CITY BEES – PAGE 42, 60, AND 62

Dec 2011

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Lavender produces a flower particularly attractive to honey bees, and makes a divine honey. Plus, its essential oil adds a refreshing dimension to artisan perfume. Find out about a Bay Area, perfume gardening beekeeper on page 62. (photo by Anna Brown)

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Bee Culture

FEATURES . . .

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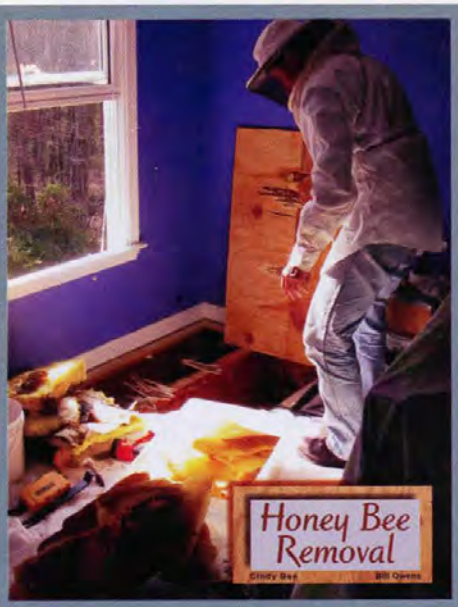

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Personal Journeys

My name is Dennis Brown, the owner of Lone Star Farms (**www.lonestarfarms.net**) and author of "Beekeeping: A Personal Journey." I am searching for information about family owned self-service "Honey Stands" from yesteryear. I would like to do an article on beekeeping families who owned self-service "Honey Stands" to market their honey surplus back in the day. If your family or you know of a beekeeping family who has owned a Honey Stand, please contact me at dennis@lonestarfarms.net or 979.279.5266 or 8371 Jackrabbit Lane, Bryan, Texas.

Dennis Brown
Bryan, TX

Monsanto Buys Beeologics

In light of the recent acquisition of Beeologics by Monsanto, and the stir this has created in the beekeeping community, I would highly appreciate it if you would publish the attached letter in your next issue of *Bee Culture* magazine. This provides the Beeologics' perspective on this purchase.

•

Please feel free to address to me any questions or concerns.

•

Several years ago (Nov. 2008, pp. 15-17), readers of Bee Culture first learned about RNAi, and more particularly about Remebee®, a product that shows promise in helping bees and their colonies avoid infection from viruses that may cause CCD. It is currently being used under an investigational use permit from the FDA as we gather data for our final submission.

As a beekeeper, I know the next step of bringing an approved product to market is essential in putting the science to work and realizing its full potential. It's one of the reasons why our announcement recently that Monsanto purchased Beeologics is coming at a good time.

In our opinion, this development is an important landmark that underscores the importance of bee health in the eyes of the agricultural community. It is a tremendous boost to facilitating the completion of the development and regulatory approval of the Remebee® product line to the benefit of the beekeeping community.

While I recognize that some people may have concerns about Monsanto getting involved in bees, I can assure you that Monsanto's leadership team and scientists recognize the value of Beeologics' research to the global bee community and are committed to continuing our work in advancing bee health. I've found them to be just as passionate about helping growers and agriculture as we are, and the work we've been doing fits well with their commitment to sustainable agriculture.

We plan on continuing to work with industry leaders to support and guide the development of our products. In addition, I invite beekeepers who have questions about, or an interest in the Remebee® product line or our acquisition by Monsanto to write to me directly.

Bee health shall continue to be our main focus, and with increased impetus!

Nitzan Paldi
CTO, Beeologics
nitzan@beeologics.com

Organic Farmers Sued

I read with dismay a letter written by "Charles" in which he stated that GMO farmers can be sued by organic farmers for GMO contamination.

Actually, to date the leading GMO seed producer has been suing numerous farmers across the country who save their seed to plant for next years crops as they have since farming began. If found to contain the seed producers patented gene, that farmer is now liable for patent infringement even if his seed was inadvertently contaminated with the patented genes.

I don't know of any organic farmers who are suing other farmers for contamination. What is happening is that organic trade groups and organic farmers have filed a preemptive lawsuit against the seed producer company. Their suit asks the Court to declare that seed producer cannot sue organic farmers should the company's transgenic seed land on their property.

Charles must understand that organic certification requires that organic food be GMO free. I may add that organic farmers support beekeeping and use bee-safe practices. There are many organic family farms throughout the United States whose livelihood will be threatened by GMO contamination.

Conor
A beekeeper and organic gardener

I Have An Irish Headache

Often we come across situations in beekeeping where we see something unusual that doesn't sit right with what we have previously believed or what is the orthodox viewpoint. In such a situation I often feel I'm witnessing a revelation and on the verge of a breakthrough in new thinking if only I could read the situation correctly. Sort of know the wood from the trees.

Back in the early 90s I was very privileged to get a breeder Queen direct from Bro. Adam of Buckfast Abbey. I already had another pure Buckfast Queen which I got from Bob Burns of Co. Antrim. I had already bred a number of daughter queens from her which of course produce pure drones.

I set up a mating apiary in Sherkin Island of the west cork coast. It wasn't very far from the mainland but as my apiary was inland on the island and the mainland itself was a rocky peninsula

with no bee hives for a few miles. I was reasonably happy with the situation and was confidant of reliable mating. I had four strong drone colonies on the island and I brought over 13 double mating nucs with virgins from the Bro.Adam Queen. The percentage mating was about 90% with most Queens laying in about two weeks.

It was some weeks later when the new brood started to hatch out and of course it was obvious from their dark colour which queens had cross mated, mated with local brown bees. I had maybe 50% pure mating.

It was a bit disappointing but what puzzled me most was why would a Queen travel over open sea and a long distance in a windswept coast when there were thousands of healthy unrelated drones on her own doorstep. This mating result was repeated the following season when I mated two separate lots of Queens.

I eventually ceased to use the island as there were some problems with swarms issuing when I was unable to be there to take them and also bringing home the honey crop – which was considerable – on a public ferry had its difficulties.

This mating situation has shown itself to me again and again. It is so easy to know if a Buckfast Queen has crossed with *Mellifera* drones as their colouration is so different.

I now have a Mating Apiary some miles north of Macroom Co. Cork in an area reasonably free from other beekeepers and these findings show up again and again. I have also brought out *Mellifera* Queens to mate with the buckfast drones and they never find *Mellifera* drones but are happy to mate with the Buckfast drones every time.

I had arrived at the conclusion that it is in a queen's nature to cross breed or at least out breed every time if she could and would go to great lengths to achieve this.

At our Hotel near Stoneleigh during the BBKA Spring show I put forward my theory to Bernard Diaper who is a very experienced beekeeper and others over a few drinks. What I was really implying was that the queen during her mating flight could reject closely related suitors and accept the more distant related suitors. We had a long discussion on the subject but I couldn't convince Bernard and the others. What I was suggesting was that the Queen being chased by hundreds of lusty drones flying on adrenalin could be rejected or accepted by the virgin Queen at will. My argument was that it did seem unbelievable but I was sure there was something in these observations even if I didn't know what it was.

Recent research has come to my attention that there is some basis for my reasoning and that there is in fact a mechanism within the Queen not for rejecting the advances of the Drone but for accepting or rejecting his sperm when mating has completed.

Noel Power

It's London Art!

The things I do for people.

I received your email as the editor of *Bee Culture* with an instruction to visit an art exhibition in London and report back. The exhibition is at 'Charlie Smith's' in the east end of London – an area not well known to me.

I had a meeting in London and decided to visit the art show after that. However, this meeting was in the West End, near Marble Arch and the Journey to the Art Gallery involved an underground journey with a couple of changes of train before arriving at Old Street. The underground Station there has about 10 exits and some experimentation was involved before the right one was discovered.

Now the street signs and house/shop numbering in London leaves something to be desired. However, I did discover that I was on the wrong side of the road. Crossing over, it was apparent that

some guesswork would be involved in finding the gallery. After several minutes walking and trying to find No. 336, I found No. 338. Ha! Must be close. However, there was shop one side and a pub the other, separated by a small door sadly in need of a coat of paint. There was a small sign announcing to the world that this was 'Charlie Smith's.' The door carried four or five bell pushes: I pushed one and waited. And waited. I pushed another and after a while a voice said 'Hello?' I said into the bell push box that I had come to see the art exhibition of paintings about bee hives and things. 'Ah!' said the voice. 'You need to go into the pub and up to the second floor.' I said 'Thanks' and entered the pub. This was very dark with no-one save a girl in there. 'Can I help you? she asked. I mentioned the Art show. 'You've come to the right place!' she said. 'Up the stairs over there.' I mentioned something about it not being very easy to find and she said 'Oh Well! You've found it now!'

I climbed a couple of flights of narrow and not very well lit stairs and entered quite a large room. Arranged round the room were the 'Artefacts. In an alcove in a corner was a table with a couple of books on it. There was a very polite young lady reading a book.

Further inspection showed that arranged along one wall there were three nucleus boxes: each box was painted in a bright color with a different color (or roof). Then there was an octagonal hive about four feet across and then on a wall were the three or four pictures. One was about four feet long and three feet high and it looked like it was painted on wood and then varnished. A very colorful Landscape of hills and valleys with hooded figures in colored bee suits doing things to beehives and a bit Salvador Dali – ish, with some very fine detail. There was another picture of a beekeeper in a hooded and colored bee suit and colored gloves who looked as if he was praying. Then there was a small – about 10"– wide triangular beehive (I think!) high up on one wall.

I asked the polite young lady if there were any more things to see. She said there weren't. She said she thought the pictures were very nice and full of meaning in that there were depictions of all these forces dealing with nature but hidden in anonymous bee suits and veils. I told her I was there as a result of instructions from across the pond so she gave me a two pages long press release (to be forward under separate cover).

There are pictures of the paintings etc on the web site. (**www.charliesmithlondon.com** and then 'John Stark').

Visiting galleries make me feel like a bit of a peasant: I don't understand the language – e.g. . . .'paintings transcend time by navigating the historical' and . . . 'this creation of non (but all encompassing) time and place' etc

Anyway, left the gallery and took bus back to Oxford Circus to get the underground. Ha! Construction works for the new 'Cross Rail' and other road works provided plenty of time to view the street scenes the bus was passing through. Descended to the train platform to find the whole of the Bakerloo line was closed due to a broken down train. About four million people milling about, all asking the same question and getting the same answer. Back to ground level and walk to another station. Phew!

Hope you enjoy the report!

Peter Smith
Great Missenden, England

Editor: *Thanks Peter. Sorry the trip was so difficult. Peter is an occasional contributor to these pages and a dedicated friend.*

A Lesson In Color

Here's an anecdote I hope many readers will enjoy! My son Thomas, who was 13 last year and is crazy into beekeeping, was able to hook up with a nearby beekeeper to help with harvesting the honey from two hives. Faithful to every book and scrap of information we had read, Thomas wore an old beesuit with veil and gloves even though it was beastly hot that day and the suit was somewhat large. The beekeeper's just home-from-college son also helped, but arrived in a black painter's bib-overalls with a dark shirt to match. Not interested in fatherly advice apparently, this young man didn't change before helping to remove the honey supers for extracting.

Even with a smoker and fume board employed, Thomas was able to witness the dramatic difference between wearing light colors versus dark colors when it comes to bees protecting their honey. My son received one bee sting during the afternoon, and his beekeeper friend, who wore light tan and blue (and did most of the direct handling), came away with only three stings. His son? He received 14 bee stings and didn't stick around to help with the extractor.

Sandra Lonneman
Pine Island, MN

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INNER COVER

Finding good help isn't getting any easier, is it?

This year the U.S. deported over 400,000 people. Just under half were found to have criminal records, but even so most were working somewhere, someplace in a job nobody else wanted and most likely being paid below average wages. Maybe some housing was involved. Maybe a trip to town once a week to buy groceries was part of the deal. Maybe. Maybe not.

The controversial laws recently passed in Alabama show exactly how messy the situation is. Real people who were working suddenly were at risk of being deported and moved on – looking for work in safer places. Businesses in that state found out what happens when you threaten their employees with this sort of action. Not surprisingly fewer than 10% of those sudden vacancies were filled by local unemployed folks who wanted those jobs – landscapers, dishwashers, hotel workers, child care workers, and beekeepers. So who is going to keep those golf courses manicured, the restaurants running, the sheets clean, those kids fed – and get those packages filled, queens raised and all that honey harvested? My bet is that it won't be any of the 1% bankers on Wall Street nor any of the 99% demonstrators out on Wall Street complaining about that 1% who have all the money. All those bankers and even all those demonstrators – they all depend on, and need – all those 400,000 plus folks who just got sent home or moved on.

There just aren't enough people who live and have jobs in this country who want to do that kind of work anymore it seems. Have you heard that before? Well, at least that applies to folks who want to work with bees – getting stung, working long hours outside when the temperature is over – what, 80 degrees . . . lifting heavy boxes all day, and having to move on when the harvest is done and there's no more work to do here . . . but there is over there, pulling weeds in soybeans, picking apples, peaches, vegetable crops, mowing lawns or making beekeeping equipment.

I don't know the answer. I don't even know the scope of the problem other than more than a million people have been deported in the last two years. I do know that if these people can't be here the beekeeping equipment you need won't be as inexpensive or as well made, or even for sale from some outfits. And find a commercial beekeeper that doesn't rely to some degree – or completely – on a labor force that isn't permanent. Who's there to lift those supers and tote those pails otherwise?

"Congress must pass laws that make it harder to come here illegally, and easier to come here legally."

This brings up why I started on the immigrant labor problem in the first place. Little different, in my opinion, is the practice of sending some sorts of work off shore. We do it because it is cheaper to have it, whatever it is, made in some country other than here in the U. S. Why is it cheaper? Basically because labor (and labor is the cheap ingredient 'over there'), costs less there than labor costs here. That may sound simplistic but it's basically the way it is.

Now, think about this for a moment – how much money were you making 10, 20, 50 years ago on average on an hourly basis. Yes, much, much less.

The way I see it, the short term economics of sending manufacturing jobs overseas to save money is the same economic engine that requires companies here to hire temporary labor – it's the cost of the labor. The competition is doing it so I have to do it too to compete. It's cheaper because laborers are paid, whether in China or Alabama, what people were being paid years and years ago – which is not nearly as much as today. We are, clearly, outsourcing our labor, and I might add our future, to the past. Not to *other countries*, nor to the *labor force* from other countries that came here to work. No, we are outsourcing our labor, our manufacturing capability, our food production technology and our service economy and work to the PAST. We are borrowing from our future to save or present backsides. It's a carefully disguised ponzi scheme. No more, no less.

This is, as you are most likely aware, morally irresponsible and economically unsustainable, and must get fixed. The *short term reward* for not fixing it is that all that stuff gets made or done gets made or done cheaper, whether here or there. But the *short term downside* is that employers gets caught and punished, or importers get what they pay for...cheap goods, for awhile.

But long term the implications are far worse. Imported manufactured goods, imported food, imported labor – it all adds up to a debt from today that will certainly come due in the future.

There's an election coming up a bit less than a year from now. This problem is being dealt with, or not, at the local level (think school lunches, hospital emergency rooms, and local small businesses), the state level (think school funding, law enforcement and tax income) and the federal level (consider that long, long fence). You have a vote. Use it to fix this problem. Or the big guy who collects those overdue debts will come visiting.

•

Finding Good Help. The *Real* Value Of Pollination

A year ago a commercial beekeeper in Pennsylvania had 200 colonies killed by a misapplication of pesticides. The spray was put on at the wrong time of day, on a crop that had blooming weeds. In 30 days all 200 colonies were dead. The beekeeper did some what I would call informal notebook figuring on what the cost of that spray entailed to the farm crops, and the farmers, that those 200 colonies would have worked for, for a whole season. Remember, 200 colonies. You know beekeepers with that many colonies.

For this calculation, farm gate value is what a farmer would lose without those 200 colonies pollinating the various crops this beekeeper pollinates over the course of a season. For Retail value loss, this is the ultimate cost to the U.S. Agriculture economy because the food those bees would have produced, wasn't produced by the bees.

For almonds, the farm gate value of lost almonds is $50,000.00 The Retail value loss is $500,000.00.

For Georgia Blueberries, farm gate value loss was $10,000.00, and the retail value loss is $800,000.00.

For Pennsylvania apples, the farm gate value loss is the same as the retail value loss, $2,000,000.00.

For Maine Blueberries, farm gate value loss was $50,000.00, and retail value loss was $500,000.00.

And for Pennsylvania pumpkins, farm gate value loss was $5,000, but the retail value was $1,000,000.00.

The farm gate value loss ~ that is, the money farmers lost because those bees weren't there, totals just over $2,000,000.00. Because one farmer screwed up that much money was lost to many other farmers. You might wonder why they would tolerate that kind of behavior, wouldn't you?

If you total the loss to the agriculture economy because of this one incident, that is, killing 200 colonies of honey bees, the total value is $4,800,000.00 – nearly $5 million. That figure would, we suspect, get the attention of any government official who is worried about the financial condition of his local economy.

Of course there's the loss to the beekeeper, too. Without those 200 colonies there is the $30,000.00 replacement cost, and $102,000.00 lost in pollination fee income, for a total of $132,000.00.

But look at the comparative losses. The real loss to the beekeeper, a mere $132,000.00 is less than 3% of the retail loss – in science, that's not a significant figure, and in economics that's a rounding error. In beekeeping it's a bankrupt business. If you want to put a real world figure on that, each and every one of those 200 colonies ultimately generates.. – $24,000.00 for this nation's economy. $24,000.00. That is the true value of a pollination unit in a professionally run Commercial Beekeeping Business.

As we said, this is a quick estimate, but if you look at it, it's a pretty good estimate. There is a real financial loss – not only to beekeepers, but to growers, processors, wholesale and retail sellers, and ultimately consumers when pesticide application regulations are ignored or violated. And more importantly, when those regulations are not enforced by those responsible. Unfortunately, there's nothing left to take to the bank.

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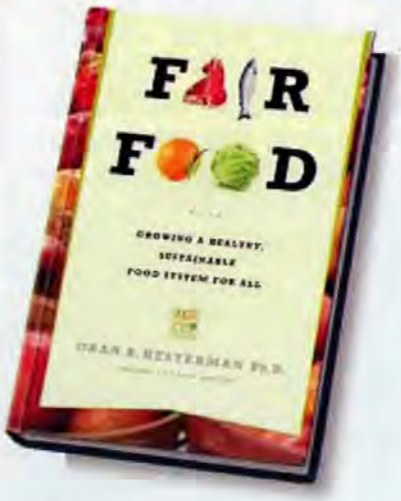
All of us at *Bee Culture* Magazine, and Root Candles wish you and yours a very Special Holiday Season. Here's our wish for a mild Winter, healthy bees, close friends and good family time.

Kim Kathy Dawn Amanda

Just In Time For The Holidays –



Fair Food: Growing A Healthy, Sustainable Food System For All. By Oran Hesterman. 304 pages. No photos or line art. Hard cover. ISBN 978-1-61039-006-4. $24.99. Electronic edition available.

If you believe the food system in this country is failing, or has already failed some or most of the people, and you want to do something about it, then this book is a good place to start. It isn't about bees or beekeeping, but the recent attention to food in general, and the loss of bees to CCD has a lot of people thinking about where does their food come from...here are some answers, some ways to improve the situation and some good ideas on where to start, and how to keep going. Hesterman suggests that the system we have now is neither healthy nor sustainable, and a new system is in order. A good quote from the book is that when trying to fix something that doesn't work, inventing a new system is better than trying the same things over and over. His concern is getting good food into the hands of every citizen, inner city, urban and country side, how to build and support farm markets and CSAs, getting good food into schools, and how to change public policy – from your community to a whole country. If you like to eat, start here.
Kim Flottum

The Handbook for Natural Beekeeping. The Apiary Standards of Certified Naturally Grown.

USDA Organic standards for beekeepers are difficult, and in most places impossible to accomplish. To accommodate beekeepers who wish to produce a natural product, and raise their bees naturally, without the extreme rigors of the USDA, Certified Naturally Grown has developed a set of standards for beekeepers that follow to a great degree those of USDA, but shy away from the foraging areas...the biggest limitation for most beekeepers. This book outlines these standards, spells out the activities allowed, the certification process, and reasoning behind the regulations. The book, available from CNG, 540 President St., Third Floor, Brooklyn, NY 11215 or from www.crm.naturallygrown.org/store. It can be ordered in bulk at a discount for members of your club. Retail is $7.00, bulk orders are as little as $3.68 each in quantitiy.

Probably the two most rewarding things in beekeeping are extracting your first super of honey and rearing your own queens. Actually looking into a colony of bees and seeing a queen that you raised then saying to yourself "I raised that queen" is very satisfying.

Then seeing a beautiful pattern of capped and uncapped brood is 'the frosting on the cake'.

There are several ways to rear queens and the most difficult way probably is using a grafting tool to manipulate the very youngest larvae to a queen cell cup, tops them all.

Transferring larvae with the cell punch tool method seems to be one of the easiest ways to relocate larvae to a queen cell bar in a frame. And you never have to touch the larvae.

A kit with some of the essential items to get started is available at a nominal cost.

It consists of some slices of an old broom stick handle or wooden dowel, a small cake of beeswax, the punching tool and two 8.5 X 11 pages of instructions with color photographs to follow the procedure.

It is available from: Wil Montgomery, 1401 Lakemont Dr. S., Southside, AL 35907

The kit costs $15 plus a couple for shipping.


Cell Punch

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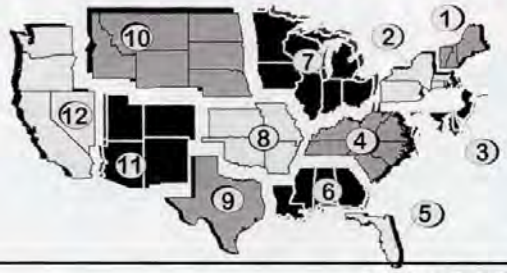
DECEMBER – REGIONAL HONEY PRICES



What difference does a year make? Take a look at December 2010 prices compared to today. Check out your region. Are you keeping up, or leading the way. Honey prices are outstepping most food items, and you should be taking advantage of this.

REPORTING REGIONS - 2010

	1	2	3	4	5	6	7	8	9	10	11	12	SUMMARY Range	SUMMARY Avg.	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.66	1.85	1.66	1.50	1.60	1.64	1.75	1.60	1.80	1.65	1.54	1.55	1.50-1.85	1.65	1.72	1.56
55 Gal. Drum, Ambr	1.63	1.75	1.63	1.48	1.55	1.48	1.85	1.60	1.40	1.63	1.51	1.55	1.40-1.85	1.59	1.54	1.41
60# Light (retail)	130.00	129.00	130.00	135.00	120.00	140.00	140.60	145.00	143.17	143.17	141.25	155.00	120.00-155.00	137.68	144.78	130.59
60# Amber (retail)	130.00	125.00	130.00	132.60	120.00	140.00	136.00	142.50	108.00	166.00	154.83	159.82	108.00-166.00	137.06	133.48	125.45
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	55.20	51.95	54.40	53.90	69.53	53.75	51.16	69.53	69.53	58.00	52.90	83.65	51.16-83.65	60.29	63.43	61.60
1# 24/case	85.56	75.57	76.20	81.20	101.67	90.38	73.80	89.60	72.00	99.84	74.40	101.93	72.00-101.93	85.18	90.92	79.44
2# 12/case	73.80	68.28	68.70	72.33	96.50	74.85	67.75	81.00	58.50	81.00	67.20	84.08	58.50-96.50	74.50	75.63	70.89
12.oz. Plas. 24/cs	68.16	70.37	66.40	68.33	60.00	73.33	58.45	79.60	66.00	61.20	70.45	74.40	58.45-79.60	68.06	70.77	62.98
5# 6/case	99.81	78.98	78.90	74.88	84.00	99.00	74.75	87.00	82.00	85.20	75.66	96.33	74.75-99.81	84.71	88.01	79.29
Quarts 12/case	104.73	110.88	112.20	105.12	96.00	91.69	95.00	103.50	126.00	120.06	97.28	119.33	91.69-126.00	106.82	109.63	106.86
Pints 12/case	69.44	56.95	66.00	69.00	61.50	55.38	65.50	64.35	96.00	92.40	57.50	72.00	55.38-96.00	68.83	72.27	67.66
RETAIL SHELF PRICES																
1/2#	3.00	2.98	3.23	3.29	3.68	3.33	3.50	2.76	3.19	3.15	3.30	5.00	2.76-5.00	3.37	3.68	3.25
12 oz. Plastic	3.50	3.82	3.41	3.77	5.00	4.07	3.43	4.21	3.65	3.71	4.06	4.59	3.41-5.00	3.93	3.78	3.99
1# Glass/Plastic	4.38	4.36	5.02	4.82	5.76	5.36	4.00	5.22	5.99	5.25	5.32	7.04	4.00-7.04	5.21	5.05	4.80
2# Glass/Plastic	7.50	7.44	8.62	7.71	9.50	7.52	7.72	8.85	8.42	9.07	8.63	10.75	7.44-10.75	8.48	8.38	7.96
Pint	8.94	8.50	6.50	6.81	6.15	6.39	6.66	7.05	9.75	7.63	7.30	9.12	6.15-9.75	7.57	7.90	7.75
Quart	12.25	9.60	11.00	11.42	12.00	10.84	13.66	11.43	18.50	12.75	10.78	15.75	9.60-18.50	12.50	11.82	11.99
5# Glass/Plastic	17.00	15.98	20.52	16.49	25.00	18.60	21.27	19.66	18.00	18.45	19.54	23.00	15.98-25.00	19.46	18.87	18.63
1# Cream	5.84	6.22	7.50	6.08	5.84	5.38	5.04	5.41	5.29	5.18	5.99	6.50	5.04-7.50	5.85	5.93	6.26
1# Cut Comb	6.50	6.78	6.50	6.95	8.06	6.13	5.85	7.25	8.06	8.00	7.20	11.50	5.85-11.50	7.40	7.95	6.79
Ross Round	6.36	5.22	6.50	5.33	6.36	6.25	6.00	7.25	6.36	6.36	7.45	8.62	5.22-8.62	6.50	6.97	6.52
Wholesale Wax (Lt)	3.00	4.00	2.75	3.36	2.15	4.08	3.42	5.67	5.50	5.00	3.00	5.25	2.15-5.67	3.93	4.22	3.91
Wholesale Wax (Dk)	3.00	3.15	2.75	3.14	2.08	3.58	4.50	4.75	5.00	3.58	2.58	4.00	2.08-5.00	3.51	3.43	3.37
Pollination Fee/Col.	90.00	102.50	70.00	43.60	127.50	60.00	55.00	75.00	89.23	89.23	66.67	116.00	43.60-127.50	82.06	82.89	81.98

REPORTING REGIONS - 2011

	1	2	3	4	5	6	7	8	9	10	11	12	SUMMARY Range	SUMMARY Avg.	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.72	1.90	1.72	1.51	1.74	1.72	1.68	1.70	1.79	1.75	1.67	1.70	1.51-1.90	1.72	1.82	1.56
55 Gal. Drum, Ambr	1.86	1.73	1.86	1.49	1.75	1.60	1.91	1.70	1.61	1.49	1.58	1.60	1.49-1.91	1.68	1.75	1.41
60# Light (retail)	149.00	161.00	162.00	145.25	159.00	156.67	143.86	151.25	127.50	139.80	158.00	182.50	127.50-182.50	152.99	146.10	130.59
60# Amber (retail)	155.00	151.00	167.00	150.60	162.00	160.00	138.00	146.67	141.00	144.61	154.33	177.50	138.00-177.50	153.98	142.47	125.45
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	63.36	77.43	54.00	61.80	69.65	60.00	52.48	72.00	69.65	56.00	58.50	87.87	52.48-87.87	65.23	62.51	61.60
1# 24/case	115.20	99.36	91.60	79.15	84.00	93.31	84.45	91.70	82.00	111.48	92.10	118.48	79.15-118.48	95.24	90.27	79.44
2# 12/case	94.30	81.51	85.90	81.33	88.00	86.32	96.00	90.00	81.25	86.16	76.50	88.50	76.50-96.00	86.31	73.81	70.89
12.oz. Plas. 24/cs	91.28	93.26	74.20	67.12	72.20	80.50	76.64	81.40	76.00	74.08	72.00	77.87	67.12-93.26	78.05	73.76	62.98
5# 6/case	141.00	98.51	89.20	78.68	96.00	118.00	91.81	97.00	82.00	88.98	87.19	99.33	78.68-141.00	97.31	83.44	79.29
Quarts 12/case	126.13	156.23	142.80	113.75	122.00	123.90	106.80	104.75	126.13	137.64	121.40	135.33	104.75-156.23	126.40	111.20	106.86
Pints 12/case	96.38	82.98	84.60	84.25	72.00	61.43	77.83	74.10	80.75	110.88	65.40	79.00	61.43-110.88	80.80	76.29	67.66
RETAIL SHELF PRICES																
1/2#	3.00	4.24	3.03	3.38	3.53	3.00	3.09	3.03	3.53	3.25	3.48	4.00	3.00-4.24	3.38	3.33	3.25
12 oz. Plastic	3.75	4.95	3.43	3.82	4.48	4.25	3.58	4.12	4.00	3.63	4.51	4.83	3.43-4.95	4.11	4.06	3.99
1# Glass/Plastic	5.50	5.74	5.49	5.95	5.04	5.70	6.52	5.57	5.00	5.13	5.28	7.44	5.00-7.44	5.70	5.40	4.80
2# Glass/Plastic	10.00	8.39	10.52	9.23	7.59	8.60	8.25	8.07	7.50	9.13	8.40	11.33	7.50-11.33	8.92	8.99	7.96
Pint	7.72	7.59	8.00	6.62	6.54	6.66	7.31	7.37	6.25	8.40	7.14	9.87	6.25-9.87	7.46	7.38	7.75
Quart	13.05	13.05	14.00	11.33	10.25	11.25	11.77	11.61	13.05	13.77	12.08	15.95	10.25-15.95	12.60	12.63	11.99
5# Glass/Plastic	23.75	18.89	25.22	18.70	23.00	22.00	17.62	20.83	21.00	16.22	18.99	23.00	16.22-25.22	20.77	20.62	18.63
1# Cream	6.75	6.74	6.80	6.15	6.75	5.85	6.17	6.62	6.75	6.17	6.99	6.95	5.85-6.99	6.56	6.10	6.26
1# Cut Comb	7.50	7.32	7.80	8.00	8.18	5.83	8.18	6.68	7.92	12.00	8.50	10.25	5.83-12.00	8.18	9.28	6.79
Ross Round	7.30	6.95	4.75	5.50	7.30	6.50	8.50	7.00	7.30	7.30	7.50	8.50	4.75-8.50	7.03	7.00	6.52
Wholesale Wax (Lt)	3.25	5.00	3.75	3.28	3.30	5.51	4.87	4.50	4.50	4.95	4.40	4.13	3.25-5.51	4.29	5.01	3.91
Wholesale Wax (Dk)	2.25	4.15	2.70	3.11	2.15	4.50	3.49	3.50	3.49	4.49	3.72	3.75	2.15-4.50	3.44	3.97	3.37
Pollination Fee/Col.	90.00	112.50	75.00	44.50	55.00	66.67	56.14	75.00	88.58	88.58	58.00	103.75	44.50-112.50	76.14	80.28	81.98

GUEST EDITORIAL

A Review Of The SETAC Pellston Pesticide Workshop

written by David Fischer, Bayer CropScience and Thomas Moriarty, EPA

Rosemary **Mason**

On 15th September the Executive Summary of the Pesticide Risk Assessment for Pollinators from the five-day SETAC Pellston Workshop in Florida, held in January 2011, was published. The 45-page document confirms what many had already suspected. The pesticide companies have total control over testing and registration of their own products.

The report was written by David Fischer from Bayer CropScience and Thomas Moriarty from the U.S. EPA Office of Pesticide Programs. The most damning statement appears on page 12 of the SETAC report:

"Many who are familiar with pesticide risk assessment recognize that the methodology and testing scheme for foliar application products (where exposure may be primarily through surface contact) is not adapted to assess potential hazard and risk from systemic pesticides."

So, for many years, the systemic pesticide risk assessments have only involved a basic Tier 1 analysis.

"A Tier 1 analysis is a conservative screen that efficiently separates those compounds that will not present a potential risk from those compounds that may present a potential risk".

The report admits that these tests are only suitable for foliar pesticides, since they are based on *"the determination of the length of time between application and when bees could be safely exposed to residues on leaves and flowers of a treated crop."*

When pesticides are coated on the seed and absorbed into the whole plant bees cannot be protected because toxins are excreted in pollen and nectar and can be collected for the entire flowering period.

The authors of the report also admitted that they still had no suitable standard tests for chronic toxicity to either adult honey bees or their larvae. Chronic toxicity tests on adult and larval bees *"require further development."* Conference members agreed that when these were developed they should be required as part of Tier 1 testing.

It appears the purpose of the SETAC meeting was to try to develop methodology and protocols for tests that are specific to systemic pesticides whilst still allowing them to remain on the market.

"Higher tiered semi field or tunnel tests are recommended to refine the oral exposure assessment, at the colony level to both systemic and non-systemic sprayed on foliage." "...but development of tiered species specific tests requires significant effort and is seen as a high priority for future research."

The workshop participants were aware of the scientific literature from bee researchers in several Universities in France and Italy, (were not present at the conference).

"Sub lethal impacts of pesticides on honey bee learning, behaviour and physiology have been well documented in the scientific literature." Instead of accepting this as a reason to suspend them urgently, delegates apparently agreed that further research was required. *"Additional work is needed in both laboratory and field test scenarios."* [Much of this work has already been done. In 2003, in a 108-page document, the *Comité Scientifique and Technique* in France reviewed all the independent scientific evidence on systemic pesticides[3]. Their findings were that *"the treatment of sunflowers is a significant risk to bees in several stages of life"*. Tunnel tests were also done in France in 2004, by scientists from Montpellier, Orléans and Avignon Universities[4]. They demonstrated that sub-lethal doses of six ppb *imidacloprid* or two ppb *fipronil* were enough to disrupt feeding. These were precisely the effects that Bayer itself had advertised for its use in termite control. In addition, the bees also exhibited signs of intoxication].

The SETAC conference was heavily sponsored by the pesticide industry, so they were well represented; three from Bayer, two from Syngenta, two from BASF, one from Monsanto and one from DuPont. In December 2010, comments from the global beekeeping network were that some independent bee scientists who had published the most important peer-reviewed research on neonicotinoids confirming that they were toxic to honey bees were excluded.

The UK was represented by Mark Clook (Chemical Regulation Directorate) and Helen Thompson (Food & Environment Research Agency, FERA). Helen Thompson had worked closely with three scientists from Bayer, Syngenta and Dow on the International Commission on Plant-Bee Relationships (ICPBR) Bee Protection Group (she was the Group's secretary). The same three had also helped with the UK Defra Research SID5A (2007-2009) Systemic Pesticide Risk Assessment, which, incidentally, only got as far as protocols for Tier 1 tests.

The conclusions of the ICPBR working group in 2008 were that protocols for the second and higher tier (Tunnel Tests and Field Tests) **were still to be developed.** So, members of the ICPBR must have known for **at least three years** that the science underpinning protocols for risk assessment for systemic pesticides was inadequate. The ICPBR have 17 members on their three bee working groups. Six are from the pesticides industry, some of whom service two groups. This may explain why the CRD,

FERA, Defra and the AFSSA (French equivalent of FERA) have repeatedly advised UK and European Ministers and informed us, the public, that there was no evidence that the neonicotinoid pesticides are harmful to honey bees.

In January 2011, on the U.S. EPA Home Page, one of Administrator Lisa Jackson's mission statements was: ***"We have greater opportunity to protect human health and the environment than before."*** Yet, on December 13th 2010 her Office of Pesticide Programs had run a workshop: ***Streamlining the Risk Assessment Process.*** Robert Schulz had designed an electronic programme (e-Builder Dossier) to facilitate the registration of pesticides by the applicants. According to slide 18, the prime benefits were *"reduced cost to the EPA,"* and *"quicker processing."*

Research and Recommendations. Also in the SETAC report, were 12 items for 'future' consideration. None had got beyond the 'ideas' stage. If actually followed up and developed most of them would take the industry and protection agencies many years to achieve. Many are very basic to safety, such as chronic toxicity studies on honey bees and larvae.

In the case of most of the items for "future research," the studies have already been done by independent scientists and have been published in peer-reviewed journals. Many scientific studies from around the world now confirm the acute and chronic toxic effects of systemic neonicotinoid pesticides on bees.

The following are just a small sample from literature; sub-lethal exposure makes bees susceptible to infections and increases mortality[5,6]; sub-lethal exposure causes abnormal foraging behaviour[4,7]; ingestion of dust from maize coated seeds during sowing kills bees[8]; consumption of guttation drops in seedlings causes death[1] and independent laboratory tests show that neonicotinoids are toxic to bees[9].

The whole point of the SETAC Pellston conference should have been for global experts to create standardised protocols. Instead, the pesticides industry achieved their aim of keeping the systemic neonicotinoids on the market by excluding the real experts. The Executive Summary proves it was a talking shop, apparently for public show. Scientific jargon was used to confuse non-expert members, such that one delegate subsequently reported: *"We are generally pleased with the increased intensity of pesticide screening discussed."*

Yet Bayer CropScience must have known for many years that honey bees were at risk. In April 2004, the President of the French Beekeepers, Henri Clément, survived a personal court action against him by Bayer (the charge was that he had defamed their products). He was able to defend himself against the might of Bayer's lawyers, by citing the 2003 findings of the *Comité Scientifique and Technique* that linked low doses of *imidacloprid* to the disorientation and disruption of foraging[3].

In Italy in September 2008 the Ministry of Health and the Ministry of Agriculture decided to apply the precautionary principle and suspended on an annual basis the insecticides on maize treated seeds (*clothianidin, thiamethoxam, imidacloprid and fipronil*). According to a letter of July 8th 2011, sent by Dr Porrini and Professor Maini to the European Commission Enquiry into Bee Health[10]: *"Winter beehive losses declined from 37.5% in 2007-2008 to around 15% in 2010-2011. No major ground-based pest attacks were observed even without using treated seed."* As a result, in a court in Turin, July 2011, Prosecutor Guariniello, who had conducted an investigation into the memory of bees, sent a warning to the managing directors of Bayer CropScience in Milan and Syngenta Crop Protection in Italy. They would be charged with the spreading of disease to animals (or plants) which pose a danger for the national economy. If the managers are found guilty of these offences, the penalty ranges from 1-5 years[11].

In the U.S., beekeepers are reported to be losing, on average, 30-50% of their hives each year; it is obvious that these losses cannot be sustained. Despite this, the U.S. EPA has consistently claimed that it was *"not aware of any data that reasonably demonstrates that bee colonies are subject to elevated losses due to chronic exposure to this pesticide."*

The situation in Europe is similar. In November 2010, the Corporate Observatory Europe and the European Beekeeping Coordination wrote a seven-page Report[12]: **Is the Future of Bees in the hands of the Pesticide Lobby? European Commission allows corporations to shape the pesticide rules.** In Europe, the Draft Assessment Reports are written by the pesticide companies themselves. As in the U.S. EPA, the Protection Agencies deny absolutely that systemic neonicotinoids have toxic effects on honey bees. On 25th January 2011, John Dalli, European Commissioner wrote: *"on the basis of current knowledge a ban would not be justified"*. On 15th February 2011 the UK CRD wrote: *"the data have not raised any cause for concern."* However, by SETAC's own admission, all the Protection Agencies have been giving registration for systemic pesticides at an extremely basic level (Tier 1) and, as it turns out, using inadequate and inappropriate tests and protocols. BC

Rosemary Mason is a naturalist and author from South Wales, UK

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THE INTERNATIONAL HONEY MARKET

One U.S. Perspective

Nicholas **Sargeantson**

The world, and the U.S. honey market, has changed a great deal since I first started working in the mid 1970s. At that time, and until the mid 1980s, the U.S. imported mainly from Mexico, Argentina and Canada. We didn't have computers or email or mobile phones. We managed very well with a clanking telex machine, and to reach the truly remote places we sent cables. It was a simple life. We had never heard of a dumping case or the concept of traceability, and seldom heard about antibiotic residues. We did worry about commercial adulteration, even then, but the most serious quality problem we faced, perhaps, was when FDA found "rodent hair" in honey samples taken from drums. This happened a couple of times. On the first occasion we assured FDA that filtration would remove the offending hair, and the goods were released. But that reasoning didn't work on the second occasion. This time, FDA argued – very plausibly – that if a rodent dropped its hair in the honey, this may not have been the only deposit left behind. The rejection notice stated, memorably, that the honey must be re-exported or destroyed due to "*soluble filth elements.*"

In the course of this talk I will try to explain what has changed in the U.S. honey market over the past 30 years. I will address the dumping case issue at some length, because the impact on our market has been immense. I will discuss quality issues (of the more serious kind), talk about the major supplying countries, and close with some comments about the current market and future prospects.

First, let's look at U.S. domestic honey production. [See Figure 1] An average crop over the past 30 years has been about 87,000 mt (metric tons), but if we consider the decade from 2000-2010 the average was 78,000 mt. And if we further narrow the focus to the five-year period 2006-2010 the average drops to just 72,000 mt. Interestingly, the decline in production over the past 10 years has occurred in spite of the historically high prices we have seen over the same period, so clearly factors other than price must have been responsible for the smaller crops. Weather – perhaps more accurately, climate change – has obviously played a major role. Then there is the matter of colony collapse disorder and bee health in general. Lastly, I would mention that, anecdotally at least, the number of retiring beekeepers in the U.S. is apparently greater than the number of younger people coming into the business.

This talk was delivered at the Apimondia congress in Argentina, 2011 by Nicholas Sargeantson, owner of Sunland Trading Inc.

It would seem, therefore, that while domestic production fluctuates quite widely from one year to the next, the overall trend is downwards.

Honey consumption in the U.S., on the other hand, has almost doubled, from around 113,000 mt in 1980 to around 190,000 mt today. [See Figure 2] There are three major sectors in the market: retail (honey in jars), food service (honey for restaurants and hotels), and industrial (bulk honey for use as an ingredient in other products). Although there has been growth in all three sectors, food service and – more particularly – the industrial business has grown much faster than retail, with numerous foods, wines and beers, candy and pharmaceutical products now advertising honey as an ingredient. On the retail side, sales of organic honey have been increasing steadily.

With domestic production now averaging around 80,000 MT, and declining, and consumption at about 190,000 mt, and rising, the need for imported honey is obvious. Imports have risen from about 23,000 mt in 1980 to 116,000 mt in 2010. [See Figure 3]

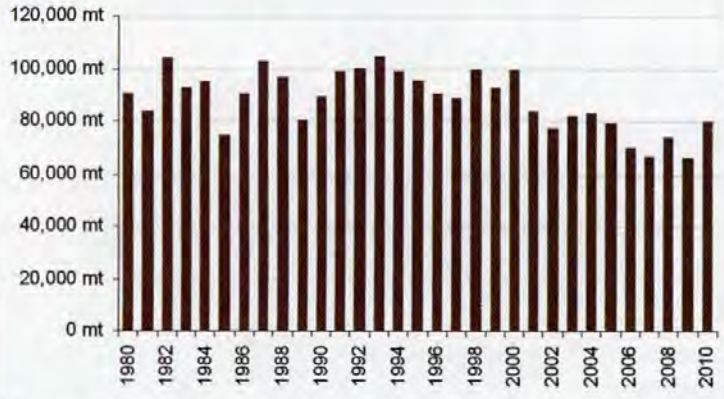
As I indicated earlier, in the 1970's and until the mid-1980s the U.S. had three principal sources of imported honey: Mexico, Argentina and Canada. From the mid 1980's onwards, however, Mexican production and exports began to decline, and China began to displace Mexico as a primary supplier to the U.S.

Although Chinese honey first began to appear in the U.S. market in the late 1970s, until 1990 the annual volumes shipped did not exceed 10,000 mt. From that year onwards, however, imports increased rapidly, reaching close to 30,000 mt by 1992. In 1993 the American Honey Producers Association (AHPA), the American Beekeeping Federation (ABF) and Sioux Honey Association (SHA) joined forces to file a dumping case against China, accusing the Chinese, in effect, of selling honey below cost. As is all but inevitable in cases against Chinese exports, they were found to be "dumping," but the case was settled when the U.S. Dept of Commerce (DOC) and the Chinese government entered into a "Suspension Agreement." This agreement, signed in the Summer of 1995, set quotas limiting the quantity of Chinese honey allowed into the U.S. market annually, and also meant that the Chinese had to sell at or above minimum prices set by the DOC. Overall, the effect of this dumping case on honey prices was not dramatic; prices certainly increased, but we did not see anything like the reaction which the next dumping case was to generate.

In 2001, while the Suspension Agreement was still in effect, AHPA and SHA filed a new dumping case, this

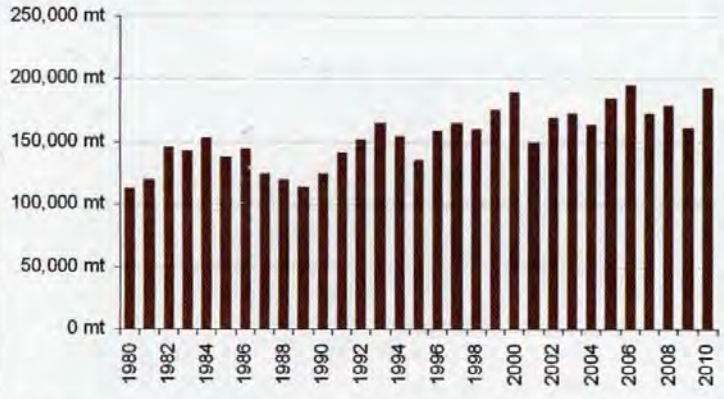
To say, as I do, that Chinese honey exporters have not been treated fairly, and that the dumping order has been a failure and should be dropped, is not to condone the illegal circumvention of dumping duties.

Fig. 1: U.S. Honey Production
From 1980 to 2010



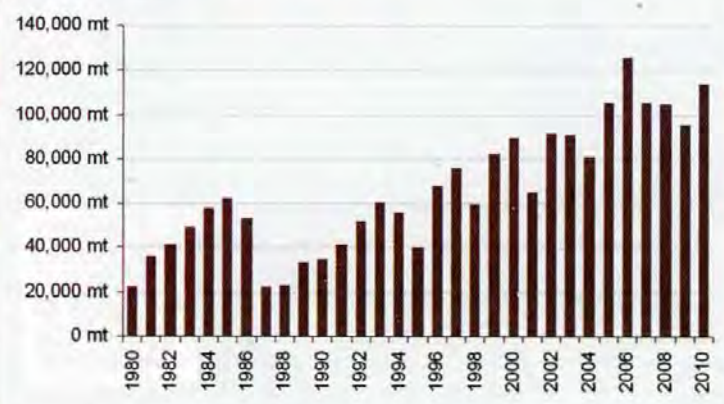
Source: U.S. Dept. of Commerce, Bureau of Census.

Fig. 2: Total Honey Consumption in the U.S.
From 1980 to 2010



Note: Total consumption is defined as the sum of total imports and total domestic production
Source: U.S. Dept. of Commerce, Bureau of Census.

Fig. 3: U.S. Total Honey Imports
From 1980 to 2010



Source: U.S. Dept. of Commerce, Bureau of Census.

time against China *and* Argentina. Even before the case had been heard by the International Trade Commission, or dumping duties imposed by the DOC, honey prices began to rise. By 2002, when "dumping" was found against both countries, there was panic in the market. Prices doubled in some cases, with domestic white honey reaching over US$3800/mt, an historic high at the time.

Why was the impact of this second case so much greater than that of the first? Apart from the obvious (that both China *and* Argentina were now under dumping case restrictions), this time there was no Suspension Agreement with China. The Chinese felt that the filing of this second case was grossly unfair, and of questionable legality. It accused them of "dumping" when for five years they had been shipping only in quantities and at prices set by the U.S. government according to the Suspension Agreement. They were in no mood to negotiate a new agreement of any kind.

To say, as I do, that Chinese honey exporters have not been treated fairly, and that the dumping order has been a failure and should be dropped, is *not* to condone the illegal circumvention of dumping duties. However, due to the complex – and seemingly changeable – formula used by the DOC to calculate exporter-specific dumping duty rates, it has proved impossible for any Chinese exporter to obtain, and then keep beyond the first review, a workable duty rate. A number of Chinese companies, in the early months of the dumping order, made an earnest effort to play by the rules; all of them failed. Eventually the Chinese realized, as did U.S. importers, that the dumping order was a de facto embargo on Chinese honey exports to the U.S. market, and that while the U.S. continued to classify China as a "non-market economy" Chinese exporters would never get a fair hearing at the DOC.

After the established importers concluded that the legal trade in Chinese honey was dead, and further business impossible, the back-street people took over. Until late last year, when U.S. Customs moved to block imports from certain countries that were clearly transit hubs and not honey producers, Chinese honey had continued to enter the market in large volumes. While the flow seems to have slowed to a trickle, for now, I do not believe that enforcement is the long-term solution to the problem, and I will return to this issue later.

More problematic, in many respects, is the fact that countries like India and Vietnam, which have legitimate and growing honey production and exports of their own, have also been exploited for the trans-shipment of Chinese honey.

India, in particular, has been the focus of a lot of criticism, some of it justified, much of it nonsense. Some recent articles proclaim that in the first half of this year Indian honey exports to the U.S. "surged" to about 27,000 mt, and that this "tsunami" of Indian honey, mostly of "Chinese" origin, threatens to "drown" the U.S. market. In fact, U.S. National Honey Board figures show that just under 23,000 mt of Indian honey entered the U.S. between January 1 and August 31 this year. Given that India itself now produces (mostly in the first six months of the year) over 60,000 mt of honey, the fact that they have exported 23,000 mt to the U.S. is hardly a surprise, and is slim evidence indeed for the accusation of fraud on a grand scale. And just how 23,000 mt is going to "drown"

a market that will import over 110,000 mt this year, is not easy to explain. India is shipping, it is reported, "large amounts of white honey, which are atypical of tropical countries". (True: white honey is not generally produced in tropical climates, but *northern* India does not have a tropical climate and does produce a substantial crop of white honey from mustard plants). "Almost all Indian exporters," we read, "are located in Punjab," implying that the only domestic honey to which they have access is the material produced in that state where, the article says, the yield is "about 10,000 metric tons." (In fact, production in the Punjab is closer to 15,000 mt, but in any case the exporters buy honey from many parts of a huge country which produces – as I mentioned – over 60,000 mt). The Indian press reported in February, we are informed, that the honey crops would be down by 40% this year, so there is no way, it is implied, that the volume exported could be of Indian origin. (So, we must conclude, honey crop forecasts are always accurate, and beekeepers never highlight the negative!). The presence of lead in Indian honey, it is claimed, "is a tell-tale sign that some of this honey originated in Chinese provinces." (It is nothing of the kind. The lead was coming from the 25kg soldered tin cans used by Indian beekeepers, but now being phased out and replaced by plastic pails). Those corrections notwithstanding, however, there is no doubt that Chinese honey has been shipped to India, and that some of this product has been trans-shipped to the U.S. The situation, however, is a lot murkier than some realize. Chinese honey is being used in the local market in India, and is being re-exported, legally, to the Middle East.

So, as you can see, the life of a U.S. honey importer is simple no longer. Navigating the shoals of Chinese honey is not easy. And it's not surprising in this context, with so many false accusations and so much wildly inaccurate information being tossed about, that U.S. Customs tends to consider with suspicion almost any shipment of honey from an Asian country. As importers from India and Vietnam we must indeed remain vigilant in our efforts to ensure the integrity of the product we deliver to our customers, but that being said, the recent articles I have referenced slander the honest producers and exporters of those countries.

Turning now to quality issues, and speaking as a U.S. importer, there are three major areas of concern: commercial adulteration, residues and, due to the Chinese trans-shipment issue, country of origin.

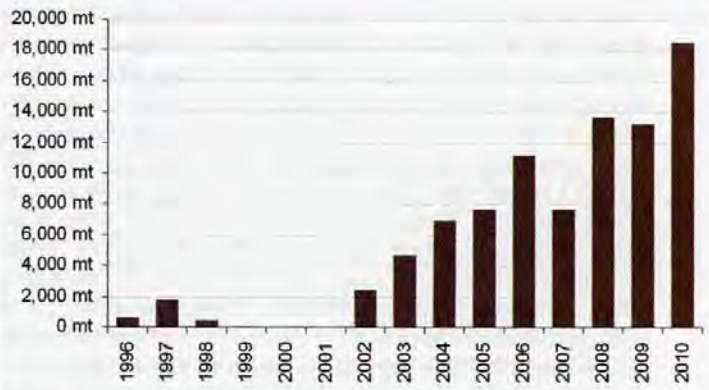
The commercial adulteration of honey, that is, the addition of other sugars of one type or another for the purpose of deceiving the buyer, is an occupational hazard in this business. And by the way, adulteration is not confined to imports, as some would like you to believe; it is as much a problem within the U.S. as without. Unfortunately, as a liquid product, honey lends itself to adulteration; it is simply too easy, and the profit incentive too great, for the unscrupulous to resist. The only aspect to have changed over the past 30 years is the level of sophistication. Where formerly the adulteration was mainly with C4 sugars (corn or cane origin), and quite easy to detect using the SIRA test, now it is often with C3 sugars (from beet or rice), and harder to find.

When it comes to residues in honey – again a problem affecting domestic as well as imported product – U.S. regulations are troublesome and need revision. While there are tolerances established with FDA for residues in a variety of major food products, there are none for residues in honey – except in the case of tylosin, an antibiotic approved for use in beekeeping. I have to remind exporters of the situation over and over again: the presence of *any* detectable amount, of *any* residue, is not just unacceptable, it's illegal. Any country, I should add, that has not already eliminated the use in beekeeping of chloramphenicol and fluoroquinolones (ciprofloxacin, enrofloxacin, etc) risks facing very serious trouble in the U.S. market. If FDA finds a residue in a particular shipment, they will issue an alert, putting the exporter on the list for Automatic Detention. And once an exporter's name is on that list, getting it removed is costly and takes a lot of time.

Country of origin testing has become a major issue in the US market because of the Chinese trans-shipment problem. U.S. Customs has been using the so-called 'trace metal' or 'soil' test in order to identify goods which may be of Chinese origin, but the test is notoriously unreliable and frequently gives false positives. The pollen test used in Europe appears to be far more dependable, but U.S. Customs has so far declined to use it.

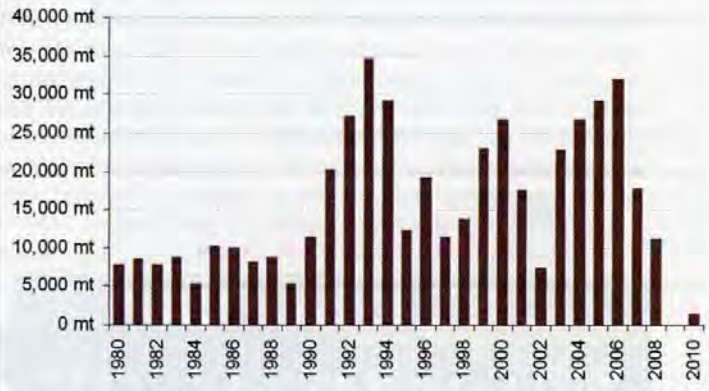
This seems an appropriate moment to say a few words about the U.S. True Source program. I was not enthusiastic about the concept when it was first announced. Like

Fig. 4: U.S. Imports from India
From 1996 to 2010



Source: U.S. Dept. of Commerce, Bureau of Census.

Fig. 5: U.S. Imports from China
From 1980 to 2010



Source: U.S. Dept. of Commerce, Bureau of Census.

others, I am sure, I rolled my eyes at the prospect of yet more paperwork and, and more to the point, I saw it as a distraction from what I consider a more fundamental need in the U.S. honey industry: to drop the dumping case and to 'legalize' Chinese honey. While I support enforcement action against circumvention, of course, in my opinion this is not a long-term solution to the intractable problems we have all faced since the first dumping case was filed. The playing field will never be level (by which I mean that those companies using or trading in trans-shipped Chinese honey will continue to reap huge commercial advantage over those who do not), the illegal activity will never truly cease, until we dump the dumping case. However, I have no illusions about the difficulty of selling this concept to U.S. beekeepers, and my company has joined the True Source program in the meantime.

A few words now on the main honey-supplying countries to the U.S. market:

I would argue that Argentina, our gracious host for Apimondia this year, perhaps deserves first prize as 'most favored exporter' to the U.S. market. U.S. packers appreciate Argentine honey for a number of reasons: the availability of white honey, low moisture, mild flavor and taste, without granulation problems, clean and free of residues. It is the ideal blending honey. Although white is the preferred color, the U.S. also buys ELA and LA. Argentina, by the way, has been able to maintain its position as a leading exporter to the U.S. in spite of the dumping case - principally because, as a "market economy" it is not subjected to the same treatment as China.

Historically, Uruguay's primary market has been Germany, but there are years – and this is one of them – when the U.S. is also an important destination. U.S. packers can generally use Uruguayan honey interchangeably with Argentine, the only drawback being that the proportion of white honey is lower in Uruguay than in neighboring Argentina.

The U.S. market has in some ways been a beneficiary this year of European problems with PAs (pyrrolizidin alkaloids) and GMOs (genetically modified organisms). Faced with the near-impossible task of guaranteeing their honey free of PAs and GMOs, Argentine, Uruguayan and Brazilian exporters are going to continue preferring the U.S. market over the EU.

What Brazil has achieved in just 10 years is remarkable. Brazilian honey is mainly LA in color, with some ELA and less white. Although moisture can sometimes be higher than we would like, the flavor is generally excellent and to my knowledge there has never been any problems with antibiotic residue.

Vietnam started producing and exporting honey in the mid 1990s, and production has steadily increased to the point where they have become a major supplier to the U.S. market, mainly of light amber for industrial and food service use. There have been problems with residues, but the Vietnamese exporters are committed to keeping their product 'clean' and they recognize that their future, and the future of the entire Vietnamese honey industry, depends upon maintaining quality standards and ensuring the integrity of their product as 100% Vietnamese.

India also started exporting in the mid 1990s, although volumes were small until 2002. [See Figure 4]

The cynics – or perhaps I should say those determined to misrepresent the facts – have said that the rise in Indian honey exports has been due mainly, even entirely, to the dumping case and the resulting trans-shipment of Chinese honey. They happen to be right in one respect only. Indian honey production, *and* Vietnamese, *and* Brazilian, was indeed given a boost by the dumping case. When a trade barrier is erected against supply from one country – or from two countries in this case – *of course* prices rise and new suppliers move in to meet demand. There is nothing surprising or sinister about that. Yes, there have been problems with residues in India too, but the Indian government has introduced measures to curtail the use of unapproved antibiotics and to replace the tin cans with plastic pails.

Canada has always been a key supplier to the U.S. market, in spite of the relatively small volume involved. Total production in Canada is generally about 30,000 mt, and about half of this quantity is exported to the U.S. Canadian honey is mostly white, of very high quality, and is typically blended with domestic and/or Argentine for the retail sector.

As mentioned earlier, Mexico was once a major supplier to the U.S., but with steadily declining production and higher prices often being paid in Europe, Mexico has not been a significant exporter to the U.S. in recent years. There is, however, a demand in the U.S. for Mexican orange and mesquite honey, and for Yucatan when prices are within reach.

And finally, in my round-up of the exporting countries, I come back to China [See Figure 5] , a major supplier to the U.S. for many years. Officially, China is no longer a supplier, and we expend an enormous amount of time and money trying to ensure that our access to this important source remains blocked. Unofficially, Chinese honey continues to enter the country – to the enormous benefit of the unscrupulous and the detriment of the principled. In my view we should drop this ridiculous game we call the dumping case and concentrate our efforts on making certain that the Chinese product arriving in the U.S. is pure and free of residue.

And so, what can I say about the current market, and a seller's prospects for the next few months? We started this year with a severe shortage of honey in the U.S., and great concern (in January and February) about the Argentine crop prospects. It was going to be a short crop in Argentina, we heard, only about 50,000 mt, some said. On that news, and with few offers at that time from Vietnam or India (where the crop was "down 40%" of course), U.S. buyers came into the market aggressively. We were just a little off in our projections. In Argentina the crop was probably close to 75,000 mt, and India, as we heard, managed to "drown" the U.S. market with 23,000 mt. Further easing the supply situation for U.S. buyers has been the 'GMO factor' in Europe: packers in Germany have continued to buy hand-to-mouth pending some resolution of the GMO issue, and this has put downward pressure on prices. After the inconclusive GMO announcement on September 6 it is clear that the uncertainty will continue.

However, the U.S. domestic honey crops in the all-important Midwest this Summer (July/August) were generally disappointing. Taken in conjunction with very poor crops elsewhere in the country – most notably in California where they failed – the total U.S. honey production in 2011 may be no more than 68,000 mt. It is significant that in the period Jan-Aug this year the U.S. had already imported over 19,000 mt of Argentine honey, and it is clear that volumes will remain high for the Sep-Dec period. Vietnam and India appear to be sold out until their new crops start in January.

In view of the ever-widening gap between U.S. domestic honey production and consumption, and keeping in mind the fact that Chinese circumvention seems to be controlled – at least for the moment – it seems clear that the U.S. will continue being the dominant buyer on the world honey market in the coming months. BC

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A Closer Look

OVARIES & OVARIOLES

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

A large-scale study was designed to assay the overall quality of 75 queens obtained from various commercial sources. Although all 10 commercial sources evaluated provided queens with ovariole numbers within the expected range, ovariole number was found to vary significantly across sources.

The ovaries of the European honey bee, *Apis mellifera*, queens and workers are divided into elongated tubular ovarioles. Each ovariole is a long slender tube throughout most of its length, the walls of which consists of a single layer of cells invested in a thin membrane; only the extreme upper, thread-like end has no lumen (inside space of a tubular structure) and consists of a solid row of stem cells lined up in single file (Snodgrass 1956, Gutzeit et al. 1993). Queens have from 100-180 ovarioles per ovary, whereas, workers typically have fewer than 10 ovarioles per ovary (Snodgrass 1956, Velthuis 1970, Chaud-Netto and Bueno 1979). This striking difference in ovariole number (and corresponding reproductive capacity) between queens and workers is a result of programmed cell death of ovarian tissue during worker development of larvae not fed a diet of royal jelly (Reginato and Cruz-Landim 2002, 2003).

The two large pear-shaped ovaries of the queen are located in the anterior portion of her abdomen. The anterior ends of the ovarioles are thin threads, adhering together and attached to the ventral side of the heart at the anterior end of the abdomen (Dade 1962). The distal curved ends of the ovaries are attached to each other (Snodgrass 1956). The ovariole tube gradually enlarges in diameter posteriorly and presents a continuous series of swellings which increase in size as you descend down the tube. These swellings are due to the contained eggs in successive stages of development together with their accompanying nutritive cells. Since the queen bee lays eggs throughout a long period of time, her ovaries always contain eggs in all stages of growth, and consequently the ovaries of different individuals do not differ much in appearance. At the posterior end of each ovary, the ovarioles come together into a lateral oviduct and these two ducts unite in a short common oviduct which opens into a wide terminal sac, the vagina.

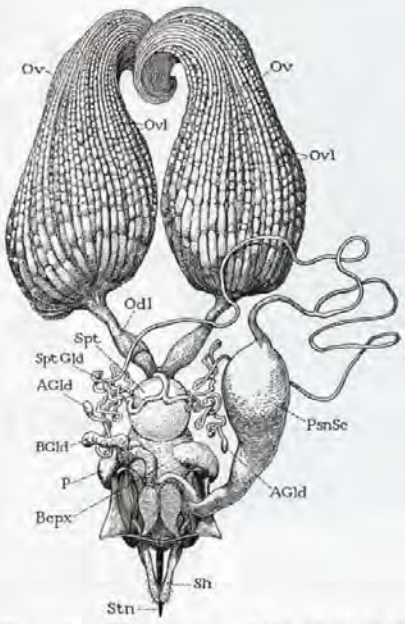
Egg cells are budded off from the germinal tissue in the tips of the ovarioles, and begin to slide down the tubules (Dade 1962). As they go, they become differentiated into three kinds of cells: the true egg cells, nurse cells, and small follicle cells which cluster round the egg cells and form a continuous sheath round each (chorion), except at the forward ends. At the apex of the egg, where it is not covered by follicle, a small area, the micropyle, remains naked, or covered only by an exceedingly thin membrane. It is through the micropyle that spermatozoa penetrate when the egg is fertilized (Dade 1962). Egg cells alternate with masses of nurse cells, the protoplasm of each egg being in direct contact with the nurse cells which follow it. As they continue to pass down the ovariole, the nurse cells absorb food through the transparent, delicate walls of the ovariole, and increase in size, while the egg

"The striking difference in ovariole number (and corresponding reproductive capacity) between queens and workers is a result of programmed cell death of ovarian tissue during worker development of larvae not fed a diet of royal jelly."

takes nutrients from the nurse cells and also quickly grows larger. Growth continues to a point when the nurse cells begin to shrink, and eventually, as the egg approaches full size, the last of the nurse cells are absorbed. The follicle cells also disappear, leaving a fine network of markings on the exterior of the egg. The individual egg cells start developing in the tips of the ovarioles and reach the oviduct in two to three days, at which time they are ready to be laid (Eckert and Shaw 1960).

The caste differences in number of ovarioles per ovary commences in the last larval instar as a result of differential feeding of queen and worker larvae and consequent caste-specific modulation of the juvenile hormone and ecdysteroid titers (Rachinsky et al. 1990). The elevated juvenile hormone titer in queen larvae prevents the induction of programmed cell death in the ovariole anlagen (initial clustering of embryonic cells from which a part or organ develops; primordium) at the onset of metamorphosis (Schmidt Capella and Hartfelder 1998) and practically all ovarioles in the ovary survive to the adult stage. In contrast, programmed cell death in the worker ovary reduces the number of ovarioles during metamorphosis from 150 to 200 primordia to fewer than 10. The ovarioles degenerate in response to a disorganization in the actin cytoskeleton in the germ cells. The dissociation of actin from spectrin in the larval germ cells occurs as a result of the low juvenile hormone titers in worker larvae and can be rescued experimentally by hormone application (Schmidt Capella and Hartfelder 2002).

During pupal development the ovary anlagen undergo extensive differentiation, and at adult eclosion (emergence from pupal case) the subdivisions typical of the polytrophic meroistic ovary type have become apparent in queens. Yet during the first days after emergence from the brood cell, the follicles are arrested in previtellogenic stages (Tanaka and Hartfelder 2004), until the queens have taken nuptial flights where they mate with 15 or more drones. Shortly thereafter, a large number of follicles become vitellogenic and egg laying rates as high as 1500 or more eggs per day are soon achieved. Considering that a mature egg may be ovulated every three to five hours



Reproductive organs and the sting of the queen, dorsal view. (from Snodgrass)

This is what the inside of a laying queen looks like when the organs are spread out. Notice that you can see the individual segments, or ovariole, of the ovary, each with a row of eggs moving down to the oviducts. Several eggs are near the spermatheca, about to be laid. (USDA/Virginia Williams)

from each ovariole (Ramamurty 1977), at least five follicles would have to separate each day from each germarium and enter the growth phase. In contrast to queens, egg laying in workers is observed only rarely in colonies headed by a fully active queen. However, when a colony has lost its queen, some of the workers activate their ovaries and can lay a considerable number of unfertilized eggs that will give rise to drones. Despite of the loss of most of the ovariole primordia during metamorphosis, the extant (still in existence) ovarioles in a honey bee worker can become fully functional once they are released from inhibition by the queen and brood pheromones.

Whether a queen was allowed to mate or not, and whether a worker bee was kept under the influence of an egg-laying queen or not, turned out to have little effect on the orderly progression of the early stages of oogenesis (creation of an egg cell) (Tanaka and Hartfelder 2004). Even when prevented from mating and thus deprived of a yet unspecified ovary activating mating stimulus (Koeniger 1986, Colonello and Hartfelder 2003), the individual ovarioles of virgin queens contained large numbers of previtellogenic follicles. These were derived from an apparently continuous production of cystocyte rosettes which descend through the germarium until reaching the zone of follicle separation.

The same sequence of events could also be observed in longitudinal sections of worker ovarioles, the only apparent difference between queens and workers being a somewhat larger number of cystocyte rosettes in the former. Counts of cystocyte rosettes in median longitudinal sections of ovarioles revealed the presence of 14-17 clusters in queens, and 10-12 clusters in workers (Tanaka and Hartfelder 2004). Apart from this minor caste difference, the overall features of oogenesis in queenless workers were strikingly similar to those observed in queens, and as in queens, the germline cells were easily distinguishable by their strong staining characteristics from the somatic (prefollicular) cells in the germarium. Longitudinal sections of queenless worker ovarioles gave a particularly clear picture on the gradual transformation of cystocyte rosettes into follicles which is marked by gradual growth of the oocyte and a comet-like arrangement of the trophocytes (nurse cells).

Berger and Da Cruz-Landim (2009) studied the effect of mating delay on cell death in the ovaries of virgin queens. They found that the terminal filament did not change throughout the study period, but its length decreased and germarium size increased with age of queens. Cell death events were observed in the ovaries from emergence but not in the terminal filament. Isolated cell death occurs in young queens prior to mating age, but cell death substantially increases if mating does not occur in the normal period.

Research on the divergent reproductive capacity between the two primary

caste phenotypes (queens and workers) is often concerned with the synthesis and uptake of vitellogenin. Such studies have shown that vitellogenin synthesis in honey bee queens is initiated prior to the adult molt, coinciding with the late pupal increase in the juvenile hormone titer (Barchuk et al. 2002). Within the first days after emergence, and still prior to the mating flight, the vitellogenin titer in queen hemolymph rises steeply and may reach levels of 60-70% of total hemolymph protein (Engels 1974). These high levels may persist during the lifetime of a queen. Even though most workers never lay eggs, they also exhibit a significantly elevated vitellogenin titer when they are between five and 15 days of age (Engels 1974). During this period, their main function in a colony is to feed large quantities of glandular secretions to the brood, and recent studies indicate that vitellogenin expression in nurse bees may in fact be directly related to this task by a direct conversion of vitellogenin into hypopharyngeal gland proteins (Amdam et al. 2003b). Honey bee vitellogenin cDNA has been sequenced (Piulachs et al. 2003) and used in RNA interference assays (Amdam et al. 2003a) that show that vitellogenin is indeed an important factor in task performance and behavioral development of honey bee workers. The digression in vitellogenin function from an egg yolk precursor to a social protein, thus will require a new look and a search for additional factors that may explain why and how follicle development can be blocked in virgin queens and in queenright workers.

Even though honey bee workers are essentially sterile females with undeveloped ovaries they have used them to study how complex social behavior develops (the transition of performing tasks within the brood nest to foraging in the field) within the worker caste. Several studies have shown that honey bee ovary size (the number of ovarioles in each ovary) is positively correlated with worker behavioral progression in unselected commercial bee stocks (Amdam et al. 2006), as well as in strains artificially selected for different social behaviors (Amdam et al. 2007, Wang et al. 2009). Workers with larger ovaries (many ovarioles) start foraging at younger ages on average. Wang et al. (2010) tested to see if the correlation confers a causal relationship between ovary size and behavorial development. They successfully grafted supernumerary ovaries into worker bees to produce an artificial increase in the amount of ovary tissue. Then they measured fat body mRNA levels for the yolk precursor gene vitellogenin, which influences behavioral development and can correlate with ovary size. Vitellogenin was equally expressed in surgical controls and bees with supernumerary ovaries, which led them to predict that these groups would be characterized by equal behavior. Contrary to their prediction, bees with supernumerary ovaries showed accelerated behavioral development compared to surgical controls, which behaved like reference bees that were not treated surgically. To further explore their results they monitored fat body expression levels of a putative ecdysteroid-response gene, HR46, which is genetically linked to ovary size in workers, thus they were able to show that social insect worker behavior can be directly influenced by ovaries, and that HR46 expression changes with ovary size independent of vitellogenin.

Jackson et al. (2011) conducted a large-scale study designed to assay the overall quality of 75 queens obtained from various commercial sources. Although all 10 commercial sources evaluated provided queens with ovariole numbers within the expected range, ovariole number was found to vary significantly across sources. Overall and within most of the individual samples, there was no correlation of ovariole number with other morphological attributes such as thoracic width, wing length or wet weight. Queens from two sources, however, displayed a significant negative relationship between wet weight and ovariole number.

Ovaries, in addition to egg production have other functions as well. The loss of a queen from a colony induces increased levels of the biogenic amine dopamine in the brain of workers, and this elevation is correlated with ovary activation. Vergoz et al. (2011) used real-time PCR to investigate expression of five biogenic amine receptor genes. They were able to show that biogenic amine receptors are expressed in ovarian tissue, and that their expression is strongly influenced by the presence or absence of a queen in the colony. In contrast to the brain, where all three dopamine receptors are expressed, only two dopamine receptors are expressed in the ovaries and are likely to be directly influential in the regulation of worker sterility. BC

"Ovaries, in addition to egg production have other functions as well. The loss of a queen from a colony induces increased levels of the biogenic amine dopamine in the brain of workers, and this elevation is correlated with ovary activation."

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Nest Location In Bumble Bees

Anne **Averill**

Effect Of Landscapes And Insecticides

Bumble bees are able to readily relocate their nest following a 1.0-2.0 km (0.6-1.2 miles) displacement, probably using landmarks. Results of our very preliminary homing bioassays, which we refined to evaluate impact of insecticides, indicate that bee size, floral resource structure, and complexity of surrounding landscape will influence results. I suggest that in intensive monocultures, bees may face a dual disadvantage when returning from foraging bouts since they must deal not only with featureless agricultural landscapes, but also with neurotoxic insecticides that may impair proper nervous system functioning, and thus, compromise orientation.

Studies have shown that native non-*Apis* bees can play an especially important role as pollinators in many crops and in fact, may provide more efficient pollination services in some crops, for example, squash, watermelon, cranberry, blueberry, and tomato. However, concern regarding the stability of pollination services has come to the forefront in the past decade. We are faced with a troubling situation where it is increasingly difficult to manage our key pollinator, *Apis mellifera*, and where an increasing number of studies report decline in the diversity of wild pollinator species (Potts et al. 2010). Recently, the status of bumble bees (*Bombus*) has become a focus of significant attention owing to reports of range reductions and local extinctions of several species (Cameron et al. 2011). Potential causes of decline in *Bombus* have been suggested, including land-use changes, pathogen introduction, and pesticides.

***Figure 1**. Bumble bees form annual colonies and can be important pollinators for several crops such as blueberry, tomato, and cranberry.*

Insecticides and bees. A major shift in both home and agricultural settings has been the startlingly rapid introduction of neonicotinoid and phenylpyrazole insecticides; these differ from most classic insecticides in that they are systemic in the plant and may be detected in pollen and nectar throughout the blooming period. As a consequence, bees could experience chronic exposure to them over long periods of time and at all stages of development (see the February 2011 CAP column by Marion Ellis for a review). Further, multiple exposures to multiple insecticides, perhaps along with high levels of fungicide applied over foraging bees during bloom, could result in synergistic impacts. To add insult to injury, honey bee studies have documented negative synergistic effects when imidacloprid (a neonicotinoid) and *Nosema* infection (a microsporidian pathogen) are combined (Alaux et al. 2010, J. Pettis, unpublished).

Until recently, when a pesticide moved through registration, most studies and guidelines focused on the dose that resulted in death of the honey bee, with much less attention given to sublethal effects, such as abnormal foraging behavior resulting from nerve poisons. An assumption was often made that toxicity would be parallel for all bee species. In reality, this has not proven to be true in many comparative studies, and we should expect a range of impacts of a pesticide across bee species since life history traits and size vary so widely (Brittain and Potts 2011). For example, in contrast to honey bees, bumble bee colonies are comprised of only 10-100s of workers and are annual, being founded by a queen in the Spring. While honey bee larvae primarily are fed secretions from nurse bees, bumble bee larvae develop directly on unprocessed pollen. It is possible that this raw bumble bee diet may end up having a higher concentration of pesticide contamination than honey bee larval diet (Fisher and Moriarty 2010). (On the other hand, metabolites could show up in honey bee worker secretions, and these are often more toxic than the parent chemicals.) Additionally, bumble bees vary in size across species and importantly, exhibit more size variation within a colony than any other bee species; workers can vary in mass by eight to 10 fold in a given colony (Goulson et al. 2002, Jandt and Dornhaus 2009). Smaller bees are often more

Figure 2. *Commercially-available bumble bee nests, contained in two layers of packaging, were fitted with clear plastic tubing so that workers could forage and return.*

Figure 3. *Mass flowering of cranberry.* (Cranberry Coast Chamber of Commerce photo)

susceptible to insecticides owing to their higher surface area to volume ratio. As a result, an LD_{50} value (the dose causing mortality of 50% of the test subjects), which is expressed as dose/bee, would require accompanying bee size information in order to make the most useful comparisons.

Many studies of bees have shown sublethal effects of neonicotinoids, such as imidacloprid, or other neurotoxic insecticides, including impaired learning, delays in foraging, and reduction in orientation abilities, but it has been difficult to determine if the doses utilized in tests are biologically relevant. However, studies working at lower and lower doses are showing deleterious outcomes in more sophisticated and natural bioassays. In greenhouse studies of bumble bees, Mommaerts et al. (2010) found that behavioral bioassays that included foraging were three to 10 times more sensitive when assessing sublethal effects of imidacloprid. We went a step further and investigated orientation of bumble bees in field settings. Here, I will describe our efforts to identify factors that could influence consistency of such field tests and then I report our preliminary data on the impact of a sublethal dose of insecticide on the ability of bumble bees to relocate their nest.

How do foraging bees relocate their nest?

When a bee leaves the nest or a newly discovered food resource for the first time, they back away from the site in a series of increasing arcs. It is thought that this allows them to record the scene around the nest with defined vantage points and to acquire information about distances between objects (Zeil et al. 1996). Based on their *Bombus* studies where bees were released at points up to 15 km from the nest, Goulson and Stout (2001) believe that the most likely homing mechanism used by the bees when they are artificially displaced (i.e. carried away from the nest and released at a distant point) would be a systematic search around the release site; they would fly out further and further from the release point until they recognized familiar landmarks, which would then be used to locate their nest. If this holds true, then the homing success of a displaced bee will depend on its experience and familiarity with the areas around the nest. Individuals that varied the distances and locations where they collect pollen and nectar should be more likely to find the nest than

An assumption was often made that toxicity (of a pesticide) would be parallel for all bee species. In reality, this has not proven to be true in many comparative studies, and we should expect a range of impacts of a pesticide across bee species since life history traits and size vary so widely.

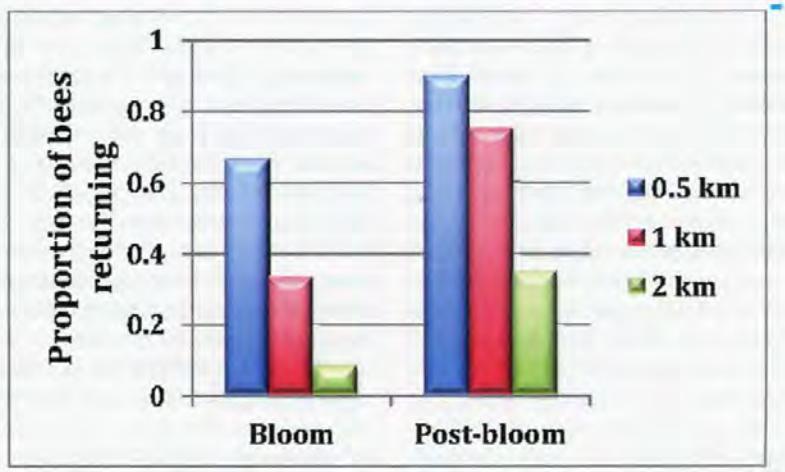

Figure 4. *Proportion of bees returning when artificially displaced either 0.5, 1.0, or 2.0 km from their nests. Nests were installed in a lab building very near cranberry beds. The test was done during mass-flowering of cranberry (Bloom) and again (with new nests that had a comparable length of time to adjust) later in the season (Post-bloom), at which time pollen and nectar sources were patchy. A possible explanation for the results is that when floral resources are abundant nearby, workers forage locally and are less familiar with the landscape and thus, will exhibit lower homing success when displaced. For each treatment, 20 bees were released.*

Figure 5. *Study areas that differed in complexity of landscape structure. Left: UMass/Amherst campus site; Right: cranberry region of Southeastern MA.*

those that repeatedly visit the closest patches.

Can we identify important factors that influence the consistency of our homing tests?

General methods: *Bombus impatiens* Cresson (Common Eastern bumble bee) colonies with 100-200 workers were purchased from a mass-rearing program (Koppert Biological Systems, Howell, MI) and were simultaneously established inside a lab building, one located in the SE Massachusetts growing region and the other on the UMass Amherst campus. Bees were allowed to exit the nest and return from foraging sites via clear vinyl tubes attached to the nest box (Figure 2). Colonies were given two weeks to adjust prior to tests.

Landscape effects on homing. We have completed only a single replicate for Test 1 and Test 2 (so data are preliminary, no statistical analysis has been applied, and thus, our conclusions are speculative). **Test 1. Effect of nearby mass-flowering crops.** In southeastern Massachusetts, during mass flowering of cranberry, our surveys of other flowering plants showed that the extensive carpets of cranberry flowers (Figure 3) are more attractive than the sparsely distributed wild plants or managed plantings in these agroecosystems. Without a doubt, we expected that during bloom, the East Wareham experimental bees (see description below), whose nests were located fewer than 50 meters from a large commercial bog, would forage nearby and show poor homing ability following a distant displacement. Following bloom, we believed that bees would have more experience searching in near and far habitats for patchy and rare floral resources, and thus would have greater homing success following displacement.

To test this, boxes were established at the onset of cranberry bloom in a lab building at the UMass Cranberry Station in East Wareham, MA (designated as an "Agricultural" site) and new nests were established again in August, when bloom was completely over. As bees exited nests early in the morning, individuals were collected from four hives and randomly divided into one of three release distances: 0.5, 1.0 and 2.0 km (in a NE transect away from the nests). Bees were cooled in the freezer, marked with an identifying color dot for the release distance, allowed to recover, carried to one of the three given distances, and released. Returning bees were captured as they arrived to enter the nest; individuals were weighed and examined for a pollen load. During cranberry bloom, only 33% and 8% of bees that were released at 1 and 2 km, respectively, returned to the nest, while more than 60% of those released 0.5 km (0.3 miles) returned (Figure 4). In contrast, when new nests were established later in the summer (following the completion of cranberry bloom) the majority of bees returned from both the 0.5 and 1 km release sites, and close to a third of foragers returned successfully from the 2 km release. Presumably, these bees foraged more widely and distantly in the habitat and were able to recognize and utilize more landmarks during the homing process.

Test 2. Effect of landscape complexity: We compared homing success for bees displaced in landscapes that differed hugely in complexity: the Cranberry Station ('Agricultural' site) and the University of Massachusetts campus site in Amherst, MA ("Urban" site) (Figure 5). All methods for release at the two locations were as identical as possible and were carried out post-bloom. Cohorts of marked bees were displaced at 0.5, 1.0, and 2.0 km from the nest and recaptured as they returned. For bees in the agricultural landscape, homing success dropped off sharply with distance; in contrast, there was no difference in homing success as a function of displacement distance in the more complex urban landscape (Figure 6), which is dense with landmarks. For all distances combined, a clear difference in the speed of return was observed: at the urban site, 37.7% (23/61) of bees returned within the first hour following release and at the agricultural site, only 15.0% (9/60) of bees returned within this interval. These data suggest that homing may become increasingly difficult in homogenous landscapes such as would be found in monocultures and agriculturally-intensive areas. Ideally, we would have liked to compare the agriculturally-intense setting with diversified farm systems within natural habitats, but this was not possible.

Effect of sublethal dose of imidacloprid on homing in bumble bees.

While foraging, bees can be at risk due to pesticide treatments via several routes, for example by (1) ingestion of contaminated nectar, pollen, or guttation fluid (exudation of xylem fluid on leaves), (2) by direct contact during the pesticide treatment, or (3) by exposure to treated surfaces. All of these contacts could occur as the result of a single exposure event (acute exposure) or by repeated exposure events (chronic exposure).

Insecticide treatment: We started with the simplest exposure route, direct contact, by making a single topical application of a sublethal dose of imidacloprid to bumble bees set up in the lab as described above. We reasoned that this approach could give insight into the potential outcome of a sublethal dose when a forager was oversprayed by an insecticide application or that arrived on wet foliage following a spray. Technical grade

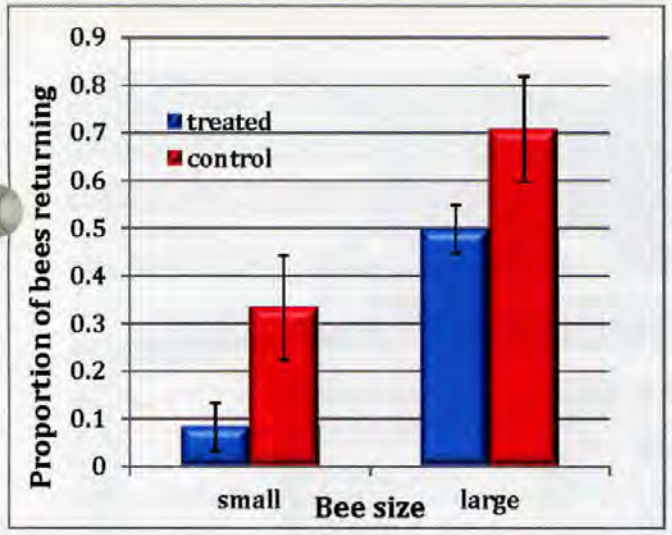

Figure 7. *Topical applications of 5 ng of imidacloprid (treated) significantly affected the proportion of bees returning to the nest vs. solvent only (control) when individuals were displace 0.5 km from the nest. There was a significant interaction between treatment and bee size. Bars represent the average ±SE of three replicates; a total of 24 bees was tested/treatment.*

imidacloprid was used. Insecticide stock was prepared via serial dilutions of compound in acetone and 5 ng in 5µl were applied to treated bees (or 5µl solvent alone = control bees). [To imagine the units we were working with: ng = nanogram and is one billionth of a gram (a gram could be visualized as the weight of ¼ teaspoon of sugar)]. Marletto et al. (2003) reported that the LD_{50} for medium-sized *Bombus terrestris* was 20 ng/bee. For our *Bombus impatiens*, in earlier studies we established an acute contact LD_{50} of 13 ng/bee; thus, our initial sublethal dose of 5 ng was high, or 40% of the LD_{50}. *Effect of body size:* Because the foraging bees exiting the nests varied greatly in size (and thus, would likely show variation in susceptibility), using body mass, we created two test groups, large (.22-.29 g) and small (0.12-0.19 g).

Workers exiting the nest in early morning were captured, cooled, measured, marked, and either treated with insecticide in acetone or treated with acetone only. All bees were transported to a release site located 0.5 km away and allowed to fly away. The test was replicated three times on three different days for a total of 24 bees per treatment. Fewer treated bees returned to the nest successfully, demonstrating that the sublethal dose of 5 ng imidacloprid impaired the ability of foragers to orient to landmarks when artificially displaced. Further, this effect was more pronounced for smaller bees (significant effect of treatment and a significant interaction between size and treatment: $p < .01$, factorial ANOVA). Our next step in our homing studies will be to move to lower treatment rates, to assess additional new insecticide chemistries that function as neurotoxins, and to begin ingestion studies based on incoming data that establish field levels of systemic insecticides in pollen and nectar.

Limitations of our studies. Several issues can be raised. First, we are working with lab-selected and reared colonies so caution must be applied when extrapolating our results to wild populations. Second, for the insecticide treatments, optimally (but this is not possible) we would capture marked, foraging bumble bees at sites distant from the nest and treat them, rather than capturing them as they left the nest. Under the optimal scenario, the bee would have experienced the landscape on the outward trip from nest to foraging site and have the advantage of a learned route with landmarks. Directionality of release locations could be important (Pahl et al. 2011) and was not considered. Finally, determinations of the actual incidence of insecticide contact in the field, particularly for ingestion of contaminated nectar and pollen (which we have not yet addressed) will be useful to make demands that more thorough evaluation of risk and modification of use patterns of neurotoxic insecticides should be mandated. BC

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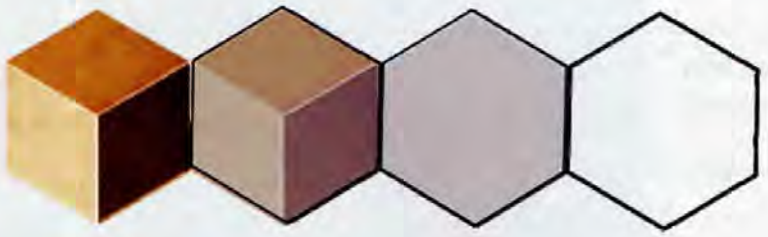


The New Beekeeper Education & Engagement System (BEES):

Bee School in a Box

David **Tarpy**

The season is upon us for many annual beekeeping short courses – so called "bee schools" – all across the nation. These educational events are without question critical to new and experienced beekeepers alike, as well as for supporting our overall beekeeping community and apiculture industry.

Some difficulties can arise, however, in either joining or conducting such bee schools. Perhaps you're an individual who can't make the weekly classes because they conflict with your work schedule, or you heard about them too late to register? Or maybe you and some similar-minded wanna-be beekeepers wish to band together and start from scratch, but you just don't know where to start? Or perhaps you wish to hold your own bee school for your local club, but you don't have the resources or expertise to put together and deliver all of the materials?

The **Beekeeper Education & Engagement System (BEES)** is an exciting new online resource for beekeepers at all levels, and it is perfectly designed to address anyone in any of the above situations. The system is entirely internet based and runs on a common teaching platform called 'Moodle,' which is very user-friendly and simple in function and design (**Figure 1**). The entire purpose of the BEES network is to facilitate a **virtual learning community** for beekeepers by providing content and resources for continuing education. As such, this system is neither designed nor intended to be a Master Beekeeper Program (as there are no "requirements") but rather serve to facilitate education about bees and beekeeping.

The structure of the BEES network (**Figure 2**) is broken into three ascending levels of complexity (Beginner, Advanced, and Ambassador) and three general areas of content (honey bee biology, honey bee management, and the honey bee industry). Together, the first three courses at the Beginner level are a "**bee school in a box,**" as they constitute a plug-and-play lecture series about bee biology, beekeeping, and the honey bee industry. These three courses – consisting of almost six full hours of lectures – are ideal for individuals who wish to learn on their own, groups who wish to teach each other, or entire clubs who wish to view the content together by projecting the lectures at their meetings. The latter option is ideal for clubs to augment their courses with more localized or hands-on content, such as post-lecture Q&A sessions or in-hive demonstrations about covered course topics.

Lectures at the Advanced level delve into greater depth of each topic and help explore some of the more interesting and pressing issues facing beekeepers. New lectures and courses will be introduced periodically to keep up with changing topics and provide new content on a regular basis. These courses are ideal for "**plug-and-play guest lectures**" at your monthly chapter meetings, as they can serve as convenient educational opportunities that give people a reason to attend.

The Ambassador level provides an infrastructure to explore your own desires for beekeeping education, engagement, and involvement. Many beekeepers already provide such valued service in their local communities, so this system hopes to capture and channel these efforts in a virtual community. This includes **educating other beekeepers** (by holding a BEES bee school, mentoring beekeepers in the apiary, or conducting a workshop), **being engaged** with the public (by writing a popular article in a beekeeping trade magazine, being interviewed by local media, or holding a public seminar about the importance of bees and beekeeping), and **getting involved** in the apiculture community (by recruiting others to the BEES network, conducting your own research and publishing it online, or even posting your own BEES lecture!).

To view a video tutorial of the BEES network, or for ordering and pricing information, visit our website at: **http://entomology.ncsu.edu/apiculture/BEES.html.**

The **Beekeeper Education & Engagement System** is new and constantly evolving, so stay tuned for further developments and additional details. In the meantime, enroll today!

Advantages of the **BEES** network

- **No specialized equipment or prior experience necessary** – just an internet connection, a standard web browser, and a desire to learn about bees at all levels!
- **Topic selection is a la carte**, so you can pick and choose exactly which topics you wish to learn about.
- **You can go at your own pace**; there is no mandate as to how quickly you progress through the **BEES** network.
- **There are opportunities for individual topics or entire "bee schools"!** For an introductory short course about bees and beekeeping, you can bundle all three introductory level lectures into one plug-and-play short course for beginner beekeepers. If shown to large audiences, there are opportunities for discounts!
- **Promotes being a "beekeeping ambassador."** The framework recognizes getting others involved, educating the community about the benefits of bees and beekeeping, and enables you to contribute to your own personal education on a continuous basis.
- **All proceeds go directly to support the NC State Apiculture Program** and our various research and extension endeavors. BC

Figure 1. *Screenshot of the BEES network and the Moodle system for one example course (BEES 1.01: Basic honey bee biology and life history).*

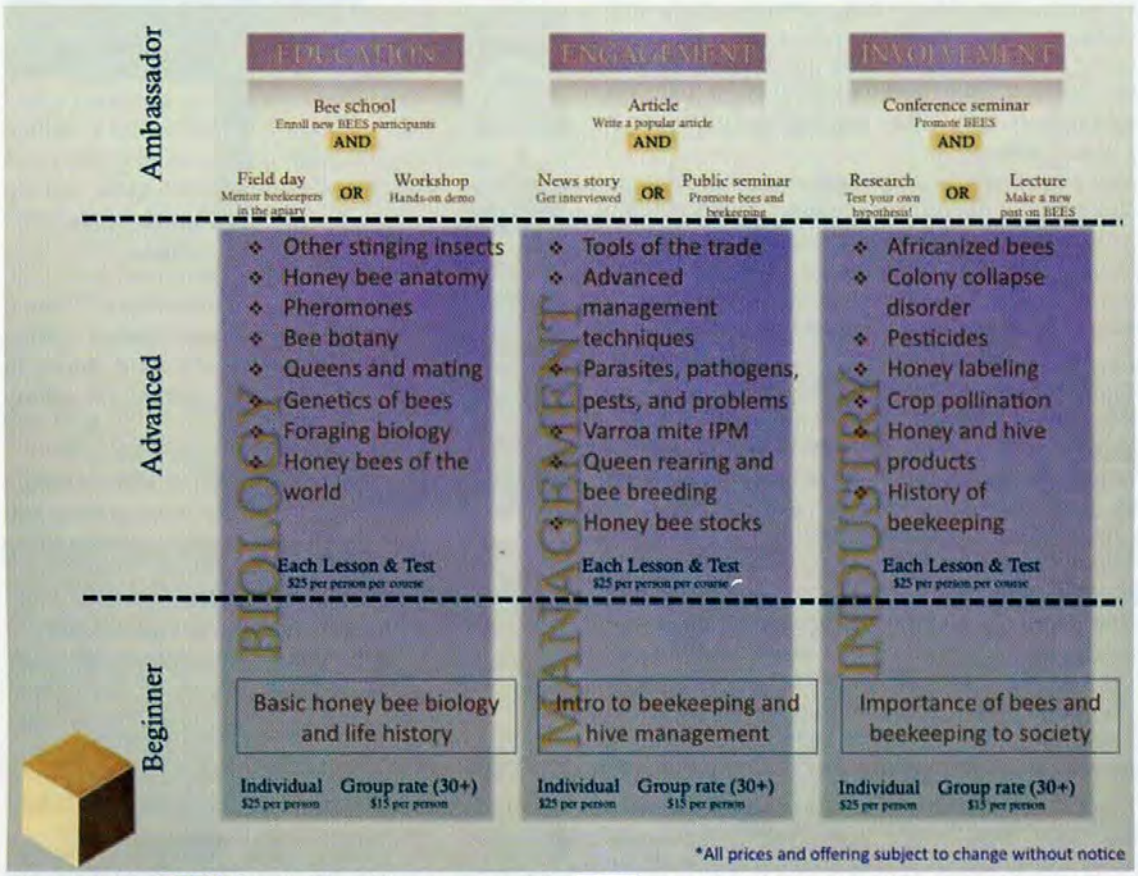


Figure 2. The BEES Curriculum. *The structure of the BEES network is broken into three ascending levels of complexity (Beginner, Advanced, and Ambassador) and three general areas of content (honey bee biology, honey bee management, and the honey bee industry).*

Making BEESWAX PAPER

The yellow patina lent by a smooth beeswax coating makes paper an instant antique, a perfect look for many scrapbooking, card making, and altered book projects. Or perhaps you're more interested in the waterproofing effect of the beeswax – a beeswax-coated paper bunting is one outdoor party decoration that won't be ruined by a rainy day.

And just as with beeswax leaves, beeswax-coated paper is, while perhaps not archival, certainly preserved. A beeswax-coated newspaper clipping can live in a shadow box of other mementos without crumbling to dust, and your grandmother's hand-written recipe card, coated in beeswax, is safe from all tomato sauce stains while you use it.

To make your own beeswax paper, you need only beeswax, paper, and a tool for melting the beeswax and keeping it melted. To melt beeswax, I stand proudly by my thrift store crock pot. Used only for crafting, my crockpot was cheap (yay!), and heats wax at a controlled temperature safely below its flash point, so that I can trust my children to use it. If you don't have space for another entire crock pot, consider buying a second bowl, dedicated only to crafting, for your regular crock pot.

In a double-boiler, bain-marie, or crock pot devoted to crafting (get one!), heat a block of clean beeswax until melted. In your crock pot, this can be done with either the Low or Hot settings, but not the Keep Warm setting.

When the beeswax is melted, simply dip one piece of paper calmly but quickly into and out of the beeswax. Don't attempt to immerse the entire sheet – keep your fingers safe!

Hold the paper aloft over the beeswax pot until it's finished dripping. Continue to hold it up for just another minute until the beeswax coating is solid and cool. Conveniently, this allows plenty of time for a second person to dip her paper, and so two reasonably cooperative people can easily take turns.

Turn the paper around and dip the uncoated end, trying to overlap as little as possible the paper that you've already coated. Any overlap will show as an extra thickness of beeswax, but honestly, the flaw is only discernible to the person who made it, and then only by peering very closely. Again, hold the paper aloft until melted beeswax has finished dripping from it, and the beeswax coating is solid and cool.

We use beeswax paper for so many things in our house: we make paper luminaries out of it, and weather-resistant buntings, and Christmas ornaments. I scrapbook with beeswax paper, coat newspaper clippings in it to preserve them, and dip sheets of poetry or old dictionary pages in melted beeswax to "antique" it. My girls use beeswax paper in any number of art and science projects, almost daily it seems.

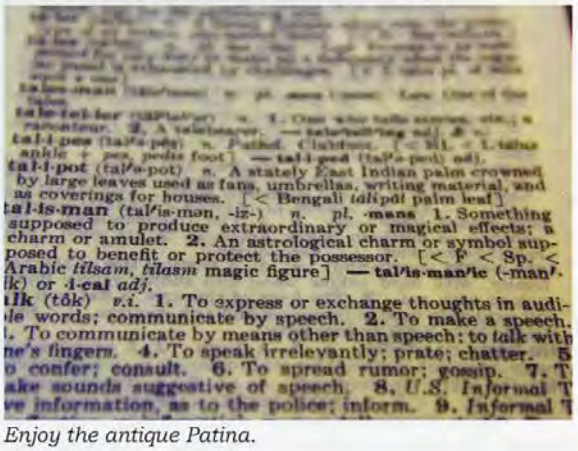
Thank goodness for well-loved art supplies! BC

Julie Finn is a writer, a crafter, and the stay-at-home, homeschooling momma of two little blonde daughters who look exactly like their daddy. To hear more exploits about handmade homeschooling and the crafty life, visit her blog Craft Knife.

Dip paper in melted wax.

Remove and let drip.

Dip uncoated portion.



Enjoy the antique Patina.

The Beauty Salon

Peter **Sieling**

Nancy got tired of what some of the more outspoken members of the bee club called my "Fred Flintstone" haircut, so she sent me to her cosmopo . . . cosmolo . . . hairdresser. Kim, the proprietress at the ***La K Salon***, does men, Nancy claimed. She also sells my honey at the front counter next to her Mary Kay Cosmetics. She absolutely refuses to accept payment for selling honey.

This is what happened. She and Nancy had been talking about bees and honey while Nancy was under the knife, or scissors – whatever they use in beauty parlors. Kim had once tasted "store honey" but had never tried "beekeeper honey," so Nancy took her a jar of bamboo, a local favorite. She was amazed at the flavor and suggested we bring some in for her customers to try. Kim had tried selling cosmetics and jewelry, but had never had much success. Honey, on the other hand, sells like crazy. Every time Nancy needs a haircut she takes along more honey, especially the bamboo. Kim hands back a wad of cash and checks. We get to deduct mileage and I get a drop-dead gorgeous babe back from the beauty salon. All transactions should work out so well.

"Kim does a great job," Nancy assured me. "And if you don't like what she does to your hair, we'll buzz your head when you get home."

There are three places no man should ever go: the delivery room in a hospital (that's why they provide waiting rooms with *Sports Illustrated* and *Deer Hunter* magazines), baby and wedding showers, and beauty salons. I've been dragged into delivery rooms and showers, but until now have avoided hair places.

Nancy made an appointment for me after dark. I warily entered and sat down. To my horror, Kim was working on a woman behind a divider. They chatted gaily, Kim tossing comments in my direction to ease my nerves. I leafed through a magazine full of pictures of women with various hair colors, clothes, and relationship advice. Meanwhile, Kim was doing something interesting. I couldn't see exactly what was happening behind the screen, but she was applying a paste-like substance and picking up squares of aluminum foil. I supposed it was a new hair style. Maybe Lady Ga Ga was using aluminum foil in her hair and all the women were imitating her.

"There!" said Kim. "Now it's Mr. Sieling's turn." The woman came out from behind the screen. I swear this is true – that woman had alternating layers of foil and hair – a human capacitor! What if she scraped her feet across a carpet and then touched a metal doorknob? What if she touched me? Would she discharge? Would she or I be electrocuted? What would happen to her brain? Does the CIA know about the human experiments occurring in the tiny hamlet of Bath, New York?

It turned out that this is how women color or streak their hair. I suppose it's some sort of chemical reaction with the aluminum. She sat down and I slid around her, keeping as far away as I could. Kim put me in the chair. Guys, it's not much different than having your teeth cleaned, except the cosmo . . . coslom . . . hair dresser keeps her hands out of your mouth. My dental hygienist talks nonstop. Usually she'll get both hands in my mouth with a saliva ejector, cotton balls, and some sort of plaque grinder. Then she'll ask, "So, what are your three children up to these days?"

"Arrggh aff oorg" I answer.

Like my dental hygienist, Kim talks nonstop, pausing only to inhale. That gives the client time to answer. When there are two heavy talkers talking it works great. One talks until her lungs are empty while the second inhales. Then the second talks while the first inhales.

"What would you like done?" Kim asked, pausing to inhale.

"Um, kind of like it is now only shorter and a little less like Fred Flintstone."

Above me, I could hear the whirring snip snips of the scissors, like a cloud of bees trying to grip my scalp and plant their stingers. I wondered if Kim ever accidentally nipped off a bit of ear.

"So how are Mr. Sieling's bees doing?" Kim asked.

"Um, fine," I answered.

She made me explain to her other customer how bees make a queen from worker larvae and they both made ooh and ah noises in all the appropriate places. Then she explained to the human capacitor how she never before realized what "real" honey tastes like, especially the bamboo. I added that ***La K*** was the only place in Bath where you could find honey like this.

By the end I was chatting and giggling like one of the girls. Kim even trimmed my eyebrows and the mutant hairs growing out of my ears. I told the girls that one of my customers uses honey as a hair conditioner and another uses it for facials because of its hygroscopic properties.

"You mean it's a humectant," Kim said.

"Yeah, something like that. I have some inedible honey at home if you want to try experimenting with it," I suggested, looking at the human capacitor who was examining a jar of bamboo honey while removing money from her purse. "It came out of a wild colony and had a lot of dead bees mixed in before I strained it. It's half price."

"Bring some in next time and I'll try it on my daughters."

"They'll love me for this," I thought.

Kim disappeared behind the counter and came out with a wad of money. "Tell Nancy to bring half a dozen honey bears to her next appointment." Then she whispered, "No charge on the first haircut."

"Do I look like Fred Flintstone?"

"More like a cross between Tom Selleck and Burt Reynolds."

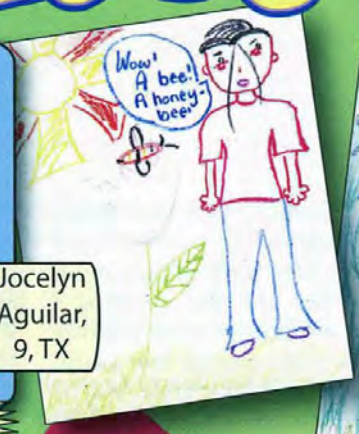
Yabba Dabba Doo. BC

All The Buzzz in...

Hello Bee Buddies,

I am thinking about you! Have a warm, friendly holiday season and a happy, healthy New Year!

Bee B.Queen



Jocelyn Aguilar, 9, TX

Melissa Meenehan

Maria Garcia, 7, TX

Bee B. Queen Challenge

Let us know what you are doing to help honey bees.

Gifts to Bees

The Gift That Keeps on Giving

Consider giving a gift of honey bees to a family this year. From Uganda to El Salvador, bees from Heifer International help struggling families earn income through the sale of honey, beeswax and pollen. Beehives need little space and, once established, are inexpensive to care for. Your gift can help Heifer provide a family with a package of bees, a hive, plus training in beekeeping. Go to Heifer International at www.heifer.org to make a donation.

Bryan's Birthday Buzz

Bee Buddy Bryan Brown has a special birthday. He was born on August 20 which happens to be National Honey Bee Day. How cool is that? This year for his eighth birthday, Bryan asked friends and family to give money to the Foundation for the Preservation of Honey Bees instead of giving him a birthday present. In a letter, Bryan wrote, "I wanted to help because I learned in school that the honey bees were dying and nobody knew what was going on so that's why I did the honey bee donation." He raised $250.00. Thank you Bryan for your creativity, initiative, and hard work to help our flying friends the honey bees.

Here is Bryan with the checks he received, pamphlets from the Foundation, and a letter he wrote to Bee B. Queen explaining his fundraising efforts.

Bees go to School

Pollinator Partnership is a non-profit working to help pollinators like the honey bee. By donating $150 or more to this organization, a Bee Smart™ School Garden Kit can be shipped to a school of your choice so that they can grow a bee-friendly garden as a living classroom. Each kit includes lesson plans, support materials, seeds, handouts and other fun things. To learn more go www.pollinator.org.

The busy bee has no time for sorrow.

... Bee kid's corner

Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
December 2011

Honey Spice Oatmeal Cookie Mix

Thanks to the National Honey Board for this great recipe. You can find many more recipes at www.honey.com.

- 2-3/4 cups all-purpose flour
- 1 Tablespoon ground ginger
- 2 teaspoons ground cinnamon
- 1 teaspoon baking soda
- 1/2 teaspoon salt
- 1/4 teaspoon ground cloves
- 1/4 teaspoon nutmeg
- 1-1/2 cups Quaker© oats, uncooked

To make mix

In large bowl, combine flour, ginger, cinnamon, baking soda, salt, cloves and nutmeg; mix well. Add oats; mix well. Transfer to resealable plastic bag, a decorative jar or other airtight container. Store in cool dry place.

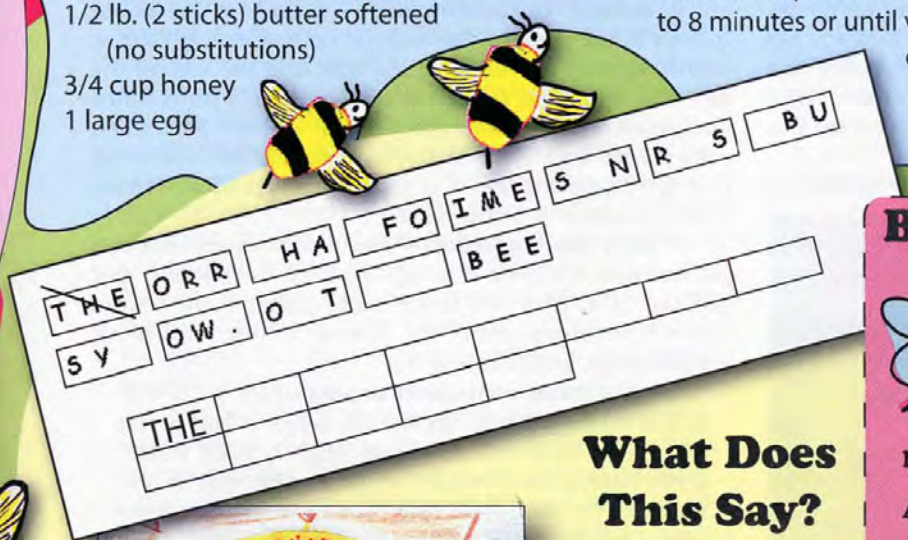
Ingredients Needed to Complete Cookies

1/2 lb. (2 sticks) butter softened (no substitutions)
3/4 cup honey
1 large egg

To prepare cookies

In a large bowl, beat butter and honey with electric mixer until creamy. Add egg; beat well. Add half of cookie mix; beat well. Add remaining cookie mix; beat well. Divide dough into thirds; place each on a piece of plastic wrap and flatten to 1/2-inch thickness. Wrap tightly; chill at least 4 hours. Heat oven to 350°F. Remove one portion of dough from refrigerator. Shape dough into 1-inch balls. Place 2 inches apart on ungreased cookie sheets. Flatten to 1/8-inch thickness with bottom of glass dipped in granulated sugar. Repeat with remaining dough. Bake 5 to 7 minutes, just until centers are set. (Cookies will feel soft. Do not overbake.) Cool 1 minute on cookie sheets; remove to wire rack. Cool completely. Store tightly covered.

Variations - Decorate cooled cookies with melted chocolate, ready-to-spread frosting, decorator frosting in tubes, assorted small candies or candy sprinkles. Thumbprint Cookies - Use thumb to make a deep indentation in center of each cookie dough ball. Bake 6 to 8 minutes or until very light golden brown. Remove cookies from oven; press small dark or white chocolate candy into indentation or fill with 1/2 teaspoon preserves. Cool and store as directed.



What Does This Say?

Arrange the boxes to make a quote by William Blake. The first box is done for you.

Beecome a Bee Buddy

Send two self addressed stamped envelopes and the following information to: Bee Buddies, PO Box 2743, Austin, TX 78768. We will send you a membership card, a prize and a birthday surprise!

Name: _____

Address: _____

City, State, Zip Code _____

Age: _____ **Birthday:** _____

E-mail (optional)

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

Urban, Suburban And Country Bees

Larry **Connor**

Some tips for safe beekeeping no matter where you are.

Once Upon A Time, all beekeepers kept their hives on the family farm, perhaps behind the barn, out of the way, or in the apple orchard, or by the squash and cucumbers. That fairy tale has really changed, and more and more beekeepers are keeping colonies in places that were considered inconceivable not so long ago.

Something else is changing too. The old rule was that you started with one hive and let it build until the supers were bursting with honey. Now over half the single colony beekeepers are NOT able to keep that sole colony alive for a full year. The solution: Start with two beehives and a nucleus. Why? The extra bees will give you protection against bad luck, poor queens, mites, and a range of diseases. By having an extra colony in your apiary you can save a colony that has a queen problem or failure. By keeping a nucleus with a laying queen, you can quickly replace a queen that is failing or just not doing her job. This can make the difference between making a honey crop and no honey crop. It also increases the chances of getting the colony through Winter or a dearth period.

The nucleus hive can be started during the initial season and kept small by removing bees and brood periodically but with a viable queen ready to perform her duties in a full sized colony. Many beekeepers have had excellent success wintering these small colonies in cold areas, so it makes sense to have one as backup in case one of the big colonies dies over the Winter.

My goal is to develop a certain level of new beekeeper confidence as well as increase their chance of getting bees through a full year of beekeeping, not to increase sales at the bee supply company. Most of us who keep bees have poured a lot of cash into our beekeeping, and I hope to help with facing the harsher realities.

Beehives on a New Jersey roof.

City Lights

Beekeepers keep bee colonies in big cities using rooftops, small garden plots, and community garden sites. Keep these concerns in mind when you set up an urban apiary (beeyard):

1. **Do No Harm** – Do not let your bees fly into the walkway, sidewalk, or garden where people (and their pets) may be in the way of their flight path. A solid fence is a nice way of deflecting bee flight up, up and away, into the air where they want to fly instinctively. Use a shrub hedge. Even a row of large garden pots filled with tall plant material will provide screening. Lacking that, fasten wood lathe, woven willow branches (or some other sort of natural screen material) together to create a fence. A piece of burlap fastened between fence posts or parts of two structures may work as well. Any of these solutions will work to deflect flight and to protect the bees from strong winds, especially on rooftops.

2. **Buzzin' in the Sunshine** – If there is any doubt in your mind, position the bees in the sun, facing East or South, so they get full morning light and the heat of the day. There is good science that two pests, *Varroa* mites and small hive beetles reproduce at a lower rate when colonies are kept in warm, dry locations. In fact, the small hive beetle experiences a much slower reproductive rate when humidity is below 50%.

3. **Give them a Drink! –** Those sunny locations can get hot and the bees increase fanning to ventilate and cool the hive. They will be forced to gather quite a bit of water to evaporate inside the hive for a little natural air conditioning. You can help by:

   a. Put **water containers or pots** on the rooftop or in the urban garden. Bees seem to like bright green and blue containers filled with slightly salty water. If you have a water feature in the garden, maybe one area can be filled with large stones to provide bees with a nearby water supply.

   b. Use an **entrance feeder** (Boardman Feeder) filled with water (no sugar) whenever it might be hot (mid Spring to late Summer). I found that the bees remove water until sometime in early September, indicating to me that these sunshine hives need the water, and a lot of it!

   c. Install **follower boards** (dummy boards by

some) inside each hive body, along the outside walls, and in the honey super so there is a ventilation space between the inside of the hive body and the frames of bees. True, this reduces the volume of the hive by one or two frames (depending on how thick the follower board is), but it provides more insulation by creating an air space. It will reduce the bees need to ventilate as much inside the hive. There will be fewer bees clustered at the entrance in the afternoon and evening. The bees will produce an airflow using these spaces and space itself is a thermal buffer from the heat.

d. Give each hive a **sun shade**, a piece of rigid plastic, corrugated metal or piece of plywood, covering the entire top of the hive and hanging over as much as you can get away with. Use a big rock or cement block to keep it from blowing away in the wind and creating an additional hazard.

e. Try to keep the bees **away from nighttime lighting**. I don't know if this disturbs them, but bee colonies did not evolve around flashing or flickering neon and mercury lamps. Then again, neither did humans, and look at our nightlife!

f. **Watch out for zoning rules** that restrict your ability to keep bees in the city limits. Most cities have relaxed their rules, but if you have a less-than-progressive environment, plan on joining the ranks of the underground beekeepers.

Pleasant Valley

Oh, sweet suburbia! From large suburban estates to tiny, chain-link enclosures reflecting a developer's nightmarish push for less for more, we need to pay attention to many of the suggestions about hive placement listed above in City Lights. In the 'burbs you need to pay attention to the following concerns as well:

a. **Avoid** anything that will put **water** between you and your bees, or that will force your bees to float away when that bubbling brook becomes a raging torrent. If you are saying "Oh, I would never be that stupid," think about the speed the local stream or river can get to in a matter of a few minutes! Check with the locals about flooding.

b. When it is cold and it **snows**, you may not be able to get to the bees to check them for food and to give them feed. Position the hives so they are not receiving the full blast of the Winter (or Summer) winds. Give them a break – a windbreak. If you are freezing your ears off because of the wind, so are the bees! If you haven't provided a sufficient windbreak, you may have to move the bees into a more protected area.

c. If you are surrounded by huge, **well-manicured lawns** you are probably in a really poor place for bee colonies. Why? Lawn grass plants use more chemicals (fertilizers, herbicides, fungicides) than any other single plant in the United States. What? More than corn or beans? You are dealing with both the risk of chemical contamination of the bees and the beehive, as well as reduction of forage for the bees to collect for food. The grass in my little city lot has not seen any chemicals for years, and a city planner was brilliant enough to plant basswood and other bee-friendly forage trees along the streets as shade. I still worry about neighbors applying pesticides stupidly, in violation of the label, but my cookie-cutter neighborhood does not have many large lawns – it's the big suburban lawns that scare me, where the owners or lawn crews spend days mowing. As a corollary, it should be obvious that you should **never put bees on the edge of a golf course**.

Perhaps too much shade in this setting.

We do not need to use lawn chemicals on our lawns. There is no economic reason to do this, and it comes at a huge environmental cost in terms of soil and water contamination and unknown sub lethal effects! Let the clover and dandelion plants grow and provide natural food for honey bees and other beneficial insects. The clover will help fix nitrogen with their roots so the grass around the clover plants will be greener.

Farm Bees

If you are a beekeeper who keeps bees on a farm, you are dealing with a mixed bag of issues, some good and some bad, concerning your colonies. In general, a farm location is great for bees, but consider these points:

a. Bees in the country should have a **diverse floral buffet** to select the best forage for both pollen and nectar. Look at a satellite photo of your potential or current apiary and see how much diversity is in the area. Are there waterways (riparian zones) where trees and shrubs and wild flowers are allowed

Full sun, lots of forage, and easy to get to are good qualities for a country beeyard.

to grow? This is a good thing. Are there woodlot and fence rows bordering fields of agricultural crops? This is also good.

b. Are farmers using **chemicals** that might harm bees, or are there organic farms, or others who restrict chemical use?

c. Are you surrounded by a **monoculture** of field corn and soybeans? There is a lot of concern about **GMO** (genetically modified organisms) crops and the use of sub-lethal systemic insecticides that may or may not have a negative impact on honey bee brood rearing, chemical communications, learning and a whole host of suspected issues. As a general rule, I feel that colonies will avoid exposure to problems on their own, but since their evolution did not include exposure to either GMO materials or sub-lethal toxins, we must ask ourselves how would they have developed detection systems and avoidance behaviors?

d. The best thing you can do for bees is to set them near fields and forests of various plants, shrubs and trees that are excellent food sources for bees. Lets look at some of the more important flora. This is not a comprehensive list, but a good starter point for where you should position hives if you have the opportunity.

Important Flora:

- **Sweet clover** is a legume with yellow and white species. It is the biggest nectar source we have, and produces protein rich pollen
- **Alfalfa** is not as attractive as the clovers because of its floral design, but it is still an important honey source.
- **Apple**, **cherry**, **plum**, **almond and other fruit and nut trees** are attractive to bees, **BUT** they are often produced in such a manner that you should not keep the bees in the area unless the farmer is all **organic** and has diverse alternative forage.
- **Basswood** (**Linden**) is a tree with excellent nectar production.
- **Black Locust** is an invasive tree that spreads via root shoots. The white flowers produce lovely nectar when the weather cooperates, which is a nice way of saying that beekeepers do not get a crop from the flowers every year.
- **Raspberry/Brambles** are cane producers with white flowers and a rich source of quality nectar and pollen.
- **Spotted Knapweed** (**star thistle**) is my favorite nectar and pollen source, but people say it should be eliminated because cattle cannot eat it and it blocks growth of other plants.
- **Sourwood** is a tree of the mid-south that has a narrow production zone. The honey created from these trees is excellent.
- **Sumac** is a clonal shrub found in abandoned fields. It blooms with the clovers, and I suspect much of the honey from sumac is labeled clover. Beekeepers cannot follow every bee!
- **Christmas Berry** in Hawaii and **Brazilian Pepper Bush** in Florida is the same plant, flowering in late summer and fall. It is a good nectar producer in these subtropical regions.
- **Citrus** in subtropical areas is a good source of nectar, but watch for sprays in the shouth-east.
- **Mesquite** if important in dry areas of Texas and the southwest and Hawaii. There are various species.

Some plants only produce pollen or are known for their pollen production. Rich pollen sources are what the bees need for good development and colony growth.

Prolific Pollen Producers:

- **Willows** come in many species flowering from winter to early summer, depending on the region.
- **Alder** is a wind-pollinated plant that is visited for pollen by honey bees
- **Asters** produce both nectar and pollen, but the pollen is essential for fall forage in many areas. There are many species of asters.

With these tips in mind, any beekeeper, both novice and experienced, may consider themselves well armed against the hazards of another year, with high hopes for sweet success! BC

Robert Muir helped in the preparation and editing of this article.

If you plan to attend the ABF Conference in Las Vegas, stop by the Serious Sideliner Symposium (Thursday and Friday) and the Wicwas Press booth in the display room. See how Dr. Connor has figured out how to be in two places at one time!

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Honey Bees & Insecticides

Inside And Outside The Hive

James E. **Tew**

Insecticides and bees - a volatile subject

Like most of you, I am not a trained chemist or insecticide application specialist. I don't want toxic chemicals in my food or in my environment. Whenever possible, I prefer organic concepts of pest control. Yet, I like most other beekeepers am expected to have some kind of informed and objective opinion on chemical pesticide use both inside and outside the bee colony. Early next year I am slated to give presentations to a grower group and to a pesticide certification training program; and I will – as I always have – struggle to find *the right path* for this subject. Recently at a state beekeeping meeting, I presented a discussion on *"Keeping Bees without Chemical Use."* I always wrestle with that related subject, too. Insecticide use around honey bees is one of those troubling areas that presently have inexact answers. In this complex issue, we try to choose the answer that is the least wrong. This incomplete answer never results in a satisfied feeling.

The subject of pesticides in the beekeeping industry has been an issue my entire beekeeping life. I don't see the issue waning anytime soon.

As I was preparing the draft of this article, an electronic news release arrived with news that "*representatives of the Environmental Protection Agency and Bayer CropScience are apparently voluntarily removing almond trees from the label of their imidacloprid products.*" As was indicated elsewhere in the news release, this type voluntary product removal is unusual. The concern about the use of this pesticide is an evolving issue. (From: Bee Culture's *Catch the Buzz*, October 27, 2011)

In fact, it has become much more complicated. Now we are intentionally using miticides and other medicinal chemicals and pesticides within our colonies and not just having neighbors applying pesticide materials on crops and vegetation near our hives. Additionally, pesticide modes-of-action have become more sophisticated. The photo shows a classic insecticide kill. Thankfully, we rarely see those kinds of kills anymore, but as pesticides are forced to become more complex, indeed more environmentally acceptable, the effects on our bees becomes increasingly unclear.

Presently, there are many camps concerning the chemical-use issue and each camp has web pages and mechanisms for getting their loud word out. It has become practically impossible to separate fact from background noise. Yes, I remember *Silent Spring*[1]. Years ago, I sat on a B-Farmall tractor with the attached duster applying toxaphene[2]/DDT to cotton. I remember the *Honey Bee Indemnification Program* that Senator William Proximire gave the *"Golden Fleece Award"* as a wasteful governmental program[3]. During the 70s and 80s, beekeepers made their case known about PennCap-M and Seven XLR accumulating in our hives and contaminating bee pollen. I remember how difficult it was for society to wean itself off unbridled use of pesticides – or at least clamor for safer insecticides. So, present-day fears are no longer about the infamous *dirty dozen of banned pesticides*[4] listing such pesticides as: Aldrin, DDT (***d**ichloro**d**iphenyl **t**richloroethane*), Heptachlor, or Mirex. These compounds are now completely eliminated or restricted to limited uses.

Presently, some beekeepers' focus is on various neonicotinoids – such as Imidacloprid and Clothianidin. That's unnerving to many growers, researchers and administrators because variations of these compounds are widely used in a diverse array of crops and household products. While these products are clearly toxic to bees, in many other areas, these products are presently considered much safer for the environment than their predecessors.

The right path?

Recently, I was asked by concerned Emerald Ash Borer (EAB) researchers to offer my opinion on various compounds suggested for controlling this new pest in *high dollar* trees[5]. This type of tree is strategically found in parks, arboretums and other public garden areas. Although I have seen dead Ash trees all over Ohio, there is presently a healthy, untreated Ash tree in my front yard. I planted this tree 20 years ago, and I want it to be there for years to come. As I have said many times in these

[1]Carson, Rachel. 1962. Silent Spring. A fable for tomorrow. ISBN: 0618249060 352pp Houghton Mifflin

[2]All US uses for toxaphene were banned in 1986.

[3]The USDA Honey Bee Indemnification Program paid beekeepers modest sums to replace bee colonies killed by insecticides.

[4]The International Program on Chemical Safety (IPCS) was formed in 1980 and is a collaboration between three United Nations bodies – the World Health Organization, the International Labor Organization and the United Nations Environment Program to establish the scientific basis for safe use of chemicals, and to strengthen national capabilities and capacities for chemical safety. **http://inchem.org/**

[5]Frequently Asked Questions Regarding Potential Side Effects of Systemic Insecticides Used To Control Emerald Ash Borer **http://ashalert.osu.edu**

A "classic" insecticide honey bee kill.

pieces, I am a life-long woodworker and have used Ash lumber to build a table that is presently in my kitchen. Protecting Ash trees from this threat is important to me and many others who enjoy their beauty, shade, and useful wood.

One of the control recommendations is a soil application of Imidacloprid. In the U.S., bees rarely visit Ash trees for either pollen or nectar. Additionally only highly selected trees are being treated. The treatment cost and regime are not insignificant. I felt that the risk to honey bees was miniscule compared to the unbridled loss of the Ash forest due to the EAB. If these occasional, selected applications of insecticides could forestall ***all*** loss of Ash trees, I could accept the occasional use of these insecticides. No doubt, some of you are already drafting letters to Editor Kim about this; indeed, I have already spoken to a few of you at bee meetings who felt that I have gone astray. Yes, I am aware that there is the possibility of translocation of the material into the nectar and pollen or even the dew that forms on Ash leaves, but the documented bee loss from these contaminated sources is presently nonexistent.

While I admit that the issues are complex and beyond my ability to completely comprehend and that the monetary stake is high both for manufacturers, applicators, and beekeepers, I will try to stay objective and open on this subject. I understand that others of you are farther along in your decision-making and have formed a firmer opinion, but this is a very big picture and I am still working to form mine. While we are all developing our opinions, can anything be done to help our bees in this uncertain time?

The Traditional Approach To Dealing With Pesticides In The Beeyard

It is well-known that honey bees and other insect pollinators play a critical role in the production of many crops in the world. However, since crops frequently need protecting from insect pests and diseases, pesticide poisoning can be a problem for pollinating insects in agricultural areas. Protecting pollinators, especially honey bees, from pesticide poisoning must be part of any pesticide program. There are so many materials that are presently available and that have been available for many years that it becomes difficult to stay abreast with both past and present pesticide issues. Even so, the following recommendations can help minimize bee kills, but nothing can completely eliminate them.

Pesticides on Blossoms

The blossom is usually the only part of a plant that bees visit. To avoid killing bees, do not apply pesticides hazardous to bees during the blooming period. When the treated area contains the only attractive plants in bloom within flight range, injury may occur to colonies several miles away. Treating non-blooming crops with a hazardous pesticide when cover crops, weeds, or wild flowers are in bloom within (or near) the treated field may also cause bee losses.

Drift of Pesticides

Drift occurs from nearly all spray or dust applications of pesticides from a short distance to miles downwind. Pesticide dusts drift farther than sprays. Pesticides applied by plane usually drift farther than those applied by ground equipment. Generally, it is less hazardous to apply pesticides near apiaries with ground equipment than by plane. Drift can be reduced by applying pesticides in the evening or early morning when the air is calm.

Time of Application

Ideally, pesticides should be applied when there is no wind and when bees are not visiting plants in the area. The time and intensity of bee visitation to a given crop depends on the abundance and attractiveness of the bloom. For example, apple trees or clover in bloom may be attractive to bees all day while cucumbers and corn are usually attractive in the morning and early afternoon hours. In general, evening or early night applications are the least harmful to bees.

Formulation of Pesticides

Dusts are usually more hazardous to bees than sprays. Wettable powders often have a longer residual effect than emulsifiable concentrates. Granular pesticides seem to present very little hazard. Ultra-low volume (ULV) formulations of some pesticides are much more toxic than regular sprays. No effective repellent has been developed that can be added to pesticides to keep bees from treated areas.

Toxicity of Pesticides

Most agricultural pesticides have been tested for their toxicity to honey bees. However, due to peculiarities of bee behavior, length of residual life of the pesticide, or the effects of different formulations, laboratory and field results do not always coincide.

Insecticides affect bees in one or more ways: as stomach poisons, as contact poisons, and as fumigants. Pyrethroids, organophosphates, and carbamates vary in their toxicity to bees from relatively nonhazardous to very hazardous, depending upon the individual material or combination of materials. Some bacteria, protozoans, and viruses that are currently recommended for biological control pose a serious hazard to bees.

Imidacloprids, as discussed elsewhere in this article, have recently been in the bright light of controversy. According to the Material Safety Data Sheet[6] (MSDS)," *Imidacloprid is toxic to certain aquatic species. It is dangerous to bees. Triadimenol is harmful to aquatic organisms and may cause long term adverse effects in the aquatic environment. It is non-toxic to honey bees.* Both the grower and the beekeeper are on uncertain ground when trying to make rational application decisions. Modern compounds, such as these, are apparently safe

[6]Bayer CropScience. **www.bayercropscience.com.au/resources/uploads/msds/file7616.pdf**

in other categories except in issues related to bees. The research community is presently conducting research – on both sides of the issue. For the foreseeable future this material is not going to be taken from the market. For the present, this will continue to be an emotional issue for all involved.

DO NOT contaminate streams, rivers or waterways with Zorro Cereal Seed Dressing or used containers.

Herbicides, defoliants, and desiccants such as paraquat, MAA, and MSMA reportedly were extremely toxic when fed to newly emerged worker honey bees or when sprayed onto older bees in field tests. Most tests have shown other materials in this class to be nonhazardous to bees, except that they kill or damage nectar or pollen-producing plants.

Fungicides seem to cause little trouble for bees. Captan at field dosages has caused brood damage. But fungicide tank mixes are coming under intense scrutiny because of synergistic effects.

Sex lures, attractants, and other hormones usually cause no problem for bees. Occasionally, a few honey bees and bumblebees have been found in traps containing Japanese beetle lures.

Precautions for Farmers and Applicators

- Apply pesticides only when needed.
- Use the recommended pesticide at the lowest effective rate.
- Use the pesticide least hazardous to bees that will control the pest involved. If all recommended pesticides are equally hazardous to bees, use the one that has the shortest residual effect.
- Use sprays or granules instead of dusts.
- Use ground equipment instead of aerial application to apply pesticides near bee hives.
- Apply pesticides in late afternoon or at night when bees are not working the blooms.
- Avoid drift of pesticides onto plants that are attractive to bees.
- Notify beekeepers several days before applying any pesticide that is hazardous to honey bees. This will give them a chance to protect their colonies. However, notifications are not a release of responsibility.

Even if the pesticide is safe, this situation makes beekeepers nervous.

Precautions for Beekeepers

- Place colonies where they will be away from fields that are routinely treated with hazardous pesticides and will not be subjected to pesticide drifts. That is frequently not possible.
- Identify your apiary. Post your name, address, and phone number in a conspicuous place near your apiary. Let farmers and custom applicators in your area know where your apiaries are located so they will not unknowingly poison them.
- Be familiar with pesticides commonly used in your area and what their application dates are.
- Relocate colonies that are exposed repeatedly to hazardous pesticides. Also, remember that soon after colonies are moved to a new location, foraging bees search for water. They may collect water that has been contaminated with pesticides. To reduce the chance of bee losses, provide clean water near the hives.

Bee Kill Estimations

0 - 100 dead bees per day	Normal Die-off
200 - 400 dead bees per day	Low Kill
500 - 900 dead bees per day	Moderate Kill
1000 or more dead bees per day	High Kill

The Insecticide Container Label

Though not a long document, the insecticide label represents vast amounts of research, legal regulations, and instructions. There are thousands of registered pesticide formulations. Each label clearly gives a brand name in bold letters across the label while the common name and chemical ingredients follow in the section called "Active Ingredients." For example, the Chevron Chemical Company manufactures Orthenex (brand name). In the "Active Ingredients" section of the label, the name acephate (common name), is followed by the chemical name[7].

For serious bee kill problems

If you have had a serious pesticide kill and need to know the pesticide responsible, dead bee samples must be sent to chemical laboratories for analysis. This service is for hire and companies can be found on the Project apis m web page. They are not cheap.

(State Departments of Agriculture are charged with enforcing pesticide regulations. They do not have, for the most part, a good track record for protecting honey bees. *The Editor.*)

For now

Unintentional bee kills are always disheartening and frustrating to the beekeeper. Dead bees have always been common collateral damage. Though this bee/insecticide issue is confusing, annoying and noisy, clearly all parties must continue to research, explore and implement new pest control paradigms. One observation is clear – bees are easily killed by some types of pesticides – and we don't have many bees to spare at the moment. BC

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[7]Brand name of proprietary product Information was taken from:
(1)Farm Chemicals Handbook, 95, Meister Publishing Company.
(2)Pollinator Protection, Johansen & Mayer, Wicwas Press, 1990.
(3)The New Pesticide User's Guide, Bert L. Bohmont, Reston Publishing Company.

NATURAL REMEDIES

Balsam Apple and Asparagus

Abbas **Edun**

BALSAM APPLE

Momordica balsamina is a member of the cucumber family Cucurbitaceae; it is also known to botanists as *M. involucrata*. Its common names are Bombo, Southern Balsam Pear, Bitter Apple or Melon, Cundeamor, Margose, Pomme de Merveille and Jamaican Cerassee.

It is an annual, dioecious vine native to southeast Asia and the tropical regions of Africa.[1] It was introduced to Arabia, Australia, and Central America where it has escaped from cultivation and has become invasive. It is grown as an ornamental plant in many parts of the United States, and is considered by some residents to be a problematic weed.

Balsam Apple[2] is a vigorous climber found mainly in woodlands, wooded grasslands and riverine fringes, and ranges in altitude from sea level up to about 5000 feet.[3] It requires consistently moist sandy soils in a sunny location. The prostrate or scandent stems[4] are up to 10 feet (3 m.) long; they are glabrous or puberulent, and grow from a tuberous rootstock. The leaves are broadly ovate to almost circular in outline, deeply lobed and cordate at the base; they have a margin with sinuate teeth.

Blooming may continue for six months; male flowers open five to six weeks after seeds are sown, while the female ones appear 10 days later. Flowers open at sunrise and close after only one day. Optimum viability of pollen and receptivity of the stigma are attained at anthesis, the anthers having dehisced in the previous two hours.[5] Flowers are pollinated by honey bees, butterflies and other insects.

Momordica balsamina (Balsam Apple).

In regions with an extended growing season, oblong, tuberculate fruits develop. They are four to six inches long, pointed and furrowed lengthwise, and have a light green to greenish-white, waxy skin. When mature, they become orange, and the drying skin splits open to expose bright scarlet arils (tissue) surrounding the brown or white seeds.

Balsam Apple contains a wide spectrum of medicinal and nutritional products and is used as a traditional folk remedy in many countries. Its medicinal properties vary according to the environment. Soil and climate play an important role in the concentration of its active ingredients and medicinal properties.

The plant contains calceolarioside, verbascoside and a ribosome inactivating protein. It also has phenylpropanoid esters which exhibit antihypertensive, analgesic and antibacterial activities. Carotene and a highly aromatic volatile oil are also found in the young leaves.

The fruits contain an amaroid called momordicin,[6] which is a chemical constituent of some bitter-tasting vegetables. It stimulates the production of gastric fluid and saliva and is capable minimizing the effects of HIV and other viruses.

Balsam Apple is rich in vitamins A and C, calcium and iron. In their natural form, these are easily absorbed, help to increase bone density and defer the effects of osteoporosis.

The medicinal uses of *M. balsamina* are widespread and diverse. Common uses are as an anthelminthic (fruits, leaves and seeds), against fever and excessive uterine bleeding (leaves), and to treat syphilis, gonorrhea, rheumatism and hepatitis. Other uses are as an abortifacient, an aphrodisiac and a lactogenic, and in treating diabetes.

In many African countries the fruit is taken as a purgative. The leaves are particularly sought after for urinary tract inflammations, stomach and intestinal complaints, liver deficiencies and for use as a blood purifier. They are steeped in water and taken to treat diarrhea and dysentery, and are said to have strong astringent properties when used as an enema.

Preparations made from the stems and leaves are used to treat yaws; a decoction is applied to boils, ulcers, septic swellings and infected feet. A liniment is made by infusing the fruit without the seeds in olive or almond oil; it is used for hemorrhoids, burns and chapped hands. Yellow fever and jaundice are treated by an enema of the entire plant in water, and it has been used to treat colic, dropsy, griping and pains in the back and lower abdomen.

ASPARAGUS

The botanical name of this well-known table delicacy is *Asparagus officinalis*; it is also known as Sparrow Grass. In France it is called Asperge officinale, and in Germany, Spargel; the Spanish name is Esparrago and the Chinese call it Tien Men Tong.

The plant is believed to be native to the Middle East and the eastern Mediterranean. It flourishes in moderate climates and is widely cultivated as a vegetable crop in most of Europe, western Asia and northern Africa. Peru is the world's largest producer, followed by the United States, Mexico and Spain. In the U.S. it is grown mainly in California, Michigan, New Jersey and Washington.

Asparagus grows in fencerows, pastures, disturbed sites, open woods, and at the sides of roads. It is often found in alluvial habitats, along the shores of lakes and sandy riverbanks. The fertility of the soil is a large factor in growing the plant; it

Asparagus.

needs to be well drained because the plant is deep-rooted. It grows best in loose, rich, sandy loam, in a bed that is enriched with well-rotted manure and lime.

The underground portion of the plant consists of a network of rhizomes, fleshy storage roots, and fibrous ones. The fleshy roots and rhizome make up the crown, which is the perennial portion of the plant. It is generally between three and six feet (1-2 m.) tall, with stout stems and highly-branched, soft, feathery needle-like cladodes (modified stems). The upper leaves are not really leaves at all but are, in fact, reduced branches. The true leaves which are scale-like are on the main stem.

The blossoms appear in May and June; they start to develop as hermaphrodites and later become unisexual, the males being conspicuously larger.[7] The flowers are greenish-white to yellowish, pendulous and bell-shaped with a characteristic odor that makes them quite attractive to honey bees. They have six sepals partially fused together at the base, and are produced singly or in clusters of two or three in the junctions of the branches. After pollination the plant produces small, red, poisonous berries.

The root contains arginine, asparagusic acid and its derivatives, and tyrosine. Flavonoids, including kaempferol, quercetin, rutin, inulin and other polysaccarides are also found in the root. The young shoots contain saponin, rutoside, tannin, potassium salts and traces of fluoride. A spirostanol glycoside, isolated from a methanolic extract of the fruits, has shown 100% immobilization of human spermatozoa.

Asparagus juice is full of asparagine, a non-essential amino acid which is created from aspartic acid. As it is converted back into the acid, asparagine releases energy that the brain and cells of the nervous system use for metabolism. Both aspartic acid and asparagine are important in the metabolism of ammonia, which when it enters our circulatory system, acts like a highly toxic substance that can harm the central nervous system. Recent studies show that aspartic acid may increase resistance to fatigue and increase endurance.

Irrigation therapy for inflammatory diseases of the urinary tract and for prevention of kidney stones is under extensive scrutiny by the scientific research community. Such therapy is noted in monographs for Asparagus root and other herbs.

The action of the plant is cardiotonic, galactagogue, laxative and sedative, and it is used for neuritis and rheumatism, as well as for cystitis and pyelitis. It contains substances that protect small blood vessels from rupturing, and acts as a diuretic, in cases of dropsy and rheumatism. Crushed Asparagus can alleviate the pain of a bee sting or a toothache.

It was popular as an herbal remedy from time immemorial; Hippocrates used it for the treatment of diarrhea and urinary problems. It has been used as a part of Ayurvedic medicine to (a) promote fertility, (b) alleviate menstrual pains, (c) improve and increase milk production, and (d) generally aid the reproductive system.

The plant provides us with essential nutrients; it is a good source of folate, iron and Vitamins A, B6, C, E and K. It is also contains calcium, copper, manganese, magnesium, selenium and zinc, as well as chromium, a trace mineral that enhances the ability of insulin to transport glucose from the bloodstream into cells. Its dietary fiber content makes it a laxative.

Asparagus, rich in hormone promoting steroidal glycosides, has a high reputation as an aphrodisiac. Folate is a B vitamin that helps to increase the production of histamine, proper levels of which play an essential role in the enhancement of sexual arousal and performance.[8] An ancient Arabian love manual provided an asparagus recipe to create a stimulus for amorous desires.[9]

A deficiency of vitamin B 6 or folate may increase blood levels of homocysteine, a substance implicated in heart disease. Folate is also necessary for growth and the prevention of liver disease. It is important for nucleic acid metabolism in the body. Anemia, diarrhea, and neural tube defects such as spina bifida and anencephaly[10] in fetuses can result from an insufficiency of folic acid. **BC**

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[1]E.g. Botswana, Namibia, Swaziland and Zanzibar.

[2]This is also a common name for *Echinocystis lobata* (Wild Cucumber) and *Clusia major* (the Autograph Tree).

[3]That is, about 1525 m. In India, it is fairly common in Sind and Punjab, up to an altitude of about 1000 feet (300 m.), and it also grows in Andhra Pradesh, Dehra Dun and Gujarat.

[4]It climbs by means of tendrils.

[5]Anthesis is the period during which a flower is fully open and functional.

[6]This appears to be identical to elaterin, a purgative substance precipitated as a fine powder from the fruit juice of the squirting cucumber, *Ecballium elaterium*, on spontaneous evaporation.

[7]In the female flowers the stamens degenerate, while in male ones the ovary stops growing without degenerating.

[8]Histamine produces a dilation of blood vessels and capillaries, which results in a subsequent increase in the flow of blood. It stimulates our nervous and circulatory systems and sends more blood flowing to the sex organs. Asparagus is considered a psycho-physiological aphrodisiac. It is said to trigger the mind to have a physiological response to enhance sex because of its shape.

[9]'The Perfumed Garden of Sensual Delight' was written at the beginning of the 16th century by Sheikh Umar Ibn Muhammed Al-Nefzawi of Tunisia. He is believed to have written this erotica for a Minister of the 17th ruler of the Hafsid kingdom.

[10]A congenital malformation that occurs in approximately one out of a thousand pregnancies.

Abbas Edun has been keeping bees in Ontario, Canada since 1979.

Plastic, Or Not?

Ross **Conrad**

"From the tone of this article you can probably tell that I much prefer beeswax and other more "natural" hive components and tend to avoid plastic whenever possible in my beeyards."

Plastic or Beeswax?

In recent years there has been a trend toward the increased use of plastic hive parts, especially as a replacement for some or all of the beeswax normally used for foundation and combs. This is an extension of a cultural-wide trend toward the ubiquitous use of plastic in society following the rapid development of petroleum and petrochemicals in the early part of the 20th century.

Plastic's Benefits for the Beekeeper

Plastic foundation and combs have the benefit of being a lot more rugged than wax resulting in fewer lost combs from extractor blow-outs. Plastic is not as temperature sensitive as wax, which reduces shipping and storage damage. For example, plastic frames and foundation are resistant to becoming brittle and cracking when cold and are not easily destroyed by mice, wax moths, and other pests. Frames composed of plastic foundation and wood, or all plastic comb, take less (or no) labor to assemble compared to traditional wax foundation in wooden frames. Such savings are especially important when running a large beekeeping operation. In addition for those with fading eyesight, frames made with black plastic foundation make spotting bee eggs a lot easier.

Research cited by Roger Morse and William Coggshall in their seminal work titled: *Beeswax*, indicates that honey bees must consume somewhere between 6.6 and 8.8 pounds of honey in order to produce one pound of beeswax. Thus, frames of beeswax comb represent a substantial investment of time and energy on the part of the bees and the beekeeper who now has less honey to harvest. The use of fully drawn plastic frames of comb significantly reduces the use of honey for comb building.

The Honey Bee's Perspective

Despite beekeeper enthusiasm there has not been any plastic frames or foundation manufactured to date that the bees like more than beeswax. Bees will typically refrain from drawing out plastic foundation well, if at all, unless it is coated with beeswax or sprayed with sugar water or both. Why the bees don't take to plastic foundation as well as beeswax is a bit of a mystery. It may be that the bees can sense minute amounts of chemicals that the plastic off-gasses, or perhaps they simply don't like the texture of the smooth plastic surface. However, during a strong honey flow, most colonies show little preference between wax and plastic – when space is at a premium, the foundation seems to be less important.

Plastic's Social and Environmental Impacts

For beekeepers who choose not to follow the bee's lead and listen to what the bees tell them, there are plenty of other reasons one might want to avoid using plastic as part of the hive. Increased reliance upon plastic parts means an increased reliance upon the petroleum oil that is used in its manufacture. A manufacturing process that released numerous pollutants and toxins into the environment. This issue is so pervasive that there are designated "cancer alleys" along the Mississippi river where many of the nations plastic factories are located.

Another on-going problem with plastic is the disposal issue. Most plastics are extremely stable and do not break down or biodegrade readily. Thus, one of plastics most valued benefits is also one of plastics most

Black plastic foundation makes these honey bee eggs easier to spot but there is a price that the bees and the beekeeper have to pay for such a convenience. (photo by Steve Parise.)

difficult challenges. Plastic frames and foundation have the potential to be used and reused, over and over again for decades if not centuries. What happens however when a hive becomes infected with American Foulbrood disease and the law says that the hive must be burned? The burning of plastic releases more deadly toxins into the environment than are released during the manufacturing process. Such toxic pollution is not good for bees, people, or any other living thing.

Plastic by another name

Styrofoam™, Foamed or Expanded Polystyrene (another form of plastic) is also becoming more common for use in constructing hive bodies, covers, bottom boards and hivetop feeders. Polystyrene is promoted especially in northern climates as providing greater insulation for bees compared to standard wooden hives.

Unfortunately, highly insulated hives can also be a problem. When a mid-Winter thaw occurs it will take the hive longer to warm up inside since insulation is just as effective at keeping the cold in as it is at keeping the cold out. This delays the ability of the bees to warm up during a thaw and make cleansing flights or move to more food.

Unlike hard plastic hive components, polystyrene does not hold up to rough use and is easily dented, cracked, and broken. While this also means that polystyrene readily breaks down in the environment, it unfortunately does not degrade. Similar to the "green" plastics that incorporate corn starch into their structure and break down from a single large piece of plastic into numerous smaller pieces, polystyrene presents a similar problem. A problem that has led to the formation of a Texas-sized island of plastic flotsam that is floating around out in the Atlantic Ocean.

The increased use of Styrofoam™ in beekeeping is occurring simultaneously with an effort to find alternatives to polystyrene foam, especially in restaurant settings, as society becomes more environmentally conscious. As a result, restricting the use of foamed polystyrene takeout food packaging is a priority of many solid waste environmental organizations. Given that beekeepers tend to be among the most environmentally conscious individuals in society, this paradox is fascinating.

One possible explanation for this situation is that plastic and polystyrene hive components are heavily promoted and sold to beginner beekeepers by various beekeeping supply companies. This despite the fact that plastic foundation, fully drawn plastic frames, and polystyrene hive bodies, supers, etc., tend to be more expensive than their natural wood and beeswax counterparts. Beekeeping supply companies get beekeepers to overlook the increased cost by offering "beginner kits" made up of plastic or Styrofoam components at a discounted price. Once the beekeeper has started on plastic, they will often continue to purchase more of the same as the need for new and replacement equipment arises.

Other reasons to avoid plastic

Why would a beekeeper decide to forgo the use of plastic hive components and spend extra time assembling hive parts or extra money purchasing preassembled wooden equipment, having to replace some of the parts more often, and give up a significant portion of the honey crop? Even if we don't consider the larger social and environmental consequences that might inspire such a decision, the bees themselves may provide the reason since they like wax and wood better. Their behavior tells us this. Even though there has yet to be any conclusive scientific research to support this theory, the production of beeswax by worker bees that are approximately 12-18 days old is an important part of the honey bee's biological development and health. For example, I suspect that just as people eliminate toxins from their systems when they perspire, it may well be that the honey bee is able to excrete toxic chemicals and toxins from its body during the process of wax production. If this is true, then encouraging bees to build out new combs on a regular basis may well benefit the colonies in more ways than the simple removal of old, diseased, and chemically contaminated combs from the hive.

Disposal of removed combs is simplified when they are entirely composed of wax, wood, and a small amount of metal. The fact that beeswax is a valuable commodity with many uses and is more valuable pound for pound than most honey, means it can provide a good alternative income stream for a beekeeping operation. Another reason one may want to use beeswax foundation rather than plastic is to simply support their fellow beekeepers rather than the petroleum/plastics industry.

From the tone of this article you can probably tell that I much prefer beeswax and other more "natural" hive components and tend to avoid plastic whenever possible in my beeyards. This preference for avoiding plastic extends to the rest of my life as well. Ultimately however, each of us has to make our own decisions regarding the way we keep our bees and live our lives. What is your preference, beeswax or plastic? BC

Ross Conrad will be teaching an advanced organic beekeeping workshop February 5, 2012 in Lincoln, Vermont. For more information call 802-349-4279 or visit dancingbeegardens.com

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The Honey Bees Of Paraguay

Celebrating 50 Years Of Peace Corps Beekeeping – One Woman's Story

Melanie **Kirby**

"M'beicha-pa? Che cherera Melania" (bay-eesha-paw? Shay, shurayruh...) This is Guarani-the indigenous language of Paraguay, South America for "Hello, how are you? My name is Melanie."

When I graduated with a liberal arts degree from St. John's College in Santa Fe, New Mexico I enlisted as a United States Peace Corps Volunteer. My reasons for wanting to enlist were pre-destined: my mother had been a Peace Corps Volunteer in the late 60s stationed in St. Vincent of the French Caribbean as a Spanish instructor. There she met and married my father, a St. Vincent native. The small fishing village sits north of the coast of Valenzuela and being predominantly of French speaking persons, the interest and need for trade with Valenzuela required learning Spanish. My mother was born and raised in New Mexico-having mestizo parents (of mixed Spanish and Native American heritage) and being the last of five children, she was one of two to attend and graduate from college. She graduated with a degree in English though her first love was mathematics.

My mother instilled in both me and my sister a strong appreciation for education and the opportunities it could present to those who were diligent and motivated. My earliest memories of my mother discussing her Peace Corps experience were words of gratitude and fascination. "The Peace Corps was the most wonderful experience she had had the opportunity to participate in as a young woman." I carried this with me throughout my childhood, not quite knowing what exactly what it was that I wanted to become but sure that I wanted to enlist as a volunteer upon graduating from college.

Having a father who was from another country also piqued my curiosity. He had a French accent and interesting customs. My exposure to both my mother's culture and heritage with that of my father's (Amero-Indian) prompted me to become very interested in anthropology-a study which I thought would be my focus in college. As a "nerdy" highschooler, I applied for many a different Summer enrichment programs including one at New Mexico State University as a Regent Summer Scholar where I took college credit courses in anthropology. By the time I graduated from high school, my interests took more of a scientific turn and I ended up initially focusing on Marine Biology/Fisheries at the University of Miami.

I studied there for two years, had way too much fun and decided to return to New Mexico to my first choice school of St. John's College (which also has a sister campus in Annapolis, Maryland across from the Naval Academy). My exposure to Hispanic descendent peoples living in Florida reminded me of my interest in cultures and once again, I knew that after college, I would like to travel. St. John's College has a curriculum based on the Great Books which include the Greek philosophers to the German transcendentalists. The philosophic approach-or rather the Socratic dialogue approach to the program enabled me to "learn how to learn" and to "learn how to read" for content and reflection. The basic premise that ideas transcend language reminded me again of my intentions to travel post graduation.

I wanted to serve my country, but not by carrying a weapon. I began the Peace Corps application process during my final semester at St. John's not knowing where or to what extent I would be able to take my efforts. I recall filling out the application and reviewing the question: "Do you mind working with stinging insects?" I figured, "Hey, I am flexible – what are the chances of me working with stinging insects?" and so I marked NO, that I did not mind working with stinging insects. I came to find out later, that not that many folks are naïve about working with stinging insects. Fear prevents most from checking no, but apparently in my enthusiasm to appear flexible and courageous in the face of new experiences and challenges, I chose to make the statement that I would consider working with stinging insects.

Did I dwell on this question? Not at all. I merely checked the box and moved on to the next question not really giving thought to what a provocative answer I had given. A couple other classmates of mine also began the

President John Kennedy started the Peace Corps March 1, 1961, then appointed Sargent Shriver as the first director.

application process and were assigned immediately, all of us with the same degree but in very different assignments. One in particular was sent to Ghana to teach English. Another to Nepal to teach Mathematics. And me . . . well I was sent to Paraguay in the heart of South America to teach Beekeeping! I suppose my classmates checked "yes", that indeed they would not consider working with stinging insects . . .

I had no prior knowledge of beekeeping, only that honey was yummy and it came from bees. I went straight to the library as this was all pre-internet and checked out the few books I could find on beekeeping. I scoured them and read about the cycles of bees-their lifecycle and also seasonal cycles. I was so excited to go abroad that the fear of the reality of working with honey bees and Africanized ones at that, had yet to sink in. I was truly "ignorant" of what I had signed up for and while I didn't carry a gun while serving my country, I was indeed in the trenches and had my comfort zones removed and my identity questioned. I was a foreigner in a strange land having to prove my positive intentions and learn new languages in order to better facilitate projects with the natives.

Lucky for me, I had three months of intensive training in Guarani, the native language and in basic beekeeping in the community of Aregua near the country's capitol city of Asuncion. There were four other "okay to work with stinging insects" volunteers in my group and we were stationed together for training as Agriculture Sector Beekeeping Extensionists. We came from all different walks of life-one a microbiologist from San Francisco, a Spanish language fanatic from New Jersey, a Puerto Rican salsa lover from New York, a preppie from Connecticut and myself, a wanna-be philosopher from New Mexico. We were an eclectic mix and luckily we all got along, enough to work through the stings and the trials and tribulations of dedicating the next two years to a foreign community away from our homes and families. Lucky for us, we were also in training with the Aggie Crop Extensionists and the Environmental Sector's Agroforesters and Environmental Educators. All in all training was like boot camp and many of the friendships forged there will last a lifetime.

After our training, we were all assigned to our individual communities. I was assigned to Calle Mil in the Colonia Independencia region of the state of Guaira in the central eastern area of Paraguay. The state of Guaira was considered to be "awkward." Apparently, the accent of those of us in Guaira distinguished us from the other states. I learned this later as I interacted with other volunteers and host country nationals and facilitators. It always led to a comical conversation about the "eccentrics" in Guaira who also included many ex-nazis who had fled Germany after World War II and had relocated there. There were also many South Africans who had relocated to the area after apartheid ended. There was rumored to be the library of "Dr. Death" in the area. The interaction of these immigrants to the area was quite visible in the array of people there were in the mix. Many blond haired and blue eyed Paraguayans. They all thought I was a "Cubana" or Brazilian due to my brown skin and curly hair – I didn't look like the American's on TV (Beverly Hills 90210 was regularly aired on their TV stations). So, I had to prove I was indeed "American" and why I would leave the land of plenty to come to the land of need. I came to find that It was a daily test.

I was fortunate to be placed in the only real "mountains" of Paraguay-Los Cerros del Ybytyruzy (oo-boo-too-roo-zoo: Or the hills of wind). There was much deforestation of the local flora for planting sugar cane and there was also a somewhat thriving vineyard and winery industry. Not altogether beneficial for bees, but it did add to the diversity of the landscape. There was also a fair amount of citrus groves and ka'a he'e (literally translated into "sweet weed" it is also known as the stevia plant, a natural sugar substitute).

And of course, the locals grew a fair amount of plain Ka'a 0r Yerba Mate, the national drink. Paraguayans are rare in their custom of drinking Mate cold and hot. Neighboring countries mainly drink the hot version, or mate while Paraguayans continued the war-time tradition (from the triple alliance and Chaco war) of not being able to light fires to heat their water for their tea hence the practice of drinking mate cold, known as terere. Terere is quite refreshing as the sub-tropical climate has its fair share of hot and humid days.

Different jujos (joo-joze: or herbs) were added as "refrescante" (refreshing herbs) to alleviate the heat of the day and to assist with varied ailments. Mint and lemongrass were two of my favorites added to terere. Neighboring countries looked at the drinking of mate cold as "backwards" and in a sense, Paraguay is a backwards country – it is the only country apart from Bolivia to be landlocked from the broad coasts of the Pacific and the Atlantic. Their interaction with their larger neighbors is limited as is their global interaction.

Though I was born in the early 70s, I felt as if living in Paraguay was like living in the 50s – all the women wore dresses and the men all dressed the same and had the same hairdos. Everyone listened to the same music and went to church on Sundays. Community was everything-as this was all they had. TV was only available at certain homes and schooling was not a guarantee for everyone-you had to pay for it, even kindergarten. I started my service by attempting to connect with the farmers, which were the men-folk. However, cultural observance dictated that women not work alone with men in the fields so I changed my direction and began working with the women who were the main caretakers of the animals. Beekeeping naturally fell culturally into their domain.

I started a women's committee, or working group and we would meet once a week to discuss everything from

embroidery stitching to breast exams. We planted family gardens and had cooking classes to share how to cook some of the "unknown" but healthy varieties of vegetables. We pooled our resources together and bought seeds and cloth for sewing projects. I worked with individuals brave enough to take on the Africanized honey bees by establishing apiaries and workshops in neighboring villages for those interested in beekeeping. We eventually helped to coordinate a local farmer's market down the hill in the neighboring village of Melgarejo, the capitol of Colonia Independencia and where the only phone was available for miles around.

I had no bus service so buying beekeeping equipment in the capitol of Asuncion over six hours away (where there were three hardware stores that carried very limited and basic apiculture equipment) wasn't really feasible – physically nor financially. So we worked to make our own equipment including our own smokers out of coffee cans and veils out of mesh netting. We used rubber dish washing gloves and string to tie our pants and shirts around our ankles and wrists. We used machetes and fishing knives as hive tools. We made do with what was available, catching all of our own bee colonies from deserted coco trees and from swarms. Cut and paste – or rather, cut and tie onto top bars and transfer into boxes – was the name of the game. Many bees were feisty, but I knew no different as I hadn't yet been exposed to pure European honey bees and their tranquil behavior. I actually learned how to be a beekeeper and how to manage bees in Paraguay despite the beginner's pitfalls and lack of resources. I even developed a small project with the area children in managing the jete'i (jaht-hay-ee: or the small, yellow, stingless bees) who made very exquisite and medicinal honey in little wax pots. We used recycled soda pop bottles to make little homes for them that we could see through and harvest their honey when there was extra.

It was a great feat and an overwhelming feeling of accomplishment for me to return to Paraguay in 2003, four years after my service ended in 1999, and to witness the continuance of some of the family gardens and apiaries. The women I worked with were able to sell their extra honey (whatever their large families didn't readily consume at harvest) via the Farmer's market and to use that money to buy shoes for their children and pencils and paper for school. I truly learned that it isn't how much you have or what you don't have, that makes a person wise. But rather, the innate intelligence and reverence for land, resources and community that makes one rich and a sage. I truly thank the campesinos of Paraguay for sharing their culture and homes with me and can only hope that the two years I gave them, will provide them with loving and lasting memories as it has me.

Little did I know that my initial beekeeping experiences in Paraguay would lead to the professional declaration for me that it has become. Out of the five total of us from my initial training in Aregua, I am the only one who has continued to keep bees and to have made it my career. I credit the United States Peace Corps for helping me to "find myself" by helping others and for exposing me to the wonderful and fascinating work of bee stewardship. I have no idea what I would rather be doing or what I could be doing if not keeping bees and I value my Peace Corps experience as did my own mother "as one of the most wonderful experiences I have had the opportunity to participate in as a young woman."

The United States Peace Corps slogan states that it is, "The toughest job you'll ever love." And it is true. it has been the toughest job I have ever held (apart from running my own small bee farm) and I loved every minute of it even the awkward and difficult minutes, for whatever doesn't kill you, can only make you stronger. And I feel that my Peace Corps experience really has made me stronger – emotionally and spiritually as a person and as a dedicated professional in a very dynamic field. Thank you U.S. Peace Corps for giving me the opportunity to serve my country abroad as a technical and cultural ambassador! I have future hopes of re-enlisting when I "retire" and when my children are grown. Hopefully they will consider becoming third generation volunteers. BC

Melanie Kirby A-27 Peace Corps Paraguay Truchas, New Mexico Email: ziaqueenbees@hotmail.com

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The Hurricane I

Buy some extra water, take the information, be aware, but don'

Adam **Warner**

In the days leading up to Hurricane Irene's New England landfall, the internet was abuzz with tweets and status updates. Citizens were warned of long grocery lines, plundered toilet paper aisles, and impending doom. The MTA was beginning to shut down the subway system, and New Jersey Governor Chris Christie was warning coastal residents to "get the hell off the beach." All the while, New York City beekeepers were making last-minute preparations to protect their hives, covering them with tarps and securing their hive stands.

Just last year the NYC Board of Health lifted a ban on beekeeping within city limits. Hundreds of clandestine honey lovers came out of hiding, and hundreds more put up apiaries of their own. These new hobbyists were worried about what would happen if the storm was as strong as forecasters were predicting.

Bees, once considered "wild animals" in the city, are now local residents, no longer grouped with scorpions, cobras, and cheetahs. The end of the bee ban resulted in swarms being spotted throughout the city this past Spring and Summer. I had seen a large number of the furry, yellow critters in Ohio last season but was surprised to find so many in the rooftop garden of my sublet in Greenpoint. I was in the process of looking for a new apartment and had been renting the place for about a week from a notable photographer. Each day I'd find some bees hovering in the butterfly bushes or morning glories. I had assumed insects like that didn't show up much in such an inimical place as New York. I had even left a can of Deet at home, thinking mosquitos wouldn't be a problem. I was proven wrong on both fronts. By the end of each watering escapade I was scratching at least one mosquito bite, usually more. And the bees, well, they were everywhere.

Across cultures and centuries, bees have symbolized busyness, work ethic, cooperation, and fortune. In Greek mythology, the Thriae – a trio of sister-nymph-bee-goddesses – could see into the future and read omens from the natural world. Although bees have traditionally been revered as something all but holy, in recent years their vitality has weakened considerably. Colony collapse disorder (CCD), a phenomenon whereby entire colonies of bees disappear seemingly overnight, became a global conundrum in 2006. That year record numbers of bees went missing around the world. Everything from dubious pesticides and cell phone use to disease and malnutrition has been blamed, although the cause is still unknown.

The past few years the media has warned that the number of bees around the world is waning. In March, the UN Environment Program released a report saying that the international bee population is declining at an alarming rate. But you wouldn't have known it living in New York. The Friday before the storm, bees were still whizzing in and out of the black-eyed Susans at my sublet. I had become accustomed to hearing them buzzing around me. The owner of the Lorimer Street flat had asked me to water the plants once every non-rainy day. Each corner of the terrace was filled with some sort of bush or tree, so the endeavor often took me well over an hour.

That Saturday, I began to bring plants in from the balcony. The media was reporting extensively on Hurricane Irene. The news said she was "snarling," "churning," "barreling," "pounding," and "pummeling" her way to NYC. Things were said to be in "shambles" along the Lower East Coast, the forgotten country. The Lower East Side would supposedly disappear beneath "a wall of water" come Sunday morning. Battery Park and Far Rockaway would sink into New York Bay, and Coney Island would cease to exist. Politicians and reporters spoke of the apocalypse and a new Atlantis. The hydrangea bush, spruce, and

Before the storm, the balcony had a gre

Adam Warner, or Habibi Berlin, or Sh land, OH. He is currently studying at the is encouraged to be suspicious of everyo shrimp named Little Nun Shrimp and Tap where the sun shines approximately 23.3

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r New York City

take it too seriously. There's more bees out there than you think.

large deciduous tree were the most susceptible to wind damage, so I brought them in first, laying them on a bed of towels and plastic bags set out around the living room. By the time I'd carried most of the plants inside, the once spacious apartment was like some sort of covert grow house. The couch and ottoman were no longer visible among the leaves.

The bees were flying chaotically around the porch, wondering what had happened to the orange, pink, and yellow flowers that had filled the now empty patio. Rain began to pour onto the deck and the Manhattan skyline disappeared behind a dense layer of fog. The storm was on.

iew, plenty of plants, and quite a few bees.

Encouraged by concerned friends and family, I got out of flood-prone Greenpoint, and headed to Queens, leaving my plant brothers behind and wishing them the best. From my hotel room, I could see all of Midtown Manhattan. I watched as the clouds rolled over more and more of the city and then – well, that was pretty much it. There was some rain and a little wind, but by Sunday morning things were already looking calm again. South Queens and New Jersey got most of the flooding. The rest of the city was more or less intact.

When I returned to the sublet, I put the plants back outside and ordered Chinese food. The take-out and delivery business stops for nothing here. I ate chow mein fun and watched the last of the storm move north, revealing a bright orange setting sun. Irene had been advertised by the media as a monster, but revealed herself to be no more harmful than my departed grandmother of the same name. Half of New York was hauled up at home, surrounded by bottles of distilled water, packages of Dunk-a-roos, and cans of beer. And yet the hurricane had proved to be no more than an average thunderstorm.

And then there are the bees. One's hovering by a marigold, another's dead on the windowsill. I suppose that's the reality of most things. Bees could be declining worldwide, but you'd never know it in this garden. In fact, there's one right in front of me, and one over there. All conditions change throughout the macrocosm. Each microcosm holds a reality different from the whole. The hurricane, while destructive in the Carolinas, proved nothing much in New York. And the bees, which you'd think were near their end if you'd read the news, are busy being bees.

That's not to say we shouldn't look at global trends or bulletins from around the world. Being aware of something as relevant as the decline of an insect that pollinates so much of what we eat is imperative. But in the end what's local matters most. After Hurricane Irene hit, a hive containing some 30,000 bees was rescued from a toppled tree in Fort Greene. It's an instance such as this that have determined and will determine our future – and the future of bees. It is impractical to take all things broadcasted indiscriminately as undisputed matters of fact. For millennia, humans foraged, hunted, and dwelled in their own backyard – unaware of the rest of the earth.

The world is too big a place for each person to conquer. Our generation has been exposed to too much information and, consequently, expectations. It's defeating to think you can change it all, and that it's all as dire as it sounds. Take the information and be aware of it, but don't take it too seriously. Buy some extra water before a hurricane, but don't think just because the media declares the storm of the century, that it's necessarily true. Grow a few extra flowers for your local honey bees and stay away from pesticides. Encourage your friends to do it too. You'll probably find there's a lot more bees out there than you thought. BC

a, is a poet and flora enthusiast from Cleve-NY Graduate School of Journalism, where he and everything at all times. He has two pet loney Jones. He lives in Sunnyside, Queens, urs per day.

Hou e Man and Half a Billion Honey Bees Spr without Bees: How Colony Collapse by Michael Schacker; *Fruitless Fall: The Colcultural Crisis* by Rowan Jacobsen.

Judith **Adamson**

Bay Area Perfumer & Beekeeper

Laurie Stern

Ever since honey bees came to our garden several years ago, it's been so much fuller and richer. In fact, they've made my garden absolutely thrive. Bees can forage for miles and I'm sure these bees go elsewhere in addition to all they find here, but they always come back to the hive in our garden. It's their home.

I originally saw them as a swarm right in the middle of the tomato patch. I didn't know what a swarm was; I just saw this big wad of bees. I wasn't afraid of them, but they stayed and stayed, and I realized I'd better deal with it. Being the total nature lover that I am, I certainly wouldn't poison them, although I know a lot of people do. Then I found David Eichorn on the Internet, and called him to take them away.

When he came to remove them he started telling me about them – "these are foraging bees, these are fanning the hive...." I found it so fascinating that by the time he was ready to take them away I knew I wanted them to stay. He also mentioned they tend to swarm to a place that's an ideal environment for them, so I thought I should make them a home here. He tried to discourage me because keeping bees can be a fair amount of work; you have to pay attention and be aware of what's going on. He finally agreed to teach me, and I hired him on retainer. He and I built my hive in his workshop so I could learn every aspect of beekeeping. I started with that hive and then got another.

I've always loved flowers and gardens. My husband and I have these extensive gardens that go down the slope of the hill and are filled with many different flowers. I had a wedding flower business for years but ended it ten years ago. Now I have a botanical perfume business named Velvet and Sweet Pea's Purrfumery, which is named after two of our cats. I make perfumes from essential oils and floral tinctures from our garden, so to have this bee swarm come to me felt magical and somehow auspicious.

One Summer when my parents were visiting, the bees were on the lavender near the entrance to the guesthouse, and my dad was worried about my mom getting stung. I told him, if you don't hurt them, they won't hurt you, and my father said, "I can't believe it; you said the exact same thing when we were showing you tigers in the zoo years ago." That's my philosophy, and I think that's why the bees came here.

My beloved bees disappeared after living here for four years. We couldn't find any residue of any kind of disease; both hives just disappeared. I knew one of them wasn't doing very well, but the other one was really strong. I had been checking them every couple of days and thought everything was fine. It was sad, I have to say, and I was pretty devastated, which I know sounds crazy. I took it quite personally, actually; I felt abandoned. They had come to me so personally, and their leaving also felt personal, but I realize bees are really just like a wild animal; we have no control over them. We don't understand their hardwiring or what makes them stay or go.

After they disappeared, I did the extraction from the hives because there was a lot of honey and wax. Here was this gorgeous honey, and I was wondering what I might have done to make them disappear.

At that time in my life I was incredibly busy between my perfume making, my cat rescue, family, relatives, my husband Gary, everything. I was overwhelmed and thought maybe I should take a break from having bees for a year or so. But I missed them so much and realized when I went into the garden, without them there, it was as if I didn't have a destination. The garden, even though it was full of life, felt as if it had lost its soul.

Seeing how devastated I was, Gary offered to take over the beekeeping if we got more hives. I knew I'd have to help since I've been doing it longer and know more, but I was thrilled, especially if he could take over the extraction, which is a very long, intensive day.

He could also handle the swarms, which always happen at the worst time imaginable like when you're having 20 people over for brunch and suddenly you notice 50,000 bees swarming into the air. As a conscientious beekeeper you're responsible for your swarms and you have to jump to it immediately. It's like running after a wayward child with everyone watching. Once I was having a birthday breakfast for a friend for her 60th birthday with 10 people coming. I was getting everything ready, and suddenly the

bees swarmed into my neighbor's yard. She happens to be allergic to bees. "Okay, Gary," I said, "take over on the brunch. I've got to go deal with the swarm."

This Spring, my friend Pat's bees were swarming like mad. Her hives had started from my swarms from the bees who left. I had caught one of them last year, hived it, and brought it to her. When she started having swarms, she gave me a wonderful one. Then that hive swarmed, which they don't usually do that fast because a swarm doesn't usually swarm. We gave that one to Pat. Our exchange of related swarms was kind of incestuous, if you ask me.

At that point, I was thinking we'll have just one hive, but then I decided that we should actually have two, because if one of them isn't strong, you can take brood frame from the stronger hive and put it in the weaker. So I got another swarm from Pat which was really tiny but I thought I'd try it. Unfortunately, that one didn't do very well. One day Gary went down to check on them and saw there were robber bees going into the hive as the other bees were coming out. They were literally fighting and killing each other. It was just horrible to watch. I saw all the little dead bodies on the ground. My friend, who calls me the "Jewish Mother of Beekeeping," asked me if I had buried each one and given them a ceremony. Thankfully, we caught the situation immediately, put entrance reducers on, and the robber bees left. A reducer is a small piece of wood that makes the entrance to the hive a lot smaller and only allows a couple of bees to go in, so the resident bees have lot more ability to fight robbers off. Usually you put it on in the winter, because if it gets very cold or rainy, the hive stays warmer.

The robber bees left, but the hive didn't make it. David told me it had foulbrood. The part with the foulbrood was all semi-capped cells, but there was nothing in them. They were very dark brown with a little hole in each.

David found us another swarm; this one was really large. They're doing fantastic, building a new frame and brood. Now both hives are strong, and I'm very happy because Gary's taking over more and more.

Gary is an incredible, natural beekeeper. I suit up completely when I go into the hives because I don't want to be nervous, but Gary is kind of macho and says he doesn't need a suit. It turns out he's right. He's the quintessential beekeeper, and without wearing a suit, veil or gloves he's able to bring the frames out really slowly and carefully. I was really careful, too, but Gary's even slower than I was, and very delicate, concentrated, careful, and very connected with the bees. A lot of the best beekeepers don't wear suits and veils because they're so gentle. I've heard that the feel of bees on you is wonderful. If bees feel safe and not threatened, the feel of them on your hands is like the softest, lightest, sweetest kind of touch. Some day I'd like to feel that.

The bees make the most exquisite honey. My husband and I are complete honey addicts so it's a good thing we have bees. Every morning for breakfast we eat Greek yogurt drizzled with honey and fruit from our fruit trees. At this point we're beyond addicted, but at least it's one of the healthiest foods on the planet. Gary jokes that our honey would be $100 a jar at the rate we produce.

Only when you threaten them or do something really idiotic do honey bees sting. For example, if I were to go into the hive in the winter (which I wouldn't!) to get some honey, they'd be rightfully threatened. They don't have an abundance of honey then and need to protect their food supply. Other than that, they're really friendly. Their flight path is through where we walk but it's never a problem. We have a relationship.

We have several fountains and birdbaths for them because they need water. I have corks floating around so they have little boats to land on. If they don't feel like floating, they just stand on the edge and drink.

I've heard that a garden flourishes if you have both wild bees and honey bees. Wild bees, which include bumblebees, pollinate so many flowers and herbs. In conjunction with honey bees it's ideal because there's so much pollination going on, and that strengthens the plants. I just love the bumblebees – how they get pollen all over their velvety bodies. I read somewhere that if you have an old teapot that breaks and you bury it with the spout sticking out of the ground, the wild bees will find it, and it'll make a nice, dark home for them. I love that idea. Someday I'm going to have an area with all the little teapot spouts sticking up.

The other amazing substance honey bees make is propolis or bee-glue, which they produce by adding sap and resin they've gathered from trees to a little honey, and it turns into this goopy stuff. They use it to plug any holes in the hive. It seals the hive from predators and ants and helps it stay a steady temperature. David used to sell it to someone who repaired Stradivarius violins because it's such an amazing sealant.

I scrape dried, crusty propolis off the edges of the hive and make some of my perfumes with it. I grind it all up and put it in organic grape alcohol, let it sit for about six months, strain it and use it as a tincture in my perfumes. I have a honey perfume, and the propolis slows down the evaporation. I use beeswax for my solid perfumes. I mix essential oils into jojoba oil, heat it, grate in beeswax, and it makes it solid like an unguent. Whenever I'm making my natural perfumes, I feel like a bee buzzing flower to flower combining all of these aromatic treasures from the garden together and distilling them into one delicious nectar.

When people think of beekeepers they think of commercial operations, not what we're doing here in our back yards. We're definitely not doing it for the money! It would be great if more people kept bees on a backyard scale

because it would help the bees, flowers, fruits, herbs, and vegetables so much. It's hard work, but I find it satisfying in so many ways – communication with a wild, magical creature, the wonderful honey and the tremendous help it gives to the environment. It's also endlessly interesting; you never stop learning. The more I learn, the more I realize there is to learn! Bees are still completely wild; we think we manage them, but there's still such a wildness to them that I respect and love that about them. Cats have that too. There's nature in there that just won't be tamed. Most importantly, I would like people to appreciate and respect honey bees more and fear them less. They only sting when threatened and really just want to go about their business of pollinating and making honey to feed their young.

It's amazing – it rains into the ground, the plant draws in the moisture, the moisture comes up through the flower filled with minerals, vitamins and essential oils, and it becomes this beautiful nectar. The bees sip it, bring it back to the hive and make it into honey by drawing the moisture out of it. The plants need to attract the bees in order to survive, and the bees need the nectar and pollen to survive. In turn, we need bees to survive. We're all so interdependent and interconnected.

People say honey bees are hardwired, genetically programmed. To me that isn't enough of an explanation for their amazing behavior; it misses the mystery. How bees figure things out is incredible; for example, when they're searching for a new home, the scout bees go out to look and when they come back they do a dance to tell the other bees how far away this ideal place is. Several bees come back with a report on different places, and then they communally decide which place to go. If this is all genetically programmed how can a group decision be programmed? If the bee isn't thinking, somebody originally did. I don't know what I believe about God . . . it's a mystery, and I'm fine with that, but when I see what the bees do, I think there's some magical force, an original design. The whole natural world blows me away constantly. There's a method to it; every animal and plant has some kind of gift or signature that makes it unique.

All I really know for sure is my garden is my sanctuary and my little paradise. It's pretty heavenly out here and sometimes I wonder why I ever leave. I love all of these wild little creatures in my life! I'm very thankful to the honey bees for making life so much more delicious! BC

Laurie Stern is a backyard beekeeper and perfumer in El Cerrito, CA. Thanks to the bees who inhabit her garden, her botanical perfume business is thriving. Velvet & Sweet Pea's Purrfumery; ***www.purrfumery.com.***

Excerpted from Backyard Beekeepers of the Bay Area *by Judith Adamson;* ***www.BackyardBeekeepersBayArea.com.*** *Photos by Catherine Butler, Butler Films, Inc.*

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Mother Nature Happens

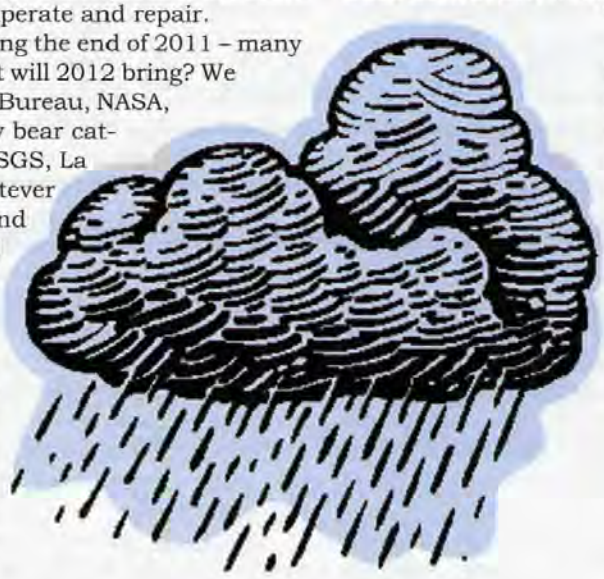
Ann **Harman**

Hurricanes, Floods, Drought, Wildfires, Tornados, and whatever else Mother Nature has in her handbag are all part of the world we live in.

If there is anything dependable about Mother Nature it is the undependable nature of what she can deliver. If we peer into her handbag we find tornadoes, hurricanes, earthquakes, thunderstorms, high winds, extreme drought, an excess of rain and snow – with the accompanying forest or grassland fires and floods. If we rummage around in her handbag we do find sun, gentle breezes and blue skies.

Beekeeping is an agricultural pursuit. And like all farmers, beekeepers are susceptible to all of the above problems. This year it seems that the entire country has felt some of those. Several of the events were short-term and recovery was swift and easy. Other parts of the country are still struggling to recuperate and repair.

We are quickly approaching the end of 2011 – many are very glad to see it go. What will 2012 bring? We can consult with the Weather Bureau, NASA, the Farmer's Almanac, woolly bear caterpillars, sunspots, NOAA, USGS, La Niña and El Niño, and whatever else you wish. (Go ahead and Google all of those – yes, all includes woolly bears.) However, surprises will happen.



What can we do?

First, no matter what disaster is about to happen, or is happening, save yourself and your family. Save your pets if you can. Save your livestock if possible. Heed all "watches" and warnings even if you think they have "called wolf" before.

Can all these disasters be predicted? The answer is not easy – some can up to a point, others cannot. If you live in an area prone to tornadoes you are familiar with the announcements and sirens. You may have a tornado cellar and know where signs are that indicate tornado shelters. You are familiar with the weather conditions that may form a tornado. But it is still not certain whether the tornado will change course, jump up and touch down again, or simply cease to exist.

Geologists are trying to solve the problem of predicting earthquakes. Most of that research is in the west, centered at the famous San Andreas fault and other main faults in the earth. You are aware of those if you live in the area. But the eastern part of the U.S. is not used to earthquakes, such as the one on August 23, 2011, that jiggled blocks of stone loose in the famous Washington Monument or toppled pieces off the well-known Washington, DC, Cathedral. Only the various animals – dogs and cats, horses and cows – knew that one was coming. But their warning, probably not noticed or perhaps misunderstood, was only moments before the ground quivered.

Heavy rains coupled with snowmelt do give us thoughts of floods, such as the ones that occurred in the Midwest in the Spring. Floods caused by hurricanes would be familiar to people on the east coast but turned out to be a total, horrible surprise to residents of Vermont, the Green Mountain state. It does not border the Atlantic and is famous for its snow and skiing. However hurricane rains that produced floods tore apart highways and local roads, ruined towns – homes and businesses. Such destruction would not necessarily be predictable in Vermont.

Some places in 2011 did have too much rain. But the other extreme is drought. Everyone in Texas this year waited for rain. It did not come and the temperatures were extremely high. The ground cracked. Crops turned brown and crisp. Other plants withered and dried. Forage for livestock, bees and wildlife simply began disappearing. Now that the land was covered with dry plants of all kinds wildfires could easily be predicted. All that was needed was a small spark. But which way the fires would go depended on wind directions as well as the abundance of the dry plant matter.

Other oddities, local in nature, occur without warning. A beekeeper in Iowa reported straight-line wind of 100+ mph. That can do as much damage as a small tornado. You can imagine the destruction in his beeyard. Flash floods can occur in small creeks and rivers during heavy rains and thunderstorms. Lightening can strike anywhere.

What about your beehives in a disaster? A hit by a tornado results in no beehives. Floods may carry the hives away for a catastrophic landing of parts and pieces a long way from the home apiary. A small jiggling from an earthquake may well annoy the bees but probably not cause ruin. Wind and rain from a hurricane could mean minor problems. Drought, by itself, means no forage. If a wildfire reaches hives or your equipment, you have lost it. Beeswax is flammable! How about the building where you store your beekeeping equipment?

This year I am certain that many people used their

Double Check Your Insurance Policies This Year

homeowner's insurance. Some were probably surprised to find their disaster damage was not covered. Right now – a no-disaster time – is a very good time to review your insurance policies. Don't hesitate to ask your company for help in interpreting your coverage. True, some insurers are not happy that you have beehives. Perhaps it is time to change insurers. Only you can decide that.

One thing you can do for you bees (and actually for everything else you own) is to record and photograph your hives and equipment. Beekeeping equipment represents quite a bit of money for replacement, especially if you have more than about two or three hives. As you are recording and photographing you probably will end up throwing out that ancient, battered hive body and also find that hive tool you haven't seen for three years. If you purchased equipment, especially something expensive like an extractor, make copies of receipts. Store the originals in a safe deposit box. If your home suffered damage or total loss your bank and its vault is most probably still standing.

Make an action plan for your family – what to do, where to go, how to get there. Now include your pets in that plan. So many have been abandoned in recent disasters that the animal shelters have been overwhelmed. Livestock presents a difficult problem. But give it a thought now before whatever disaster can arrive. Here again is something to discuss with your insurance company. Income-producing livestock needs to be documented and even photographed.

Considering probable disasters is there anything a beekeeper can do to minimize or even prevent loss of hives and bees? Sometimes. But remember Mother Nature is unpredictable. If you are storing much beeswax perhaps it needs to be removed to an isolated shed. In this way if it catches fire you will lose the shed and wax but at least its hot fire will not spread.

Flash floods come quickly and usually leave as quickly. Think about where your hives are sitting. Suppose that pond overflowed or that innocent stream becomes a broad raging torrent. Even if your hives don't float away they can sink into waterlogged soggy soil, perhaps tip over. Give a thought to moving your hives long before a raindrop falls. Perhaps the hives should have been on higher, stable ground from the beginning.

So your honey crop has been bottled, labeled and ready to be sold. You hear information about a coming disaster. Quick – take a photograph. With the digital cameras today you can take just about a zillion photos quickly. That bottled honey represents an income, large or small. If you have enough time before a disaster you might be able to transport the honey crop to store in a safer place.

Do you have a honey house where you do extracting and bottling? (Take more photos now while everything is in place.) Suppose you have a flood like the ones in Vermont? Your honey house had a muddy, churned up river flowing into it. One problem with such floods, besides mud and plant debris, is the possibility of sewage contamination. If warnings of that have been given by your local authorities you need to think about taking all that equipment as a total loss. After all, it was equipment used for processing and handling a food – honey. Cleaning and sterilizing may not be practical.

What about flooded stored equipment such as hive bodies, frames with drawn comb, bottom boards, smokers? Well, here again the warning about sewage contamination is pertinent. If the flood water was not contaminated it is possible that the woodenware can be salvaged. It does need to be thoroughly dried out especially if it was under water for a while. If stored damp then mold could be a problem. The frames with drawn comb? Check the cells to see if filled with silt or mud. If any brood comb was three or more years old, discard. It should be cycled out anyway for bee disease control. If comb seems to be filled with silt or mud you can try rinsing it with a hose but, again, it might not be worth the time and it may be impossible to clean it enough for the bees to use. New comb is quite fragile and probably would not survive either the flood or cleaning.

Drought means loss of bee food. We may see bees flying but they will be starving to death, perhaps in the middle of Summer. Think "feed the bees" pollen substitute and sugar syrup no matter what the calendar says. Severe heat? Think "close-by water supply" for the bees' air conditioning. Supplying pollen substitute and sugar syrup is much cheaper than buying bees to replace losses.

Have you been raising queens or making nucs for sale? Those represent income. Take photos, please, of the apiary, the mating nucs, and take a photo of one of your queens. Now you have a record of what you are doing. Remember, even if your insurance company is perfectly happy to include your bees, most of the people are not beekeepers. Your photos save an enormous amount of explanation. Beekeepers tend to use beekeeping words like "nucs," "extractor," "frames" that mean nothing to the uninitiated.

Not every one of us will experience a disaster. But hurricanes, floods, drought, wildfires, tornadoes, and whatever else Mother Nature has in her handbag are all part of the world we live in. Just as the Vermonters did not expect hurricane damage, I did not expect a straight-line wind to blow a run-in shed for the horses over completely onto its roof (well-built, sturdy 12- by 24-foot by 12 feet high; three sides, open to the south, strong posts buried three feet in the ground). There it sat, unharmed, but upside down.

After some disasters our bees will survive; other disasters will destroy our apiaries and perhaps our beekeeping business. Just make sure you and your family will survive. BC

Ann Harman keeps her bees and prepares for Mother Nature at her home in Flint Hill, Virginia.

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Vol. 3 No. 1

New Products

GLEANINGS

DECEMBER, 2011 • ALL THE NEWS THAT FITS

VANISHING OF THE BEES EDUCATIONAL VERSION AVAILABLE

The Educational Version of the film *Vanishing of the Bees*, and spectacular study guide is finally available.

Educators can now incorporate the 34-minute version of the film into their curriculum as a tool for transformation in classrooms (or community groups) and then action can be taken locally.

It's available for sale at **www.vanishingbees.com/educational-version/**.

Reach out to the people you know in your community who are part of the educational system, such as teachers, principals and librarians to inform them of the documentary, or better, have your association purchase a copy for them.

USDA ANNUAL HONEY REPORT ELIMINATED!

In light of funding reductions in fiscal year (FY) 2011 and the likelihood of additional reductions in FY 2012, NASS conducted deliberate reviews of all programs against mission- and user-based criteria, aimed at finding cost savings and forward-thinking business efficiencies so that key timely, accurate and useful data remains available in service to agriculture. As a result, the agency is discontinuing or reducing a wide range of agricultural survey programs. The decision to eliminate or reduce these reports was not made lightly, but it was nevertheless necessary, given the funding situation. Because of the timing of the agency's survey work during the coming year, these decisions are necessary now.

These programs are:

- Annual Reports on Farm Numbers, Land in Farms and Livestock Operations - Eliminate
- Catfish and Trout Reports - Eliminate all
- Annual Floriculture Report - Eliminate
- January Sheep and Goat Report - Eliminate
- Chemical Use Reports - Reduce frequency of commodity coverage
- July Cattle Report - Eliminate
- Distiller Co-Products for Feed Survey - Cancel
- **Annual Bee and Honey Report - Eliminate**
- Annual Hops Production Report - Eliminate
- Monthly Potato Stocks Report - Reduce from monthly to quarterly
- Annual Mink Report - Eliminate
- Fruit and Vegetable in-season forecast and estimates- Reduce from monthly and quarterly to annual report
- Nursery Report - Eliminate
- Rice Stocks June and September reports - Eliminate but continue January, March and August reports

Recognizing the importance of NASS's data products and services to U.S. agriculture, NASS will make available similar data either less frequently or within the every 5-year Census of Agriculture. The next census will be conducted beginning January 2013 to reflect activities in the 2012 calendar year.

A Federal Register notice announcing the program changes will be forthcoming.

PETITION FOR STANDARD OF IDENTITY REJECTED BY FDA

The FDA recently rejected the application for a standard of identity for honey, concluding that the petition did not provide reasonable grounds for the FDA to adopt the Codex standard for honey. It also concluded that the agency's existing enforcement tools are sufficient to address the concerns of the petition and "the establishment of a standard of identity would not aid the agency in its enforcement efforts or help insure industry compliance."

The argument presented in the original petition was that a standard of identity for honey would promote honesty and fair dealing in the interest of consumers, because consumers are confused about what the term "honey" means in terms of the food's composition. The FDA concluded that establishing a standard of identity for honey would not provide additional assurance that consumers would be informed any better. The label should provide any information on what might be added to the honey and it is the label that should alleviate any confusion that consumers might have.

While it is certainly true that some products are mislabeled, the proposed standard of identity would not provide any additional enforcement authority beyond what currently exists for improperly branded foods. The proposed goals are 1) informing consumers who are confused about what "honey" means in terms of the food's composition; 2) combating economic adulteration by aiding enforcement and industry compliance; and 3) promoting honesty and fair dealing within the food trade in general, where pure honey is highly valued as an ingredient in other foods. Those goals "can all be achieved using existing FDA enforcement tools" and concluded that a standard of identity for honey would not provide any "additional support toward the achievement of these goals."

While we in the industry tend to disagree, it will be a difficult hurdle to get the FDA to reconsider any time in the near future, so it will be necessary to continue efforts at the state level for individual standard of identity establishment.

Tim Tucker

Dear Fellow Beekeepers
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TERRA AND MITICIDES A DEADLY MIX

A widely used antibiotic to combat American and European foulbrood may harm rather than help the bees being treated.

U.S. researchers report in the online journal PLoS ONE the in-hive medication may make bees more susceptible to toxicity of commonly used pesticides, and this interaction may be at least partially responsible for honey bee population losses.

The researchers, led by David Hawthorne of University of MD, pre-treated healthy honey bees with the antibiotic oxytetracycline and exposed the bees to two pesticides that are commonly used in bee hives to control parasitic *Varroa* mites.

In both cases, the pre-treated bees were much more sensitive to pesticide exposure than were bees that had not been treated.

The researchers suspect that oxytetracycline may interact with specific bee proteins called multiple drug resistance (MDR) transporters, making them less effective and therefore rendering the bee more at risk to the pesticides.

To test this hypothesis, they pre-treated the bees with another drug, verapamil, which is known to inhibit a particular MDR transporter. These insects showed increased sensitivity to five different pesticides, supporting the group's theory that MDR transporters, and specific combinations of independently safe chemicals, may play an important role in colony collapse disorder.

Alan Harman

A MODEL QUEEN

Arizona State University researchers believe a protein love triangle is the key to crowning bees queens.

A honey bee becomes a queen or a common worker as a result of the food she receives as a larva. While it has been well established that royal jelly is the diet that makes bees queens, the molecular path from food to queen is still in dispute.

Scientists at Arizona State University, led by Adam Dolezal and Gro Amdam, have helped reconcile some of the conflicts about bee development and the role of insulin pathways and partner proteins.

Their research "IIS and TOR nutrient-signaling pathways act via juvenile hormone to influence honey bee cast fate" is published in the Journal of Experimental Biology.

Central to the dispute within the scientific community about "who would be queen" has been a groundbreaking study published in the journal Nature by Japanese scientist Masaki Kamakura in 2011.

He found that a single protein in royal jelly, called royalactin, activated queen development in larval bees through interaction with an epidermal growth factor receptor (EGFR).

Kamakura's work suggested that insulin signals do not play a role in queen development, despite previous studies suggesting otherwise, including work pioneered with the insulin receptor protein by Amdam's group.

Undeterred by Kamakura's findings, Dolezal, a doctoral student, and Amdam, a professor in ASU's School of Life Sciences, looked for ways to resolve the disparity between the research studies.

Amdam's team's first step involved taking control of the insulin receptor's partner protein, IRS, which the insulin receptor relies upon for signaling.

The scientists found that by blocking IRS, they caused a central developmental hormone to crash, which forced larval bees into the worker mold despite their diet of royal jelly.

Amdam's team then "rescued" the now worker-destined bees. They found by giving the bees hormone treatments, the bees could then develop along the queen trajectory.

However, while Dolezal and Amdam's studies showed that they could block queen development, and then rescue it, and clarified the role of IRS in the queen-making process, their work could not resolve the remaining conflict with Kamakura's results.

Taking a new tack, the Amdam group, which also included Navdeep Mutti, Florian Wolschin, and Jasdeep Mutti, and Washington State University scientist Kulvinder Gill, turned to mathematical modeling, combining their results with approaches that analyze potential partner interactions.

These models, developed to understand and clarify complex relationships in physics and biology, allowed the ASU researchers to build a model of consensus – explaining how the IRS partner protein could partner to both epidermal growth factor receptor and insulin receptor.

And while the insulin receptor itself may play no role – as Kamakura's findings suggest – Dolezal and Amdam's findings show that the IRS partner protein may in fact be key to a molecular love triangle, interacting with both receptors, and with the bond to epidermal growth factor receptor being the crowning feature in queen development.

Alan Harman

GET EDUCATED IN COMMERCIAL BEEKEEPING

The first commercial beekeeping training course in Canada is being introduced at Grande Prairie Regional College in Alberta starting in January.

The program will prepare students for employment such as apiary assistants and field supervisors with commercial beekeeping operations, technicians with government agriculture departments and self-employment as beekeepers.

GPRC, 290 miles northwest of Edmonton, ran a beekeeping course at its Fairview College campus between 1981and 1999 and 271 graduates completed the program.

The college says industry interest and support for the renewal of a beekeeping program has provided the opportunity for it to develop a program that will meet the needs of industry and international growth in the bee and honey industry.

The program is accepting up to 12 students for 45 weeks of training. This includes 26 weeks of paid work over the summer at a commercial beekeeping operation.

It includes classes on honey bee biology, botany, hive management for honey production, queen rearing, pest and disease management and the processing and marketing of honey products. There is also a technical woodworking class that teaches students to make beehives and other equipment.

"The program will provide needed training for those wishing to pursue a career in this industry and will provide an avenue for a new generation of producers to enter the industry," says Steve Pernal, senior research scientist at Agriculture Canada's Beaverlodge Research Farm.

Pernal says it is very important to the success of the industry to train new beekeepers.

"If you go to beekeeping organizations across North America or Europe, it's not exaggeration to say that you're talking to a sea of grey hair," he says.

A worker bee (left) and queen bee show the vast differences in development that can occur based upon the food a bee receives during its larval stages. (photo by Christofer Bang)

Alberta Beekeepers Commission northwest region representative Rodrigo Mendez says the group is looking forward to the new crops of beekeepers trained by GPRC Fairview.

"The beekeeping industry in Canada has lacked the ability to formally train new beekeepers for many years," Mendez says. "This is a rapidly evolving industry and having this course will give the opportunity for new people with different backgrounds to enter this vibrant industry with new ideas and points of view. This course will re-invigorate the industry and keep Alberta beekeepers at the forefront of beekeeping."

The province of Alberta is the third-largest honey producer in North America, with an estimated $20-million annual contribution to the economy.

It's Peace Region, long known for its honey production, is quickly becoming an important knowledge and research base in the field of apiculture.

"This program not only fills a clearly established need in North America and beyond, but it adds a key component to the work in bee research and diagnostics which is now being initiated in our region," GPRC president and chief executive Don Gnatiuk says.

"I believe that GPRC, through our partnership with Agriculture and Agri-Foods Canada and the beekeeping industry in Alberta is poised to establish an apiculture centre of excellence which will be respected throughout the world," he says.

"The whole reason we went after this is because the community told us it was important to them," Gnatiuk says. "This was the first thing we look at; if it's important to the community, it's important to the college."

GPRC dean of trade, agriculture and environment Chris Laue tells a news conference there have already been international inquiries, especially out of Mexico.

"I wouldn't be surprised if we get some inquiries out of South America also, because beekeeping is fairly large down there," he says. "As far as we know, we have the only program that is 45 weeks long that is this comprehensive in North America." – *Alan Harman*

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God Bless, and Merry Christmas to you all!!

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I used to think I knew about every beekeeper here in the valley – from Rifle to Aspen. Now, backyard hives – especially top bar hives – spring up quicker than you can say, "Queen of the Sun."

If you're new to beekeeping or maybe just dropped in from Outer Space, top bar hives use no foundation. The bees make comb much way they do in the wild. They hang it from the top of the hive.

In the last three weeks – minding my own business and not going out of the way to socialize – I met six hobbyist beekeepers. The most experienced of these has been keeping bees for three years. Five of them use top bar hives and made sure I knew it.

Top bar beekeepers can be passionate about their peculiar calling. Yet when I try to talk shop with the ones I've met, I just get these blank stares. *Varroa*? American Foul Brood? Winter bees? Winter stores? They have no idea what I'm talking about. All right, they're beginners. But they have opinions. They know the Langstroth system is plain no good. They feel it's important that their little darlings not make uniform-sized cells from foundation but rather have the freedom to make cells whatever size they want. Maybe they have a point here. They want to keep bees a better, more natural, way.

They're blasé about honey production. They're not doing this for the honey. They're doing it "for the bees."

And they have this disconcerting way of looking at me that tells me they know the secret to beekeeping, and I don't.

The top bar enthusiasts I met all seem to know each other. The most experienced of them – the guy with three years under his belt – is a friend of my gal Marilyn. When she introduced us, he and I talked about getting together to learn from each other, but so far it hasn't happened. Are we afraid we might learn something?

I wish these guys the best. They're part of the remarkable resurgence of beekeeping in this country. But there's a lot to learn in this game. I just wish they weren't quite so sure of themselves.

I'm not so sure of myself right now. I've got this problem with my Flat Tops bees. They had a great Summer and now in late October I'm worried.

Paul once casually remarked that, "Flat Tops bees don't Winter very well." This didn't make sense to me, but I never forgot it.

Why would migratory bees at 9,000 feet not Winter as well or better, even, than bees from down in the valley? They don't spend the Winter up there. True, they don't always get on a good honey flow – some years it's flat out too cold for bees in the Colorado high country – but they always seem to pull in a lot of wildflower pollen. This would seem to bode well for Winter survival. There's a little herbicide spraying on the Flat Tops, but no pesticide applications to speak of.

After mid-Summer, the pollen is predominantly orange and very sweet tasting. I think it comes from sneeze weed, although I'm sure there's rabbit brush in there, too.

I've had queens stop laying too early in the Fall before, but I've never isolated it as a Flat Tops problem – until now. My bees from six Summer apiaries get consolidated into two Winter yards, and I generally don't keep track of what hives come from what Summer yards. But this year I've got it straight.

The Flat Tops bees made a good honey crop. I pulled it at the end of August. Then we had a dreamy Indian Summer. The bees were still bringing in pollen, and I didn't get around to moving them to their low-altitude Winter yard on Silt Mesa until **the first of October.**

In September I tested and treated for mites on the Flat Tops. I used the sugar shake test, in which I take a 300-bee sample from brood comb. I noticed nothing out of the ordinary. These good hives had brood.

At the Colorado Beekeepers meeting in June, Lyle Johnston preached to us about Fall pollen substitute feeding "beginning in September." You want your queens laying like year-old hens through the Fall to give you the long-living "fat Winter bees" that will get you into Spring. Pollen intake is the key to prolific fall queen laying.

I was a little late getting started. Too late, apparently. I slapped the first pollen patties onto my Flat Tops bees on October 5. Imagine my surprise when I discovered that these 30 colonies had virtually no brood! There were plenty of bees in the boxes, but only three or four had brood. The rest – nada!

I don't have pesticides to blame. My mite levels were generally low. In September, I did treat a few hives with Apiguard at half the 50-mg. recommended dosage. But most hives received no treatment. I neither tested for, nor treated for, nosema. I never do. I'm either stubborn, or naïve.

The other 50 hives that I kept at multiple Summer locations, including the 10 I kept at 9,000 feet on Aspen Mountain, looked fine. The vast majority had brood.

Maybe I'm borrowing trouble here, but those Flat Tops bees were some of my best. Will they have a tough go of it this Winter?

I'll let you know next Spring. Now there's nothing to do but wonder, and wait.

Ed **Colby**

So, Is There A Problem?