want ugly fruit! Also, if I'm making jam, it's an extra cut that I have to make to get the seeds out of a spot with no flesh for the pot.

Horticulture

There are multiple varieties of strawberries, which differ primarily in fruiting time. You can choose between everbearing, June bearing (or short-day) and day-neutral. Short day varieties produce a large crop over a few weeks in the normal blooming time (like Spring for North



Strawberry Anatomy: descriptive diagram from S.E. McGregor's book.

A bee visiting a strawberry flower in Florida.

Carolina, Winter for Florida), and these are the big-berried crops. Everbearing varieties produce a crop (more or less) in the Spring, Summer and Fall, maybe two to three harvests a year. Day Neutral varieties are not dependent on the length of day and will bear fruit through the entire season. Regardless of fruiting period, strawberries are cool weather loving plants. Therefore, everbearing and day neutral will perform best in areas with mild Summers and may either stop fruiting or produce small, less marketable berries if the weather gets hot. Some varieties are also meant for a specific region, like Oregon or California. Oregon, for example, has varieties like Totem, Hood and Tillamook which are suited for the Pacific Northwest area. When choosing a variety, some of the factors to consider include picking ease, redness consistency throughout the fruit, ease of processing, yield, disease resistance and fresh appeal.

The most common way to grow strawberries commercially is called *plasticulture*, where raised beds are formed and covered in plastic mulch. There are a lot of benefits to this type of growing. You can install drip irrigation under the plastic so the root moisture can be easily maintained without wetting the foliage and causing a disease, and keeps good air flow around the plants. The raised beds give more topsoil to the roots, but the plastic stops the majority of weed problems. Aside from plant benefits, I like that they raise the plants off the ground so I can reach them easier when I pick.

Beds will be about 30 inches across, and most growers will use four to eight foot spacing from row center to row center. The middle of the bed row needs to be slightly higher than the rest of the bed so water doesn't collect on the surface. The height of the bed (in general) depends on the climate of the area. In a colder climate, the beds are usually lower to keep the berries from overexposure. The beds are formed by using a press, and the drip tape for irrigation is put down at the same time as the plastic. The plastic cover not only keeps the local wildlife from digging at the plants, but it stops weeds and helps keep the soil a little warmer in the early growing season.

Now that the plastic is down, the beds are fumigated for nematodes and other diseases. Commonly used fumigants include Chloropicrin and Methyl Bromide. Fumigation may not be necessary if the field wasn't used for strawberries the year before. Crop rotation is important in every setting so that you're not settling diseases and pests in an area. Nematodes and root rot are both problems that can be reduced with crop rotation. In particular, strawberries shouldn't be rotated with nightshades like tomatoes or potatoes because they will be affected by similar issues.

Strawberries are a labor-intensive job because a lot of the work is done by hand rather than machinery. Most operations use either bare root or plugs, both of which are greenhouse transplants and require some hand labor. Most bare root plantings are by hand. If a bare root plant is improperly "installed" with the crown under the soil, likely the plant will rot and die. Plugs are easier because a planter can be used that also cuts holes in the plastic at the correct spacing, but they have to have the blooms hand-removed prior to planting, and the temperature requirements are a little stricter than bare root (three to four weeks before the last frost date as compared to six to eight weeks before the last frost date). Plugs also cost up to four times more than bare root.

Finances

In most cases, a grower with strawberries has more than one poker in the fire. That's because it's not cheap to run the berries, and it would be a lot of investment to buy the machinery needed for berries and not use it for anything else. Something like a tractor, for example, is necessary for field preparation, but is a heady investment for a small crop. For the purposes of understanding the economics of strawberry production, I am assuming that the grower already has the major equipment purchased. My numbers are all coming from an everbearing strawberry guide produced by the University of Maryland Extension agents, but I'm rounding the numbers for ease of math purposes.

For the initial set-up in the field, we're going to estimate around $250 per acre. This includes plowing, tilling, making the beds, chemical applications (fertilizer and pesticides) and planting. For fertilizer and pesticides throughout the growing season, we can estimate around $750 per acre, assuming we're applying around 200 pounds per acre of fertilizer. For materials, if we buy 15,000 plants for an acre, plus plastic costs, straw mulch, etc., we'll have around $7500 invested in "disposables" that will be used for the year. Labor costs are going to run around $4500 per acre. What we have in total is around $13,000 ($16,000 in NC) in expenses for running the operation. If we charge $3.00 per pound for our strawberries, we can expect a yield of $31,000 from the acre, showing a profit of around $18,000. This gives a return of around $1.20 per plant or $1.70 per pound.

U.S. Geography:

When I think of strawberry production, my mind immediately goes to Florida, California and Oregon. These

are the places that I have visited a commercial operation, as opposed to my home state of North Carolina, where I go to the local farmer's U-pick on a half-acre plot. I did a little bit of research and found that according to the USDA Ag price summary, California actually makes less than us at $75 per cwt, while North Carolina is averaging around $100 per cwt. This is compared to Florida at $140, New York at $165, Oregon, Ohio and Washington at $170 and Pennsylvania at over $200 per 100 pounds. Also in this summary, it only represented California and Florida as major market stakeholders in the strawberry economy. An article by Dr. Barclay Poling at NC State University did mention that there very few wholesale fields in North Carolina, as the majority of berry production was family owned and operated as stands, farmers' markets and u-picks, which are considered commercial.

Nutrition

If you look at strawberries as a cup serving (236 grams), this is the nutritional breakdown:

Nutrient:	1c Strawberries	Recommended:	% DV:
Water	132 g	-	-
Carbohydrate	10 g	300 g	3%
Protein	0.88 g	50 g	1.7%
Calcium	20 mg	1000 mg	2%
Iron	0.55 mg	18 mg	3%
Potassium	240 mg	3500 mg	6.8%
Vitamin C	82 mg	60 mg	137%

Water is 56% of the overall weight of a cup of strawberries! Nutritionally, strawberries are pretty good for a person, with over 100% vitamin C, nearly 7% of the daily value of potassium, and a few other good things in there. In reality, this is actually two servings of strawberries, but you and I both know a cup of strawberries is easy to put away in just a few minutes. It's virtually a handful of berries . . . a good thing there's not more carbohydrates for those of us that eat strawberries fist-to-mouth!

Conclusion:

Strawberries are an important agricultural commodity in the US that can be assisted by honey bees for bigger, better fruit. They are nutritious and delicious, inspiring cookbooks dedicated solely to the production of strawberry-centric foods. I hope everyone comes away from this learning a little something about the life of a strawberry in the U.S. BC

One of the signs posted to keep people out of newly fumigated beds.

Jessica Lawrence is a Research Entomologist for Eurofins Scientific, an avid gardener, beekeeper and tattoo collector.

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EXPOSED NEST REMOVAL

The players and the nest.

Ian **Farber,** Frank **Blom,** Nancy **Burkholder,** Betty **Farber,** and Pam **Blom**

This unique exposed comb hive is urban beekeeping at its finest. The first 'swarm call' came in early October during a warm Fall, four to five months after the usual swarm season. The homeowner had been mowing his front lawn and saw some broken comb on the ground and he looked up into the tree. His wife called a local beekeeper and said, "I know honey bees and these are honey bees. Can you please move them for me?"

As a member of a group of experienced swarm removal beekeepers I was very skeptical that this could be a honey bee colony. I had the lady describe the hive, asking specifically if it was round and grey with a hole in the bottom.

"No, they are honey bees and they are all over the nest. I don't want them killed, just removed." She was adamant that they weren't wasps.

Removing branches.

Exposed nest.

Up close.

Ready to cut.

Lower away.

Settle in to move.

The location was the front yard, close to the road and across the street from a well used walking, jogging, and cycling path. On further inspection the swarm removal group saw that this was an exposed comb honey bee colony as big as a large garbage can. The hive was well hidden within the tree's foliage and it was covered with honey bees. We had never seen such a hive before. Our swarm catching experiences had been with bees living in a cavity in a tree not on the outside of the tree.

The beekeepers doing the removal estimated the hive started as a swarm in May or perhaps June. As it was October we knew that very soon the colder Fall temperatures would cause the leaves to fall and further expose the hive to the elements. And black bears are known to regularly visit this residential neighborhood looking for fallen apples and tree fruits. In any event, the unsheltered hive would certainly succumb to cold and moisture during the Winter months when temperatures commonly drop well below freezing for weeks at a time.

Located in Kamloops, BC, Canada at the 50th parallel, this hive was one of a kind. Kamloops is known for its hot and dry Summers and cold Winters. While bee trees are fewer in number since *Varroa* arrived there are a few bee trees reported each year. Had this hive been located in a conventional bee hive it would have been deemed illegal under current city by-laws. However, like many illegal beehives in Kamloops there had been no report to By-Law Enforcement. Clearly the hive needed to be saved.

A wooden crate was constructed and covered with fabric for the journey from the bee tree. The assembled beekeepers backed a pickup truck under the hive and cleared off the covering foliage. This created a new flight pattern and many bees were 'lost' and had to reorient themselves. This new issue of flying bees necessitated waiting until dusk when the cooler evening temperatures would settle the bees so we could start the removal process. Our goal was to remove the hive intact with as many bees as possible.

Meanwhile, it seemed as if every neighbor, their children and some

New digs, and . . .

. . . Home!

pets had assembled to watch the unfolding spectacle. This was the beekeepers' first experience with an exposed comb hive so it was a rare and unique opportunity. We spent a lot of time explaining what was happening to the neighbors. For the unsuspecting crowd that gathered it may have seemed to be a regular beekeeping event. Later, an Internet search revealed how rare this hive was, especially so far north.

Removal was complicated. The hive was 2-2.5 feet in diameter and three feet in height and it was totally intertwined in branches and tree shoots. Hive weight was estimated to be about 70-90 pounds. Using an electric saw, the branches were cut one by one and the hive was then lowered into the crate and tied in place. After most of the bees had settled, fabric was stapled over the top and the truck moved the crated hive to a nearby established and electric fenced beeyard.

At the beeyard, the top fabric was removed and plywood with a hole cut in the centre was added as an inner cover. A full sized super was placed over the hole and within three days the queen had moved up into the drawn comb super and had begun to lay eggs. Feeding of sugar syrup was started and a shallow super of honey was later added for extra Winter food stores. Later, the fabric wall was covered with black building paper as more insulation for the Winter.

These were the gentlest bees one could hope for. No beekeeper or neighbor was stung. The beekeepers were happy, the bees seemed happy and the neighbors who owned the tree and those who called in the beekeepers all got a jar of local honey and they were elated. BC

*Ian Farber, Master Beekeeper (**ian_farber@telus.net**)*

Ian Farber, Frank Blom, Nancy Burkholder, Betty Farber, and Pam Blom are the beekeepers that participated in this unique and fun filled bee removal in Kamloops, BC, Canada. Photos by Nancy Burkholder and Pam Blom.

A Beeline For Sourwood

Ken **Burrows**

Every year in late June, Pat Calhoun gives his bees a break from the Summer heat of the North Carolina Piedmont and takes them for a spell to the cooler mountain air near Franklin, NC. Last year, he let me, a rookie beekeeper, tag along. We started loading his hives about midnight on what turned out to be the last cool night of June, before a torrid heat wave gave us overnight highs in the 80s. The week before, Pat had 'robbed' a super of honey from each hive to lessen their weight. Typically, he moves the hives alone, so he goes with one deep and a super. Not too many bees were out after curfew, but some seemed concerned and curious, so we wafted a little smoke at them before lifting the first hive as gently as we could and slid it on the truck bed. Entrances weren't sealed. 'We'll be there before they know it,' said Pat. Even so, a suspicious worker gave me a sharp reminder that I hadn't tucked my pants into my socks, stinging the tender part of my calf. Veiled, gloved, holding a flashlight in one hand and clutching the underedge of a hive in the other, I couldn't do much about it. Pat was in a suit and so far unstung, but, before we hoisted the next hive, we both picked lengths of baling twine from my mixed bag of smoker fuel and tied our cuffs, sealing off access from below. Working hard and silently in the dark, we soon had 10 hives carefully and gently stacked in two tiers and roped down tight on the truck bed. The bees seemed for the most part unexcited. By one o'clock in the morning we had removed veils, stashed our smokers, toothbrushes, and the breakfast Sylvia, Pat's wife, had packed for us, into the cab, and were headed on the four-hour trip to the mountains.

Pat's been taking the bees to the mountains since he used to help his dad produce honey from their 115 hives down in Laurinburg, NC. Back in the early seventies, the mountains were their escape from the lethal insecticides used on the cotton where the Laurinburg honey bees foraged. Soon, the pale, clear honey from the sourwood trees along the Little Tennessee River in Macon County, western North Carolina, became the Calhoun specialty, complementing the crop of rich, dark, local honey. Pat'll tell you that he was a reluctant apprentice to his father, Lauder E. Calhoun, who wrote a charming and useful little book, *A Lifetime with Bees* (Laurinburg, NC, 1979). Mr. Calhoun Sr. dedicated his book to Pat, to "help him with his beekeeping," and Pat's tribute back is his score or so of fine colonies, some in hives he and his dad made in Laurinburg, as well as that annual trek to the mountains when the sourwoods begin to bloom. Pat's permanent home, on a few acres where he keeps his bees along a creek sheltered by walnuts, poplars, and cottonwoods, is Charlotte, North Carolina. Sylvia, named for trees, is daughter of a veteran of the U.S. Forest Service who raised a family in the Asheville area. So the beeline extends from Laurinburg in the south-eastern Sandhills to Cowee Mountain near the Georgia/Tennessee border.

Four hours from Charlotte, we exchange wide highways for narrow, twisting lanes and then gravel and dirt trails. 'Here we are,' says Pat, and I have no idea where we

are. The headlights pick out from the blackness only deep grass and brush where the dirt road ends. Pat plunges confidently forward, jolting through the meadow over ruts and boulders on a trail he remembers but cannot see. A gate opens into a black wall of trees, and we jog down toward the river, brambles and bugs and twigs grazing my arm and face through the open window. Pat rattles on affectionately about his chums and kinfolk who occupy the mountain community, their genuineness, their sense of humor, and their values. He occasionally flicks on a light at the rear to see that his cargo is still safe. I feel like a fugitive from the law as we work deeper and deeper down into the woods. And then we are through, and the lights pick out a line of bee stands, old angle iron across concrete blocks, where the bees will be billeted. We stop and, as the whine from the truck bed rises above the idle of the engine, quietly pull on gloves and veils and light our smokers. All in all, the bees seem not to have minded the ride. Pat knows where each hive will go, and in the glimmer of a flashlight balanced on the cab of the truck, together we transfer the bees to their Summer home. As night gives way to dawn, like urgent vampires we head back through dark woods, on up the tree-shadowed mountain trail to the old family place on Huckleberry Creek, high on Cowee Mountain.

The sky above the towering silhouette of trees is turning gray. We plan on just a couple of hours of sleep before returning to make sure the bees are settling in, then heading back to Charlotte. But exertion, mountain air, and a peacefulness broken only by the splash and whirr of the creek and some early birdsong knock us out till about 10. Breakfast is a wad of Sylvia's home-baked bread dunked in a puddle of Pat's honey, while he talks lovingly of this place 'on Huckleberry'. And of the old cabin below the house built of massive logs from the chestnut trees killed during the blight of the 30s. And of the quiet, close, industrious Cowee community, where the place and the land are precious, and incomes are supplemented by a few cows, chickens, truck from gardens, firewood, Christmas trees, and some of the finest honey anywhere. And of the friendly competition about the quality of honey on the mountain side of the family compared with that on the Laurinburg side.

Later, headed back to the river we easily follow last night's tracks through the meadow. The pine woods' dappled light and shadow are a cool relief from the early afternoon heat. We pull up along the line of hives and marvel for a moment at how quickly the bees have adopted their new place, as if they had always been there. Pat shows me the drooping, creamy filaments of the early sourwoods, and we watch for a moment the soaring, circling, dipping, and gliding of the field bees off to forage, like the chaos and thrill of airplanes in a dogfight. We make sure the top covers are well weighted, and that there's nothing untoward at the front door of each hive. Soon we are back among the interstate traffic heading for the clamor and change of the city.

On the banks above the Little Tennessee, Pat's daddy's bees work tirelessly, brood upon brood, ever new ever the same, like ripples on a stream. New life, promise, memories, and sweetness. BC

LOOKING OUTSIDE THE BOX

What Are We Missing?

Ann **Harman**

Varroa mites arrived in 1987 but even after 26 years it seems to be still ranked as Number One on the list of bee problems. Therefore much research is concentrated on that pest. During those 26 years it became apparent that *Varroa* hosted and seemed to transmit viruses detrimental to honey bee health. So virus research entered top ranking in health studies in honey bees. CCD is a relative newcomer in bee problems and helped boost research on the new pesticides.

What is being overlooked, put on the shelf, ignored today in honey bee research? Are there any topics being investigated now that do not particularly fit in the world of *Varroa*, viruses and pesticides? (Can we call these VVP?) What topics do bee scientists view as being important and worthwhile but put on the shelf? What about beekeepers? Can they think of some overlooked topics?

Natural Beekeeping
Queens
Drones
Drone Congregation Area
Pollen
Pollination and Nectar Production
Good-Old-Fashioned Diseases
Malphigian Tubules
Varroa
Africanized Bees
Bee Plants
Small Hive Beetles
Nosema ceranae
Adulterated Honey
Swarming
Climate Change
Colony Death
Moving Bees

Most beekeepers are aware of the bee research laboratories of USDA (Beltsville, MD; Tucson, AZ; Baton Rouge, LA; and Logan, UT) but research on bees is also being done at many universities around the entire United States, as well as around the world. Of course CCD has been important in many of those places, as well as investigations into *Varroa* and the resultant numerous viruses. These do directly affect the health of our honey bees, and are worrying.

Beekeepers are still concerned about CCD. ("My bees died of CCD." Well, perhaps not.) In addition, beekeepers are still concerned about varroa and the viruses they carry. (No. Antibiotics do not cure viruses.) Nosema? Well, Fumagilin-B® is still available. Maybe it will help. Or not.

Beekeepers still ask for the Silver Bullet. *Varroa* vs. bees at high noon at the OK Corral. Or perhaps a gentler approach with a Golden Wand to wave over an ailing colony of bees.

The Proceedings of the American Bee Research Conference (ABRC) for 2013 was published in the *American Bee Journal* and *Bee Culture*. Thirty-one abstracts were printed. Only about seven could be considered to be on non-VVP topics, but even then one or more of the three "hot topics" was part of the research. Two of the papers were given half-credit each for research on other than VVP. One investigated the midgut bacteria, a worthwhile topic but it was done in Thailand with *Apis dorsata*. The other paper given half-credit in the count was on receiving and interpreting audible clues to colony stress – from VVP but the monitor did indicate queenless conditions and Africanized bees. One paper gave the results of pollination rentals and prices in the Pacific Northwest.

A brief overview of the other investigations showed an interesting assortment of very worthwhile projects. Pollen, its quality and effects, was the topic of research both in Italy and in Arizona. Chinese researchers investigated the attractiveness of different sucrose concentrations on both *A. cerana* and *A. mellifera*. In Pennsylvania studies were done on the social interactions of workers and drones with queens. Researchers in Alabama studied keeping hive temperature regulated with a temperature-sensitive paint.

The National Honey Board funds honey bee research. In February 2013 the listing of projects was published. Four topics, out of nine funded, were for ones other than VVP. Two of these focus on queens: one on the gut microbes affecting queen quality and another on nutritional and hormonal treatments for queens. Another study is investigating stimulating propolis collection as a health benefit. A broad topic, a decision support system for colony management, is being done at Pennsylvania State University.

A number of bee scientists and a number of beekeepers were asked – what is being overlooked, put on the shelf, or ignored today in honey bee research. Their answers are given here. It is interesting that quite a few of the same topics were mentioned by a large number of both groups asked. So it would seem that the problems

considered overlooked do need exploring. However it would be difficult to say that any one particular subject is considered more important than others.

At present there is great interest in *natural beekeeping*. This topic poses interesting questions: what is "natural?" What is interference with nature? There exist no hard dictionary definitions of these terms so they are perhaps items for thought. Bee biology and resultant bee behavior are the basis of management of colonies.

Queens, of course, brought quite a number of ideas. She does get blamed for many colony problems. The fact that queens "just disappear regularly" is a puzzle. Beekeepers and researchers alike find that supersedure seems to be overly common today. Many who responded are worried about queen longevity, why queens are failing. Even if the queen lives why her performance is poor is a question that needs answering. Queen losses influence honey production, colony size for pollination and interfere with colony research projects. It's no wonder that scientists and beekeepers alike wish more attention was given to queen problems.

However *drones* were also considered. After all they are an important part of the performance of the colony. Can the drones establish new *Drone Congregation Areas* (DCAs) or find old ones in a countryside being changed by housing developments and shopping malls and by agricultural changes to increased huge acres of a monoculture? Also, are the queens being displaced from DCAs for the same reasons? What leads queens and drones to their respective DCAs and where do they go if one disappears? Drone biology and behavior provide us with interesting questions indeed.

Pollen, as a topic, produced many areas for research. Good nutrition is essential for overall health of bees, both larvae and adults. Today a look through the bee equipment catalogs shows an assortment of pollen substitutes available. And beekeepers are stirring up pollen patties or substitutes in their own kitchens. A protein patty is laid inside the hive and a quick look days hence shows that the patty is being consumed. Yes, some of it by the small hive beetle. However does anyone look to see if the bees are using it or are they throwing bits out the entrance to be carried away by various scavengers? Do some patties contain pollen, and if so what is the source of the pollen?

Pollen questions are not limited to the patties. Bees are collecting pollen themselves from acres of a monoculture, from acres of genetically modified plants, and from a vast assortment of unknown plants. The pollen is brought back to the hive and fermented into bee bread. Has anyone looked at the bee bread? Is there any problem with the fermentation cycle? Perhaps both researchers and beekeepers need to know just how nutritious the modern-day pollens and resulting bee bread really are. A good research colony is just as important as a good pollinating colony and as a good honey-producing colony.

The pollen itself leads us into *pollination and nectar production*. New varieties, new cultivars, new plant genetics arrive each year. Yet information on pollination needs of various crops has not kept up with the advances. And we can say the same for nectar production for a honey crop. Recommendations on hive placement and number of hives for both pollination and nectar seems to be in serious need of attention.

Is any thought being given to the "*good-old-fashioned diseases*" of American foulbrood and European foulbrood? Perhaps the numbers are staying steady and those diseases are not of immediate concern. But if bees are weakened by other factors should beekeepers and scientists stay aware in case problems do arise. Now for something more obscure, perhaps forgotten. Bees have *Malphigian tubules*, an important part of the excretory system. They remove waste products from the blood of a bee. The Malphigamoeba may be a rare condition that can cause spring death in honey bees. Is anyone checking for its occurrence? Perhaps it has been ignored.

Well, I guess we do have to consider VVP somewhat since it seems difficult to separate ***Varroa*** out completely. So we will have to consider a bit about an interesting research topic that was suggested. At present the only way to study living *Varroa* is basically on the bee. It certainly would be interesting to rear *Varroa* off its host, the honey bee. We know the mite carries different viruses and transfers them to the bee. Does anyone know exactly how the mite does that and still stay healthy? Since the *Varroa* receives its nourishment from the bee would there be something to feed to the bee, harmless to the bee of course, but lethal for the mite or inhibit mite reproduction? The mites seem to be thriving in spite of suspected lethal problems with pesticides. Or are they affected? Perhaps more focus on the varroa mite itself would be useful.

Biological research is done with "controls." In bee research controls can be a colony – but what defines "a colony?" Comparison of research results, both in the U.S. and throughout the world, can be quite difficult to assess. However, the problems of controls and bee research are now being addressed. The scientists have a new book: C*olossBeebook*, Standard Methods for *Apis mellifera* Research Volume 1. Editors are Vincent Dietermann, James Ellis and Peter Neumann.

At present two of the three volumes are done. All volumes are an assembly of papers by scientists from many different countries. Volume 2 covers Standard Methods for *Apis mellifera* Pest and Pathogen Research. Volume 3, due in 2014, will cover Standard Methods for *Apis mellifera* Product Research. Hard copy of volumes 1 and 2 will be available later in 2013.

For information on COLOSS and the books visit the website: www.coloss.org/beebook

Other concerns are multiple. The shelf is full but many, scientists and beekeepers alike, would like to remove items from the shelf. (Here is where money enters – never enough.) Want to see some items on that shelf? *Africanized bees*, *bee plants* for a nutritious environment, *small hive beetles* occupying the south (worse than kudzu), ***Nosema ceranae***, quick field tests for *adulterated honey*, *swarming* changes with *climate change*, colony death during foraging season (opposed to winter death), *moving bees* (with their pests and problems) around the globe instead of improving locally-adapted bees.

If you wish to add your concerns to this mixture, please also add funding. BC

Ann Harman keeps making lists at her home in Flint Hill, Virginia.

The Voice Of The South

Sometimes Begs For Caution

I received an email the other day from an overzealous newbie beekeeper. He was beginning his second full season of beekeeping after having kept two colonies during his first season. He had searched for many years to find that beekeeping was his calling in life. His exact words were, "Beekeeping done bit me like a snake. I'm hooked."

Naturally, I admired his enthusiasm. However, I nearly choked when his next words were that he had just purchased 200 bee colonies, and he wanted me to tell him how he could quickly learn everything one needs to know about commercial pollination of almonds, honey production and queen rearing. I hope my response did not scare him from the profession, but I told him that most new commercial beekeepers fail because they are not good beekeepers, or they are poor businessmen, or both conditions are true. It takes years to become proficient at any one of these areas of expertise. "Take a breath and slow down . . ."

Almost immediately after I hit send for my return email, it occurred to me that people come into commercial beekeeping in different ways. Some are born into households with multiple generations of beekeeping experience. In many ways, these are the lucky ones because they are immersed in the profession from the time they begin to crawl. Some are like the young man who had sent the email; they just explode on the scene (and many fizzle quickly). Others are more cautious and deliberate and become commercial beekeepers slowly over time. Kenneth and Johnny Thompson of Philadelphia, Mississippi fit well into this last category.

Kenneth and Johnny are a father and son duo from the Broke T Ranch. I asked Johnny if he had meant "Broken T Ranch" to make sure that my notes were correct. He laughed and said, "No, Broke T is correct because as farmers we always feel like we are broke, owing somebody money." I smiled at the self-deprecating humor so prevalent in the South. It was quite apparent to me that although times could surely be tough for any farmer, this farm family was successful and living comfortably.

I came to know the Thompson's after meeting Johnny at our annual state beekeeping convention last year. Johnny is a big man, standing well over six foot tall, and he speaks with a loud voice that carries a distinctive Mississippi draw. I was intrigued when he said that he grew up on a poultry farm and that beekeeping was only a recent addition to the family business. So, how does one go from poultry to beekeeping?

I had the chance to ask Johnny and Kenneth about their transition into beekeeping one morning this Spring. Johnny was blurry eyed from little sleep. He had spent most of the previous night preparing his broiler houses for catch crews to load chickens into trucks for shipping for slaughter to Peco Farms in Gordo, Alabama. He had gone to bed at 4:00 a.m., and he was speaking with me at 9:00 a.m. Nonetheless, he and Kenneth spoke with a relaxed and easy way that made me feel at home almost immediately. We sat on their front porch, and I petted the family dog as Johnny described his upbringing on the farm.

Kenneth and Joan Thompson have three grown children (Johnny, Kevin and Wendy), and Johnny and his wife, Sharon, have two sons (Caleb and Josh). Kenneth and Joan live

Kenneth Thompson.

Johnny Thompson.

One of four poultry houses.

in the home where Johnny lived as a child, and Johnny and Sharon live in another home not far away. Most of the family farm activity is centered upon the older home, and Johnny works closely with his father almost every day.

Kenneth had owned and managed four broiler houses while Johnny attended high school. Johnny followed his father's footsteps into poultry. After high school, Johnny earned a bachelor's degree in poultry science from Mississippi State University in Starkville. During the subsequent 10-year period he became a breeder manager and ran an egg hatchery for Peco Farms. In addition, he slowly acquired four broiler houses of his own.

Eventually, Kenneth wished to retire from fulltime farming, so Johnny came home and purchased his father's broiler houses to operate with the four he already had. Sometime during the same period, the family added beef cattle to their repertoire of animal husbandry. Currently, poultry accounts for 60% their annual income, followed by beef cattle (30%) and honey bees (10%).

As with many folks, the foray into beekeeping began as a hobby. Kenneth established an apiary of 25 colonies while Johnny was still in high school. They never thought of the bees as income back then. Instead, it was an interesting hobby that provided beneficial pollination for the family gardens. Kenneth established his first hive by cutting a colony of bees out of a fallen tree with a chainsaw. He captured swarms and bought package bees to create the additional colonies. Johnny learned beekeeping from his father, but he also spent much time reading about beekeeping from a number of sources. For various reasons, Kenneth eventually sold his hives while Johnny was off to college. Put simply, running the poultry business took all of Kenneth's waking hours.

It was in Kenneth's retirement from poultry that the urge to keep bees rekindled. He had always seen bees foraging on the clover and flowers surrounding the house, and the decline of honey bees and other pollinators were receiving almost daily attention by the mass media. Now that Johnny was running the poultry business, Kenneth felt freer to dabble in beekeeping. However, as in the first venture into bees, he did not view beekeeping as a way to earn income. He simply missed keeping bees and having hives around the yard.

The second round of bee fever began about eight years ago when Kenneth hived a swarm into a box without frames. He eventually bought some used hive equipment and some well-established hives from a local beekeeper. He also purchased nucs, and after the first season, he wintered just seven hives of bees.

Feeding the cattle.

The move into a more commercial beekeeping style came from Johnny's curiosity about diseases and parasitic mites in honey bees. Johnny read as much as he could about the problems in beekeeping, and he wondered if the tactics used to combat outbreaks of diseases in chicken houses could be used to fight diseases at the apiary level in beekeeping. Treatment decisions in poultry were based on house-level conditions. The entire poultry house was treated or not depending on the severity of an outbreak. Outbreaks of disease were avoided with sets of best management practices and good house hygiene. The farmer does everything possible to keep the broilers healthy and on schedule with their growth rates, and the goal was to minimize the need for medical intervention.

The questions that directly translated to beekeeping were: "Can we do things to avoid treatment with chemicals in our hives, and can we make decisions to treat based on apiary-level sampling?" These were the driving questions for the Thompsons, but underpinning the desire to commercialize their beekeeping was the notion that everything one does on a farm should earn money and support the family.

Johnny and Kenneth learned how to raise queens and to make splits and grow colonies from existing hives. Although truly immersed in the potential for beekeeping to become profitable, the duo added beekeeping and queen rearing to their farming with slow and deliberate patience. Every step of the way, they integrated the beekeeping activities necessary for cyclical queen production into the already existing schedules of running poultry houses and caring for beef cattle. All activities were synchronized for effective use of time, but there also needed to be enough plasticity in the system that efforts could be shifted to handle any crisis occurring within any one of the three farming arenas.

Johnny became convinced that at least part of the problems with varroa mites could be addressed with

Queen breeder colonies.

Mating nucs on rails.

the use of mite-resistant stocks. He soaked in all that he could about Minnesota hygienic Italian bees that had been developed by Dr. Marla Spivak. Johnny met Marla at an annual convention of the Mississippi Beekeepers Association a few years ago, and that conversation further fueled his desire to use resistant stocks of bees. Subsequently, he had many discussions with bee breeders like Danny Purvis (now retired) who were attempting to produce better stocks of bees. He eventually purchased a couple of Minnesota hygienic breeder queens. He also bought some VSH breeder queens from Tom and Suki Glenn (now retired). Since then, he has raised queens from all of these stocks and sold them to an ever demanding clientele.

Johnny and Kenneth believe the goal of treatment free beekeeping is not an elusive dream. They monitor their varroa mite populations, and they have yet to lose significant numbers of hives. They admit that the lack of any other commercial beekeepers near them probably helps protect them from drifting mites. They are also fortunate to live in an area free of intensive row crop farming, and the risk of insecticide poisoning is very low.

Although they could probably sell every queen that could be produced, the team decides at the beginning of the season the total number of queens to be sold and the schedule by which they will be made available. They stick to the schedule (weather permitting), and they only sell what is planned. This is important because the queen rearing decisions are based on schedules for all of their farming activities. It is this kind of discipline missing in the young newbie that had emailed me about beekeeping.

Kenneth and Johnny are also disciplined about selling honey. They are firm believers in selling at retail prices for the bulk of the honey they produce. Johnny says their honey earns more than twice as much income when sold retail versus wholesale – so they make every effort to bottle and sell locally. They are quite fortunate in that their hometown hosts a famous general store that has been operating for more than 100 years. The Williams Brothers General Store (**http://msbusiness.com/blog/2012/08/19/williams-brothers-general-store-is-something-to-count-on/**) is a great place to get bacon cut to order and to buy a nice pair of boots and denim jeans. The Thompsons sell their honey at the store year around. Every time I have visited the store, the parking lot has been full!

Although cautious about beekeeping, the Thompsons are slowly growing their operation. They have gone from tens of colonies to hundreds now, and Johnny plans to increase their capacity for queen production every year until they strike the correct balance. It was clear to me that both Kenneth and Johnny love beekeeping, and I have no doubt that they will continue to be successful. However, they also seem to relish in poultry and cattle too.

Before leaving Philadelphia after my interview with the Thompsons, I decided to stop by the Williams Brothers General Store to buy some of their honey. I just wanted to make a small gesture of support for the local beekeeper. When I finally started back home again, it occurred to me that something that I could do to help the Thompsons was to buy some honey-barbequed chicken wings during the next Super Bowl; Johnny said that over 1 billion chicken wings are sold during that football game. I probably cannot wait until the next big game, so I am grilling chicken on the next pretty weekend. I am not alone in enjoying chicken here – in Mississippi, poultry was the biggest agricultural commodity produced in the state in 2012 with an estimated value of nearly $3 billion. Of course, I will use Thompson honey to make my grilling sauce. BC

Jeff Harris is the Extension/Research Apiculturist in the Department of Entomology at Mississippi State University.

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meetings in the UK large enough to support vendors during the rest of the year otherwise, so you can see that this is serious stuff for the businesses that sell to beekeepers.

Another thing you should know is that the BBKA has about 22,000 members that have all the benefits of being a BBKA member – insurance, a great magazine/newsletter, and lots of government interference – no, I didn't say that, it's government oversight and assistance. That's what I mean.

All in all the BBKA was a wonderful host, as have all of my hosts been when visiting the UK. If you ever get the chance to take in a BBKA Spring Convention do so absolutely. It's an amazing way to spend a few days and the college is located far from the madding crowds of London or Manchester, almost way out in the country. Just be careful on the round-abouts getting there.

Oh, one more thing. Over tea one morning after the Convention Jeremy Burbidge, owner of Northern Bee Books and publisher of *The Beekeepers Quarterly*, and I were talking about the Convention and the people attending, and, not surprisingly, how similar the beekeepers at this Convention were to those attending almost any large bee meeting here. The conversation somehow turned to the names of groups – a flock of birds, a pride of lions, a murder of crows . . ." So what do you call a group of beekeepers?" I asked, "innocently."

Well, Jeremy said – it's simple. Put more than a single beekeeper in a room, and you have . . . "An argument of Beekeepers, right?" I like that. An Argument of Beekeepers. You don't disagree, do you?

•

And now for something completely different. Ethanol. Well, to be more specific, the corn it takes to make enthanol.

This year there will be something like 97,000,000 acres of corn planted in the U.S. That's kind of a hard number to imagine. If you have one handy, get a U.S. map.

97,000,000 acres is bigger than any state except Alaska, Texas or California. It's bigger than North Dakota and South Dakota combined, It's bigger than Montana. It's bigger than all the northeast states from Maine to Virginia, combined. It's pretty big.

Meanwhile, ethanol production goes something like this. They make about 850 – 900,000 barrels a day, which is over 35 million gallons, using about 13 million bushels of corn. An annual rate is something like 12 – 13,000,000,000 gallons. That's billions. We import something like 35 – 40,000 barrels per week to make up a shortfall, and there's always a supply held in reserve...something like 15 – 20,000,000 gallons.

Some more numbers, gathered from here and there.

An acre of corn harvested in 2012 produced about 159 bushels of corn. From that bushel they were able to make about 2.8 gallons of ethanol, or about 440 gallons of ethanol per acre of corn.

Now we use about 368 million gallons of gasoline every day. Of that ethanol is about 9.7% of the mix.

You can see why we need so much corn. No, let me rephrase that. You can see why there is so much corn grown in this country.

Oh, all that corn produced other products. Ethanol producers used 12.9 million bushels of corn in one week to produce ethanol, plus 95,000 metric tons of livestock feed, 85,000 metric tons of which were distiller grains, the rest comprised of corn gluten feed and corn gluten meal. Plus, 4.4 million pounds of corn oil daily...daily.

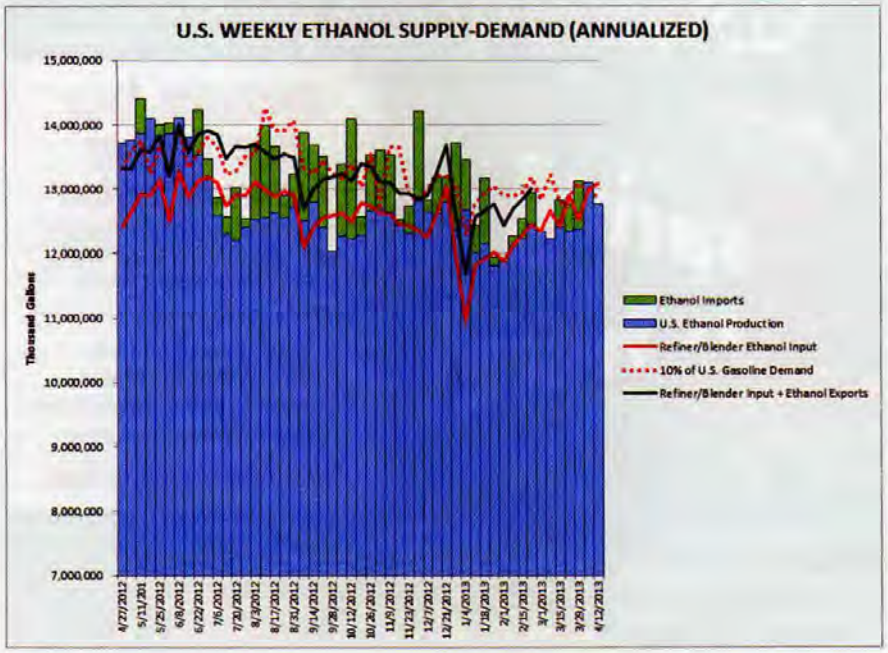
I bring all this up as food for thought. Is it any wonder there isn't enough good food for bees? And is it any wonder any company at all that supplied the corn market with anything...fertilizer, machinery, distillation facilities, processing plants, corn oil tankers, seed producers...and insecticide manufacturers would not want to see this change?

I can only imagine the army of Lobbyists at every state capitol and in Washington campaigning to not have the enthanol checkbook closed even a little bit.

I am in awe that the EU got legislation passed to curtail even one of these inputs to the corn industry. What do you think the chances of that happening here are?

And, as a bit more food for thought....sorry, corn, food...is it necessary to change the practices of the U.S. corn growing megindustry? What if we just planted lots of good bee food far, far away. There's still New Mexico, and Guam ~ not much corn there I think.

In spite of all that's going on it's Summer Time . . . Keep you veil tight, your smoker lit and your hive tool handy – you're going to need all three for the next several months.



GLEANINGS

JUNE, 2013 • ALL THE NEWS THAT FITS

EU VOTES TO BAN NEONICS, BUT BARELY

A deeply divided European Union will go ahead with a ban on the use of three neonicotinoid insecticides – clothianidin, imidacloprid and thiametoxam – blamed by critics for the decline in honey bee numbers.

The EU Commission will proceed with the suspension of their use from next Dec, 1 after 15 EU countries supported the restriction, eight voted against and 4 abstained.

The halt will be for at least two years.

"Although a majority of Member States now supports our proposal, the necessary qualified majority was not reached," Health and Consumer Commissioner Tonio Borg said in a statement. "The decision now lies with the Commission. Since our proposal is based on a number of risks to bee health identified by the European Food Safety Authority, the Commission will go ahead with its text in the coming weeks.

"I pledge to do my utmost to ensure that our bees, which are so vital to our ecosystem and contribute over €22 billion (US$28.8 billion) annually to European agriculture, are protected."

The plan restricts the use of the three neonicotinoids for seed treatment, soil application (granules) and foliar treatment on bee attractive plants and flowering crops such as corn, oil seed rape and sunflower.

Any other authorized uses must be carried out by professionals.

Exceptions will be limited to treating bee-attractive crops in greenhouses, in open-air fields only after flowering.

An EU statement says that as soon as new information is available, and at the latest within two years, the Commission will review the conditions of approval of the three neonicotinoids to take into account relevant scientific and technical developments.

Experts representing the 27 EU countries had met March 15 as the Standing Committee on the Food Chain and Animal Health and failed to reach a qualified majority to on the proposal to ban the three neonicotinoids.

Then the vote was 13 for a ban, nine against with five abstentions. The proposal was then referred to the appeal committee which also failed to reach the required majority, allowing the Commission to step in and impose the two-year ban.

The decision is seen as a victory for campaigners concerned about dramatic declines in bees, but a defeat for the chemical companies who make the products and the UK government which said a ban will harm food production.

The UK's Soil Association Head of Policy Emma Hockridge called the decision a victory not only for the bees and other pollinators, but for independent science against the political, pro-pesticide position adopted by UK Environment Secretary Owen Paterson and the pesticide industry.

"There is strong evidence that a ban on neonicotinoids would work," Hockridge says. "In Italy, where the government has taken decisive action and banned certain neonicotinoids pesticides, deaths of honey bees in winter subsequently fell by more than 50% in three years."

HONEY'S IN THE NEWS

WI, Feb 8, 2013 – Dismissed in Federal Court in Regan vs. Sue Honey Ass'n. WI honey standard is based on a Codex Alimentarius provision that prohibits pollen removal.

Federal Law has no standard for honey identity, and the label uses the common or usual name – honey.

Honey is honey, even in the absence of pollen, the court said.

Feb 13, 2013 – Is honey, honey if it does not contain pollen?

Brod vs. Sioux Honey, Ross vs. Sioux Honey, Overton vs CVS Caremark Corp, Guerrero vs. Target Corp. and Honeytree.

Yes, because of conflicting state and federal laws. No federal stan-

Continued on Next Page

GOOD MONTH FOR ERIC MUSSEN

Honey bee guru Eric Mussen, Extension apiculturist and member of the UC Davis Department of Entomology faculty since 1976, has received scores of awards during his career, and now he's received one from his alma mater.

Mussen has been named the recipient of the 2013 Alexander Hodson Graduate Alumni Award from the University of Minnesota. He received the award at a ceremony on Thursday, May 30 in the Cargill Building on the St. Paul campus.

A native of Schenectady, N.Y., Mussen received his bachelor's degree in entomology from the University of Massachusetts (after turning down an offer to play football at Harvard) and then received his master's degree and doctorate in entomology from the University of Minnesota in 1969 and 1975, respectively.

His doctoral research focused on the epidemiology of a viral disease of larval honey bees, sacbrood virus. "During those studies I also was involved in studies concerning sunflower pollination and control of a microsporidian parasite of honey bees, Nosema apis," Mussen recalled. "Now a new species of Nosema has displaced N. apis and is even more difficult to keep subdued."

"Given this foundation, he was confronted with many new challenges regarding honey bee health and pollination concerns when he arrived at UC Davis in 1976," said William Hutchison, professor and head of the Department of Entomology at the University of Minnesota. "Some 37 years later, he is still actively 'tackling' these new challenges--mites, diseases, and Africanized honey bees, to name a few--to enhance the pollination success of California's diverse agricultural cropping systems, with considerable emphasis on almonds. In brief, he is in demand, and he continues to be the primary source for objective information on honey bee health, and pollination in California."

Professors H.C. Chiang and Basil Furgala supervised his graduate work.

Considered by his peers as one of the most respected and influential professional apiculturists in the nation, Mussen was named the California Beekeeper of the Year in 2006, won the American Association of Professional Apiculturists' Award of Excellence in Extension Apiculture in 2007, and in 2008 he received the Distinguished Achievement Award in Extension from the Pacific Branch of the Entomological Society of America. He received the statewide Pedro Ilic Outstanding Agricultural Educator Award in 2010.

Mussen, with four other colleagues, comprised the UC Davis Bee Team that won the 2013 team award from the Pacific Branch of the Entomological Society of America.

Mussen educates the beekeeping industry and general public with his bimonthly newsletter, from the UC Apiaries, which he launched in 1976. Since 1976, he has also written Bee Briefs, addressing such issues as diseases, pesticides and swarms. Both publications are on the UC Davis Department of Entomology.

Mussen is a five-time president of the Western Apicultural Society, an organization he helped found in 1977. He was a founder and alter-

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MUSSEN ... Cont. From Page 91

nated between president and secretary/treasurer of the American Association of Professional Apiculturists for many years. He's delivered the keynote addresses at the California State Beekeepers' Association (CSBA) and at the American Honey Producers' Association conventions. In addition, he provides leadership roles in the CSBA, the California Bee Breeders' Association, California Farm Bureau Federation, American Honey Producers' Association, National Honey Board, American Beekeeping Federation, and the Northern California Entomology Society, among others.

Mussen, who is the UC Davis representative to the California State Apiary Board, offers input to the Department of Pesticide Regulation, particularly with the pesticide registration group. He works closely with Cooperation Extension, California Department of Food and Agriculture, California Department of Pesticide Regulation, the California Farm Bureau Federation, researchers in the UC system, researchers at the USDA/ARS honey bee laboratories at Beltsville, Md; Baton Rouge, La.; Tucson, Ariz., Weslaco, Texas, and the U.S. Environmental Protection Agency, among others.

Mussen serves on various committees and task forces of state and national organizations, reviews numerous manuscripts for journals; reviews annual research proposals to the California State Beekeepers' Association, the Almond Board of California, and the National Honey Board; reviews Small Business Innovation Research applications at the federal level; and is requested to comment on promotion evaluations for university and USDA researchers.

He was nominated by Marla Spivak, Distinguished McKnight University Professor of Apiculture (former recipient of the award), and Gary Reuter, apiculture technician, both with the University of Minnesota. Faculty and staff from UC Davis contributed to the nomination package.

BLUEBERRY BLUES IN PEI

A shortage of honey bees on Prince Edward Island has prompted the provincial government to ease its ban on imported bees to service a growing blueberry industry.

Until now bees could go onto the island from neighboring Nova Scotia, but the policy change allows bees from other provinces to enter.

Apiarist John Burhoe of Island Gold Honey tells the Canadian Broadcasting Corp. the PEI bee industry is not able to keep up with the blueberry growers.

"The number of colonies that are required will likely top out at about 15,000," Burhoe says.

"This year local beekeepers supplied about 6,000, so you can see where that's going."

PEI berry crop development officer Chris Jordan says the shortage of bees is hurting production on the province's 5,930 acres of blueberries.

"Because blueberry growers are not able to get enough honey bees it really is hindering their total maximum production," Jordan says.

Importing bees from Ontario and other provinces will open P.E.I. up to more disease, but Burhoe says beekeepers will just have to deal with this.

"We as beekeepers can't hold the blueberry growers hostage in trying to keep the border closed and restrict the number of colonies coming in," he says.

Bees brought in for the blueberries will have to be shipped out once the crop has been pollinated to ensure they don't compete with the PEI honey industry. – *Alan Harman*

APIS CERANAE-1, OZ - 0

Biosecurity Queensland is calling for help from the public in its attempt to slow the Australian invasion of Asian honey bees.

It is asking the Far North Queensland community to report any Asian bees they find outside the known infested area.

Australian authorities have abandoned their attempt to eradicate the bees.

The known infested area surrounds the Cairns region and extends from the edge of Port Douglas south 100 miles to South Johnstone and 90 miles southwest to Biboohra, Atherton and Malanda.

Biosecurity Queensland Asian honey bee program manager Russell Gilmour says the search for nests and swarms outside of the known infested area is to help track and minimize the spread of the pest bee.

"Asian honey bees are expected to slowly spread through the natural movement of the bee and we need help from the community to alert us to where they are," he says.

Biosecurity Queensland is surveying the area to the south of the infested area to determine the current spread of the pest.

The organization is also on the look-out at ports and marinas visited by international vessels, as they are high-risk areas for new bee incursions

"Any bees entering Australia could be carrying pests or diseases that are not present here," Gilmour says.

"The Asian honey bee program is now in a 'transition to management' phase, which means undertaking research and developing strategies and tools to help affected parties manage this exotic bee and minimize its impacts,; Gilmour says.

The bees, endemic in countries to the north of Australia, are known carriers of Varroa mites, but thus far none of the mItes has been found in Australia.

Alan Harman

WORST EVER UK HONEY

HONEY ... Cont. From Page 91

The average annual honey crop per hive fell 72% in the UK last season after the weather made it the most difficult beekeeping year ever.

The British Beekeepers Association's 2012 honey survey found the on average just eight pounds of honey was produced per hive, compared to the annual average of 30 pounds

Rain and cold weather was cited by 88% of the 2,700 beekeepers who took part in the survey as the main factors affecting poor honey supplies. The association was forced to issue an unprecedented mid-summer starvation warning to beekeepers to check the stores in their honey bee colonies and to feed them if they were inadequate to avoid starvation to keep honey bees alive.

Alan Harman

dard of identity for honey. So, it is what's called conflict preemption, where it is impossible for a private party to comply with both state and federal law, and obstacle preemption where the state law stands as an obstacle to the accomplishment and execution of of the full purposes and objections of congress. Plus, express preemption, which says, essentially, that if that's the way it is in some places, that's the way it will be here.

A simple summary would be that the courts want uniformity between state and federal laws.

THE CLIMATE CHANGES THE WEATHER THE WEATHER CHANGES BEEKEEPING

The American Meteorological Society is acknowledging unequivocally that Earth's lower atmosphere, ocean, and land surface are warming; sea level is rising; and snow cover, mountain glaciers and Arctic sea ice are shrinking.

In an updated statement on climate change, replacing a version in place since 2007, the society also says there is no room for doubt – the dominant cause of the warming since the 1950s is human activities.

Society executive director Keith Seitter says the statement is the result of hundreds of hours of work by many members over the past year.

"It was a careful and thorough process with many stages of review," he says.

It is based on the peer-reviewed scientific literature and is consistent with the majority of current scientific understanding as expressed in assessments and reports from the Intergovernmental Panel on Climate Change, the U.S. National Academy of Sciences, and the U.S. Global Change Research Program.

"Warming of the climate system now is unequivocal, according to many different kinds of evidence," the statement says. "Observations show increases in globally averaged air and ocean temperatures, as well as widespread melting of snow and ice and rising globally averaged sea level."

Surface temperature data for Earth as a whole, including readings over both land and ocean, show an increase of about 0.8°C over the period 1901-2010 and about 0.5°C between 1979 and 2010, the era for which satellite-based temperature data are routinely available.

Due to natural variability, not every year is warmer than the preceding year globally. Nevertheless, all of the 10 warmest years in the global temperature records up to 2011 have occurred since 1997, with 2005 and 2010 being the warmest two years in more than a century of global records.

The warming trend is greatest in northern high latitudes and over land.

The effects of this warming are especially evident in the planet's polar regions. Arctic sea ice extent and volume have been decreasing for the past several decades. Both the Greenland and Antarctic ice sheets have lost significant amounts of ice. Most of the world's glaciers are in retreat.

Other changes, globally and in the U.S., are also occurring at the same time.

The amount of rain falling in very heavy precipitation events (the heaviest 1% of all precipitation events) has increased over the last 50 years throughout the U.S. Freezing levels are rising in elevation, with rain occurring more frequently instead of snow at mid-elevations of western mountains. Spring maximum snowpack is decreasing, snowmelt occurs earlier, and the Spring runoff that supplies over two-thirds of western U.S. stream flow is reduced.

Evidence for warming is also observed in seasonal changes across many areas, including earlier springs, longer frost-free periods, longer growing seasons, and shifts in natural habitats and in migratory patterns of birds and insects.

Globally averaged sea level has risen by about 17 cm in the 20th century, with the rise accelerating since the early 1990s. Close to half of the sea level rise observed since the 1970s has been caused by water expansion due to increases in ocean temperatures.

Sea level is also rising due to melting from continental glaciers and from ice sheets on both Greenland and Antarctica. Locally, sea level changes can depend also on other factors such as slowly rising or falling land, which results in some local sea level changes much larger or smaller than the global average.

Even small rises in sea level in coastal zones are expected to lead to potentially severe impacts, especially in small island nations and in other regions that experience storm surges associated with vigorous weather systems.

The society says while climate is always changing, what is happening now is beyond what can be explained by the natural variability of the climate.

"It is clear from extensive scientific evidence that the dominant cause of the rapid change in climate of the past half century is human-induced increases in the amount of atmospheric greenhouse gases, including carbon dioxide, chlorofluorocarbons, methane, and nitrous oxide," the statement says.

"Future warming of the climate is inevitable for many years due to the greenhouse gases already added to the atmosphere and the heat that has been taken up by the oceans."

The simulations also indicate the likelihood of longer dry spells between precipitation events in the subtropics and lower-middle latitudes, with shorter dry spells projected for higher latitudes where mean precipitation is expected to increase.

Drought is projected to increase over Africa, Europe, and much of the North American continental interior.

"For the longer term, paleoclimatic observations suggest that droughts lasting decades are possible and that these prolonged droughts could occur with little warning," the statement says.

It says the ongoing warming will increase risks and stresses to human societies, economies, ecosystems, and wildlife through the 21st century and beyond, making it imperative that society respond to a changing climate.

"Prudence dictates extreme care in accounting for our relationship with the only planet known to be capable of sustaining human life," the statement concludes.

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A single bee on a Batchelor Button. (photo by Gary Wing)

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Bad hips run in my gal Marilyn's big Catholic family. I kid her that they must be part German Shepherd. At the tender age of 52, Marilyn's already had both hips replaced. Yesterday she got a new knee.

When she checked in to a Denver hospital that specializes in joint replacements, she inquired to be sure her insurance had approved the procedure. "Oh, yes," came the reply. "If you'd been denied, you wouldn't be getting this operation."

It's not that the health care establishment is heartless in dealing with the uninsured. Sixty of the staff from this hospital are taking off for the weekend to do charity knee and hip replacements . . . in Panama.

It's early April here in western Colorado. My bees wintered pretty well. A generally cold season punctuated by a few timely thaws saw the little darlings get out from time to time and relieve themselves, always a good sign. My tenant sometimes parks down by the bees, and I had to explain to her about the tiny golden splatters on the hood of her new Subaru.

Now some of my bees are pollinating apricot, plum and sweet cherry orchards around Grand Junction. It got hot down there just as the apricots bloomed, and I even honey-supered a few hives. Now let's see if I can get them back into the truck! Honey-plugged, dead-weight supers in April. OK, that's a problem I really can't whine about!

The cots and at least some of the plums have finished blooming.

Cherries, I'm not so sure. Today we have snow, and the overnight forecast for Grand Junction is clearing and 22. I don't see how the blossoms can take it, but some of these orchard locations have microclimates favorable for fruit. These guys all have wind machines that help keep cold air from settling on the orchard floor.

I'm set to buy a 32-hive yard from my neighbor Paul. It's close to my place in New Castle and belongs to the family of one of the hottest young skiers on the World Cup circuit, so if you follow ski racing, you can probably figure out who I'm talking about.

These new bees are just back from the almonds. I'm purchasing half splits-with-new-queens and half hives with old queens that have had a nuc pulled out of them. The splits come a little cheaper, and should do well, but I don't like to put all my eggs in one basket. With new queens, you never know. I'll take a proven old queen over a poorly mated new one, any day.

Paul's the honey bee guru. He knows about a thousand times as much as I do. I've worked for him, so I know his methods, but I like to do things my way. With Paul running some thousands of colonies and me 60 or 80, I've had the luxury, which is to say the time, to do some things that he doesn't. For example, I test all my hives for Varroa mites, sometimes more than once a season. Some I treat, and some I don't have to. For Paul this would be impossible.

And I've refrained from sending bees to California, even though I could probably piggyback them onto one of Paul's shipments. The almonds are a good place to pick up the latest in bee diseases, not to mention mites, but the money's good, and if you're lucky, the little darlings come back bustin' out of the boxes.

Now that I'll be up over a hundred colonies, I need to cut a few corners. I thought I might treat this new yard a little more like a commercial operation. I know how. You feed, you treat, you super, you move on and don't look back. And I might send the good boxes to the almonds this fall. They'll be on four-way pallets, so they'd be ready to go.

When I dropped Marilyn off at the hospital, I gave her a light-hearted kiss and went to lunch. All they were going to do was saw off her leg bones in two or three places and pop in an artificial knee. What could possibly go wrong? Still, before I hit the Little India Restaurant buffet line, I said my prayers, which I don't always do.

Afterwards, when they let me visit, Marilyn looked ghostly pale. What did I expect?

I'm here for her, but that doesn't include eating hospital food. This morning at the Greek diner down the street, I told the owner's son I'd take a baklava to go. He said, "Not that many people order baklava for breakfast, but I grew up on this stuff. I ate it morning, noon, and night."

"It's made with honey, right?" I said.

"Tons of honey, "he said.

"Well, I'm a beekeeper, and I have to support the industry," I said.

Marilyn doesn't tolerate Styrofoam in her life, so I got him to wrap the baklava in waxed paper.

Back at the hospital room, my little environmentalist was in the pink again. Was that a twinkle in her eye? She beamed when I set down her coffee and told her I had a little surprise.

She has a sweet tooth, and anyway, who's tasted baklava and didn't like it? It's made from honey. Marilyn ate her half. She's going to be just fine.

Ed **Colby**

Commercial Bees And Baklava