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If There Is A Label It's Removable

Features . . . . . The Rest

Clearing The Air

Recently, the *Millers American Honey Co.*, of Colton, CA was sold to Groeb Farms Inc.

Some members of the Miller's family were uncomfortable with the sale.

Nevertheless, the seller and buyer reached an agreement; a transaction occurred.

Miller's Honey Co. Inc, Salt Lake City, UT., and *Miller Honey Farms, Inc.* of Blackfoot ID., Newcastle, CA., and Gackle, ND., are in no way associated with Groeb Farms Inc.

Recently, Groeb Farms Inc. has been the subject of Federal action, and a bankruptcy proceeding.

Miller's Honey Co., Inc. wants suppliers, beekeepers, and fellow industry colleagues to know the business is operating normally.

Miller Honey Farms, Inc. is also operating normally. Both companies are still family owned and operated since 1894.

These are extraordinary times for both honey packers and beekeepers. Record prices are reflections of record poor crops, scarcity of good quality honey; and poor forage conditions. Miller's Honey Co., seeks quality honey from U.S. honey producers.

Miller's Honey Farms do all we can to preserve our hives, provide worry free pollination services, and partner with our customers.

John Miller, Miller's Honey Farms, Inc.
Ilene Miller, Miller's Honey Co. Inc.

Very Disappointing

In light of your pieces in defense of Monsanto in the December '13 issue, I will not be renewing my subscription, ever. "The government cover-ups." "The long term dangers of their technologies, a rise in health issues since the inception of their work. . . But I didn't see that." How would you see these things as a guest visiting their company? Mr. Flottum, did you see coverage of Diane Sawyer's visit to North Korea a few years ago? All appeared rosy there as well. Must be a pretty reasonable regime. Big, commercial agriculture goes directly against the grain of sustainability and a healthy ecosystem.

Adam Stockman
Concord, NH

Editor's Response: *I'm not sure I'd compare Monsanto to North Korea (Monsanto feeds people, North Korea doesn't) but ignoring or refusing to acknowledge this now-in-the-bee-business company would not be productive. And, in light of your opinion, I would think you would believe the wise saying about keeping you friends close . . .*

Bait Hive Stories –

They'll Come At 11:30 – I set up a "decoy" beehive several years ago on property of a fellow worker (we're both retired now). They did well until last Winter when they died.

I first suspected the mite, but believe the queen died. They had one full super of honey left which I removed. It had quite a bit of moisture, but saved the combs for bee feed.

I left the hive body on the old stand hoping to pick up a new swarm.

On May 15 my friend called informing me "we've got bees again." I asked if he was sure they weren't just scouts. "Oh no they're in there." I then told him to take a look inside and tried to assure him that a new swarm won't sting for the first three or four days. He said "No, I'm not taking the lid off."

He lives several miles away but I told him I'd come up and look. I could tell instantly that they were in fact scouts, by the excitement and bombing each other – you just know – so I took the cover off and sure enough just a few bees inside.

He seemed disappointed until I assured him I was sure the swarm would come as there were many scouts.

He said you want a beer, I said yeah. We sat and enjoyed watching the scouts and the beer. About 20 minutes passed and I noticed activity around the entrance had calmed down somewhat. The time was about 10:50 a.m.

I said "You know I think they're going to come soon." He gave me a

strange look and took another sip.

Within 15 minutes most activity had ceased. I looked at my watch and said "they'll be here by 11:30." He didn't reply. We sat for another five or 10 minutes, and then I heard them. I said you hear that. He said "*$@!"

It's a remarkable site, bees every where. Pretty soon the whole hive was covered. I again had to assure him that he wouldn't get stung. In a half hour they weren't in yet. A big swarm.

He finally said I can't believe you knew they were coming and even predicted the exact time. I smiled and said I missed it by five minutes. I'm usually closer!

We both had a good laugh, and another beer.

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Bait Switch – Twenty-five years ago I tried this ploy on scout bees, and it worked, so I tried it again this past June.

On the 27th scout bees started looking over a "decoy" hive that was in our back yard. I watched them all day off and on. The bad thing was the hive had a bunch of old combs of various frame sizes – brood frames and shallows. I didn't really want them in this situation – the bees like it. But the beekeeper didn't so I decided to swap boxes – nice new box with new frames filled with foundation, for this old one. But I knew I had to wait for the right time! That's when the scouts "decide" this will be the new home.

They let me know this by their actions. All of the scouts will return to the cluster when the decision is made. There will be no bees at the decoy. They do this slowly each in turn staying at the cluster until there are none at the decoy.

This never happened on the 27th or 28th. I timed one bee by putting a drop of honey near the entrance, and then took a grass shoot, dipped in latex paint, putting a small dot on her thorax. When she left I waited. Ten minutes later she came back. That figures out to be 1,000 yards. The formula is (minutes x 150 – 500) gives you yards. Adrian Wenner told me this.

On the 29th at 8:00 scouts were again coming, my marked bee came, same time 10 minutes. I watched until 10:00. Everything was the same. We had to leave for a couple of hours and I was sure I would miss their coming. We got back at 1:30. I went to the backyard and everything seemed the same. Scouts looking excited, bumping and running, just like the two days before. By the way I videoed this whole thing which I've done many times before.

About 2:00 I noticed a decline of scouts and 15 minutes later very few. Time for the switch. I put the old hive in the woodshed. There were a couple of bees inside. I left the bottom board where it was and sat my new box and frames on top. I believed they were still 1,000

yards off and probably wouldn't make it in one shot – too far to follow the scent trail of the scouts and they would recluster, nearer and the process would start over again. But to my surprise after the switch it was less than four minutes when I heard a buzzing. I yelled at the wife "they're coming." An amazing sight – bees everywhere.

They showed no concern for the new box and after a half hour they were all in. I wonder if they "knew" the difference.

I must admit I did put one drawn comb in the new box, but it probably didn't make any difference.

So, I got my bees and still have my "decoy." Sometimes you *can* fool Mother Nature.

If I had swapped boxes before the scouts disappeared they would have given up on the foundation one, I'm sure.

I think they made a move to come when we were gone. That's why it only took four minutes. It worked out good for both of us.

Jim Cowan
Aberdeen, WA

JANUARY – REGIONAL HONEY PRICE REPORT

Keeping bees healthy isn't what it used to be. And over the past seven years, it's changed even more. Fumigillin use up this year after a bit of a drop as is AFB medication. When it comes to *Varroa*, essential oil use is up, hard chemicals are down, drone comb removal up a tad – all encouraging when it comes to chemical use in general. Feeding has increased this year – after the disaster last year. HFCS use is steady, but sucrose use is up a bit, but protein use is up, and overall more are feeding more, which is good. Take a look – where does your operation fit in?

A bit about prices, as long as we're on the Honey Price page. A barrel of honey today is worth about $1400. A year ago about $1200 or so and two years ago just over $1100. A few years ago it took 3, maybe 4 colonies to produce that 660 pounds, about 150+ – 200+ lbs/colony. At today's 50+ to 100+ lbs/colony, production has halved, but the price hasn't doubled. And, costing $250 - $300 to manage one colony for a year…the hand writing is on the side of the hive folks. Think long and hard about what you are selling honey for. Like the Norwegian farmer selling corn at $1/bushel and losing $2/bushel, says…I just need a bigger truck…I'll make it up in volume.

Percent Using . . .	Every Year Needed Or Not							Never Have, Never Will							Only If Needed						
Medication	08	09	10	11	12	13	14	08	09	10	11	12	13	14	08	09	10	11	12	13	14
Nosema - Fumigillan	17	34	32	39	34	21	30	14	13	13	10	14	8	18	54	52	54	51	52	40	43
AFB Treatment	45	31	37	20	37	18	30	14	14	11	9	15	8	11	42	56	52	70	51	47	55
Feeding Carbs																					
Sucrose	24	37	42	29	20	21	21	11	12	14	20	39	6	18	35	51	43	51	41	30	38
HFCS	20	18	28	15	12	9	9	24	46	44	51	56	25	36	18	36	28	23	34	18	25
Blend	8	15	17	9	8	4	9	24	59	58	60	68	30	38	15	27	24	31	38	9	4
Honey	–	–	–	–	–	–	13	–	–	–	–	–	–	21	–	–	–	–	–	–	38
Other - Fondant, etc.	8	18	19	23	17	11	12	17	44	34	26	21	9	16	20	38	47	51	53	33	40
Adding Feeding Stimulant	–	–	27	22	31	13	27	–	–	38	38	33	16	14	–	–	34	41	35	22	32
Feeding Protein																					
Commercial Substitutes	15	27	48	47	44	26	38	60	40	22	20	21	17	20	25	35	30	33	36	21	30
Pollen	–	18	18	12	7	9	5	–	61	44	50	63	21	29	–	21	38	38	30	14	20
IPM																					
Oganic Acids, *Varroa*	18	23	23	23	20	15	23	42	44	40	45	47	20	23	38	33	37	32	33	19	27
Registered Chem. Treatments	57	37	6	8	18	17	5	14	14	34	32	41	19	48	32	49	28	59	41	19	16
Drone Comb Removal	31	22	17	23	15	11	16	38	43	30	33	37	14	27	31	34	52	45	46	20	38
Essential Oil Treatments	–	22	29	20	26	13	32	–	43	27	23	30	21	14	–	27	51	37	44	23	29
Small Cell	–	–	2	3	2	5	9	–	–	67	73	78	29	63	–	–	31	24	22	10	9
Old Comb Removal	34	40	57	43	42	30	60	–	17	4	9	7	7	2	66	42	39	49	52	20	39
Screened Bottom Boards	–	50	42	42	43	30	39	–	30	27	31	39	11	29	–	26	27	27	17	11	14
Small Hive Beetle Traps	–	–	13	3	15	17	25	–	–	44	47	46	16	23	–	–	42	50	38	18	25

All categories DO NOT total 100% because all reporters did not answer all questions.

REPORTING REGIONS	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	2.13	2.50	2.13	1.96	2.20	2.22	2.10	2.13	1.80	2.25	2.20	2.13	1.74-2.50	2.13	2.09	1.95
55 Gal. Drum, Ambr	2.05	2.00	2.05	1.94	2.05	2.10	2.10	2.05	1.60	2.05	2.05	2.50	1.60-2.50	2.04	1.95	1.82
60# Light (retail)	182.50	185.00	170.00	165.60	180.00	181.67	181.50	165.00	130.00	171.00	177.50	195.00	130.00-225.00	175.88	184.68	165.22
60# Amber (retail)	201.67	175.00	170.00	165.00	180.00	176.67	174.00	165.00	125.00	179.01	170.33	195.00	125.00-240.00	175.52	174.36	161.11
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	71.77	82.23	62.80	70.45	70.63	60.00	45.60	70.63	70.63	51.84	72.00	70.63	45.60-102.00	67.46	71.72	67.22
1# 24/case	108.85	115.63	96.00	92.80	96.00	89.10	87.00	108.00	95.62	98.16	100.00	132.00	74.00-156.00	101.25	108.00	103.25
2# 12/case	119.78	96.48	102.60	82.40	90.00	90.28	86.10	105.00	80.00	97.44	81.00	108.00	73.20-162.12	96.81	95.94	89.74
12.oz. Plas. 24/cs	98.94	87.30	71.40	78.60	84.40	92.00	66.00	103.20	85.07	74.40	93.00	88.00	62.40-108.00	84.93	84.29	76.31
5# 6/case	124.71	111.32	100.50	90.25	114.00	120.00	95.25	112.50	103.98	102.30	90.00	103.98	83.10-126.00	103.40	105.46	98.62
Quarts 12/case	153.00	140.94	132.70	116.27	120.00	121.33	140.10	120.00	132.70	115.32	110.70	150.00	99.00-181.20	125.31	124.78	115.35
Pints 12/case	104.28	70.95	96.00	78.60	96.00	73.60	118.80	88.11	66.00	88.11	69.00	84.00	55.00-132.00	82.72	80.34	74.96
RETAIL SHELF PRICES																
1/2#	4.50	4.38	3.64	3.92	4.20	3.50	2.70	4.20	4.20	3.80	3.50	4.20	2.50-6.75	3.78	3.92	3.72
12 oz. Plastic	5.17	5.15	3.80	4.53	4.50	5.17	4.00	5.50	5.13	4.73	5.08	4.86	3.25-7.75	4.77	4.82	4.50
1# Glass/Plastic	6.25	6.05	6.25	5.99	6.50	6.93	4.75	7.00	6.36	6.42	6.01	8.25	3.00-9.99	6.22	6.28	5.87
2# Glass/Plastic	11.25	9.86	11.10	9.92	11.00	10.28	8.68	12.00	8.00	9.70	9.96	13.50	6.00-15.50	10.40	10.32	9.85
Pint	11.50	7.95	10.25	7.72	7.00	7.70	11.00	9.50	6.00	9.00	8.10	9.10	6.00-15.00	8.50	8.26	7.65
Quart	15.00	13.15	20.00	13.77	13.00	13.20	13.63	20.00	14.23	14.16	10.94	16.49	8.25-20.99	13.84	13.84	12.89
5# Glass/Plastic	27.25	20.11	25.90	22.17	24.00	29.50	20.00	28.00	23.92	23.90	21.20	23.92	14.99-35.00	22.84	22.53	20.50
1# Cream	12.00	7.40	9.13	7.00	8.02	8.00	4.90	8.02	8.02	7.25	6.39	8.00	4.90-12.00	7.59	7.45	6.94
1# Cut Comb	7.50	9.43	11.08	7.62	9.43	7.88	6.63	9.43	9.43	10.00	12.00	12.00	5.00-15.00	8.85	8.79	8.55
Ross Round	9.75	6.98	8.25	6.60	7.80	7.00	6.00	9.50	7.80	7.80	7.50	7.20	4.00-12.00	7.59	8.24	8.04
Wholesale Wax (Lt)	6.67	6.57	6.00	4.35	3.20	5.68	5.50	6.00	4.00	6.00	3.58	5.00	2.00-10.00	5.22	5.28	4.64
Wholesale Wax (Dk)	4.00	5.85	6.00	4.09	3.15	5.02	5.00	5.00	3.75	4.75	2.00	4.75	2.00-8.00	4.49	4.74	4.17
Pollination Fee/Col.	106.67	62.50	97.50	58.60	80.00	65.33	64.00	85.00	88.76	80.00	88.76	93.58	35.00-165.00	77.51	81.39	75.28

INNER COVER

The Root Candle Company recently began selling candles to the largest candle store chain in Ireland, Yankee Home Fragrance Stores. They had been selling candles manufactured by Yankee Candle, out of Massachusetts – hence the name – but that company recently reduced the variety of products, and the Irish Yankee Store was suddenly looking for an additional supplier. They found Root Candles and now carry almost 70 Root Candle fragrances from the Legacy, Seeking Balance and American Experiences ranges.

They had been called Yankee Store, but now what? Find another supplier, change your name just a bit, and keep on selling candles became the plan. The difference between the two candle companies is basically the quality of the raw materials and how they are manufactured. Root takes the high road and well, let's just say others don't.

To launch the change in the product mix and the new name, Yankee Home Fragrance invited representatives from our company to be present at their two largest stores both of which are over 5000 sq ft – in Waterford and Cork – for an evening of wine, appetizers, soft jazz, and special prices on Root Candles – and a honey tasting. There are three other stores . . . Kildare, Dublin and Kerry and a new online store **www.rootstore.ie.**

One of the attributes most sought after in our candles is that we use beeswax and vegetable waxes, rather than paraffin, in many of our products – a tilt toward sustainable rather than petroleum based products. The tie between beeswax and honey was a natural and the Chain's owner, Peter Mc Auley thought a honey tasting would be both a draw, and something very unique. He was right on both counts. So in early November three of us – Brad Root, President, Floyd Ostrowski, VP Operations and myself - flew to Dublin where Peter picked us up and we drove to Waterford (of crystal fame) for our first party.

Beforehand we had contacted the beekeepers in all of Ireland with an announcement in their National Beekeeping Journal, *An Beachaire*, hoping to have some come and share their honey and try some uniquely US honeys we brought, including Starthistle, Black Sage, Goldenrod, Linden, Blueberry, Buckwheat, Sourwood and of course an Ohio Wildflower. When we arrived I went shopping (I do like to visit grocery stores, no matter where I go) and added some food for pairing – two kinds of sliced apples, crackers, and several cheeses ranging from mild to strong. The goal is to pair several of these honeys with some of these foods and see how the honey changes and adds to the flavor of the apples or the cheeses. We had small spoons or the crackers to dip and taste just the honey for a side by side comparison. Peter had also sent out invitations to his existing customers and anybody who looked at his Facebook page and he was expecting as many as several hundred customers, and honey tasters, to show up each evening. That would amount to a lot of honey.

Lots of customers and quite a few beekeepers came to the Waterford party and we tasted a lot of honey. The beekeepers brought some local honey – mostly a blend of Hawthorne and Blackberry, with a bit of Clover in the mix. Some had a mostly Rapeseed honey, with a bit of the other honeys in the mix, too. They were all good, and all very light, mild and enjoyable. Blackberry has a fruity flavor, and Hawthorne kind of an applely taste, and if there's enough clover it comes through, especially the little burn at the end in the aftertaste. The flavors, and aromas, though similar, were always a bit different because of the proportions of each in the blend.

At the Cork party more beekeepers came than the previous night. In fact, all the officers of the County Cork Beekeepers Association came (**www.cocorkbka.org**), each with a jar or two of their honey, plus several members of the group came too. We talked about the weather, honey pric-

Officers of the County Cork Beekeepers, L – R, Back Row - Noel Power, Bob McCutcheon, Jim Curtain. Front row - Mary O Riordan, Eleanor Attridge.

Ireland.
It Was An
Interesting Year.

es, honey crops, the weather, honey prices – no matter where you go in the world it seems, when you get to talk to beekeepers the conversations are about mostly the same subjects, but vastly different in content.

The photo shows the officers that came, and Eleanor Attridge brought us a jar of essentially pure Rapeseed honey that had crystalized into the smoothest, creamiest, best creamed honey I have ever tasted. It was like marshmallow fluff, with a sweet, subtle flavor. I honestly have never seen, or tasted anything like it before. It was almost like putting a spoonful of honeybutter in your mouth – absolutely no crystals or sandiness feeling at all.

We had arrived on Tuesday morning, and left on Friday morning, almost recovering from the five hour time difference, but I was still not quite sure what time it was, really, or what day it was at all. Peter was quite pleased with the turnouts at his stores, and the people who were working those evenings enjoyed the honey, and the business, so I guess it was a success for Yankee Home Fragrance, Root Candles, and Beekeepers everywhere.

If you get a chance, try a honey tasting for folks who don't know about honey. We changed a lot of opinions about honey and especially about adding honey to foods other than toast or tea. I could have sold a ton of any of those had I had some on hand, and we steered a lot of people to their local beekeepers to get some more. I think the level of honey consumption in those two towns will increase significantly after this. It will where you are too, if you simply put up a table, slice a few apples and some cheese, and say, Here, try some, it's free, and you've never tried anything like it. Bon Apetit!

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What an interesting year last year was. Monsanto got up to speed in the bee business and invited a large group of people attached to beekeeping to a honey bee health summit in June at their headquarters in St. Louis. That was a good idea. There were lots of people there – but it was kind of like a stand-off – one bunch on one side of a line, one bunch on the other side of the line, and a few on the line, all waiting for – something – to happen. The line, by the way, was imaginary, but folks on one side were feeling – What am I doing here? while those on the other were feeling . . . What's the big deal? But nothing happened. Well, there was the honey bee health summit, but for all the information that came out from that, it was all in third place compared to the fact that the Mountain came to Mohammad. Beekeepers in the same place at the same time as – Monsanto people. And nobody got hurt. Or died. But, I heard, some did get mad and quit.

Then came the news release put out by Monsanto in September that we published here on the BUZZ. It spelled out their commitment to honey bee health at the 2013 Clinton Global Initiative Annual meeting with support from the Keystone Center, The American Honey Producers Association, The American Beekeeping Federation, The World Wildlife Fund, and Project Apis m. (PAm), plus several commodity groups. Oops.

It seems they didn't talk about this beforehand with those groups, even though those groups were really kind of OK with this because it means additional money for research and other support – and they've even already used some of that money for additional research and support. Whoa, was the response. We didn't say that. We didn't sign anything.

So a second press release was released. This one just a bit different in that the actual parties weren't mentioned...but the work already done was acknowledged and spelled out. Feathers unruffled. Mostly.

Part of that second release mentioned the Keystone group meeting to be held in December – after we had to go to press – so we don't have a report from there. Maybe we won't either, since the press wasn't invited. So maybe we'll see how they will resolve and solve their issues. And maybe we won't.

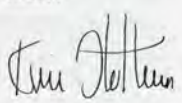
Except I'm not quite sure what the issues are. Monsanto is in the bee business because they bought Beeologics. So what's the problem? They have the money and the skills to develop what Beeologics had started. Nobody cared about this when Beeologics was doing it. Why does anybody care when Monsanto is doing it? That tidbit escapes me. And if somebody gets it figured out and it helps with Varroa control, isn't that a good thing?

Next comes the hoopla in the Journals and on the web starting in late fall or so about the January meetings of the American Honey Producers and the American Beekeeping Federation. In December I first noticed that one of the Bronze sponsors for the Federation meeting was the Bayer Bee Care Program, celebrating 25 years of commitment to honey bee health. And then the schedule for the American Honey Producers was published and Dr. Lain Kelly is lined up to speak on 'Bees and the Crop Protection Industry: Our Common Interests'. He's from, if you haven't guessed, the Bayer CropScience Bee Health Team and attended the Keystone meeting. Who would have guessed any of this would ever happen?

I don't think any of this is bad, or good. It just is. But I have to admit I didn't think it ever would happen. Like I said, what an interesting year last year was. I simply can't wait to see what will happen next.

•

Speaking of next year, here's one more thing I'd like you to consider this season. Several organizations are measuring overwintering losses. You put 20 to bed in October, there were 10 alive in March – a 50% loss, right? This year try to measure how many you lose between March and October. Conservative estimates of commercial losses during that time are much, much, much higher than the 30% given for overwintering losses. I'm beginning to suspect that that measure is of less value than one made in October of Summer losses. Queen losses, varroa losses, nosema losses, absconding losses – talk to a hard-working, migratory beekeeper and replacing 100% of his or her colonies during a 12 month period isn't uncommon. 30% is a measure, but I don't think it's the best measure we could be using. Keep track this year. Let's see how things are going during the good 'ole Summer time.



It's Summers Time —

DC In The Fall

Can you believe it's the January issue already? The years seem to fly by faster and faster. I hope that you are enjoying your holiday season and that Winter is being kind to you.

Kim and I had the pleasure of making another trip to Washington DC in mid-November. I'll say it to all of you again if you haven't been there recently or at all I encourage you to find a way to visit our nation's capital. It is an amazing place.

The purpose of our trip was for Kim to speak at the Maryland State Beekeepers Fall meeting – about 150 people came that day. It was a good meeting – saw some old friends and made a couple of new ones. Toni Burnham, who writes our *Downtown* column each month, was elected as their president for 2014. She made sure Kim and I got where we were supposed to be, on time.

We also visited the Smithsonian where Toni gave an excellent talk on urban beekeeping. Kim talked about different honeys and how to taste and enjoy them. And then we did a honey tasting for about 50 people. It's always so much fun to see people experience the differences in honeys. We offered about eight different honeys – Buckwheat, Tupelo, Orange Blossom, Basswood, local DC honey and our Ohio honey – paired with different cheeses, apples and crackers. If you haven't done this at your meetings you need to try it.

We stayed at the Key Bridge Marriott in Arlington, the oldest hotel in that chain. It was slightly retro in appearance but a great place to stay. It is just across the river from the monuments and just one metro stop from Arlington National Cemetery. Georgetown is just a few blocks away in the other direction. And the metro stop was maybe three blocks from the hotel.

After a long day at the meeting on Saturday and then a wonderful dinner with several beekeepers, hosted by Toni and her husband Sam we headed to our room and were asleep pretty quickly. At 2:45 a.m. the fire alarm went off. I don't know if you've ever had this happen. The hotel was not on fire, but of course you don't know that until some time later. So out of bed, grab your shoes and your coat (it was pretty cold outside) and your purse, and don't forget your room key. Then out into the hallway with lots of other sleepy people in their pajamas with their coats and their purses. Fortunately we were only on the third floor, because, remember, in case of fire do not use the elevator. Then you find your way outside, actually you just follow the sleepy guy in front of you and hope he knows where he's going. We ended up on the sidewalk, but quickly were able to make our way to the lobby. There was not a fire, just a happy wedding participant who decided to pull the alarm on the second floor. But you have to stand around, in your pajamas, until they've thoroughly checked out every floor – 12, I think. Everyone was remarkably calm and polite. By 3:15 we were back in bed trying to fall asleep.

Sunday we had a day with no commitments and decided to take the Metro over to the Smithosonian. I love the DC Metro. I love public transportation in most big cities. We got off right in the center of the Smithsonian Complex. We headed toward the monuments – we had not seen the newest one, Martin Luther King. It is spectacular. All of the monuments and memorials are so moving. It is always an emotional journey, wandering around the area. The Washington Monument was surrounded by scaffolding, giving it an unusual appearance. Damaged by a sizable earthquake in 2011 they were just about done with repairs and trying to determine whether it is still the same height as before.

Toni was wonderful. She met us for lunch in Georgetown on Monday and then we went shopping for supplies for the Honey Show. Tuesday she picked us up at the hotel and off to her house to cut up cheese, and prepare for the evening at the Smithsonian. Wednesday morning she gathered us and our luggage and before having to go to the airport took us to the Smithsonian American Indian Museum for a lunch of traditional American Indian food. Then she drove us around for a bit more sightseeing. She is an excellent tour guide. Thank you Toni.

Then it was back home and back to the business of everyday living – deadlines, chickens, getting ready for Winter. A week or so ago we had to finally hook up the warming lights and the water heater for the chickens – late November. We haven't had much snow, and for that we are thankful, but it's been pretty cold already. The girls are doing fine though, quite comfortable and warm in their coop. The egg laying is very slim now – I think for several reasons. They seem to be done with the molting, but they are now almost two years old and from what I've read egg laying starts to decline a bit at that age. And also the shorter days means fewer eggs – three yesterday from 11 chickens. But I have to say I'm still enjoying them. Obviously we're not in this venture to make money. They keep me entertained and as long as we get at least two eggs a day for Kim's breakfast I think we'll be OK. They are funny, they talk to me, they respond to me. We'll probably get some more chicks in the Spring and integrate them into our flock.

Next on the list a pygmy goat and a puppy of some kind. What do you think, Kim?

Hardy Summers

Start The New Year With Something New –

Need another calendar? One with honey bees and beekeeping photos? Yes? Well, here's a good one...and as far as we know there's at least three out there this year. Kodua Galieti, a photo journalist, and the photographer for the Almond Odyssey a couple of years ago, has released her 2014 calendar. You can get it on her web page at www.koduaphotography.com for $17.99, or, you can get a bunch of them and use as a fundraiser for your club...a neat idea in my opinion. In fact a portion of her sales support honey bee research, which is OK in my opinion too.

What's a Shizel? The Shizel is one of the most unique multipurpose tools ever invented! A Shizel is whatever you want it to be! It's a scraper, pry-tool, nail-puller, leveler, trowel, chisel, can opener, hammer, bee hive tool and whatever else you can find to do with it. The Shizel has been patented, tested and proven. The tool is professionally manufactured and made from a lustrous stainless steel with a satin finish that will last for years. The Shizel should be in the hands of every home owner and contractor. That's the Shizel.

Ergonomically designed with a balanced fulcrum and lever.

Remove door hinge bolts, adhesive remover, take down molding, level boards and doors, small nail remover, chisel with anvil, paint scraper, open paint cans, hammer down paint lids, use as a trowel, remove tile, remove wall board, take off tack board, remove caulk and molding from windows, dig weeds, clean under lawn mowers, remove auto paneling, scrape and remove putty, separate bee boxes, scrape and remove honey comb frames, chisel wood notches, and list goes on.

For more information see ad on page 47.

Why not Top Bar Hives? – A look at the practicalities of keeping bees in top bar hives, by J.R. Slade ISBN 978-1-908904-42-3. Soft cover. 40 pages, color throughout. Published by Northern Bee Books. Contact **topbeebars@yahoo.co.uk** for prices and delivery.

Top Bar Hives have gained more notoriety of late with many new beekeepers wanting to go that route. For a quick read, this book touches on the basics of keeping a top bar hive. It would work for a beginner top bar beekeeper, however important topics are lacking such as disease and mite control. The author has been keeping bees for over 60 years and brings his experience to the reader.

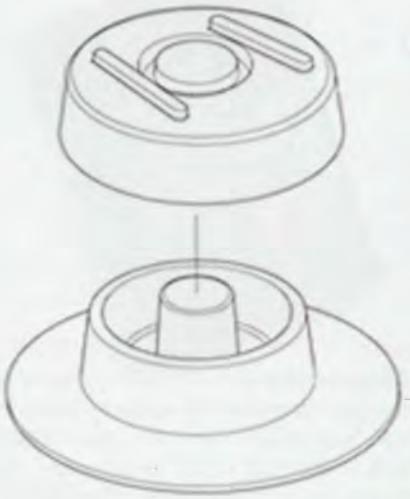
He has wonderful pictures and explains his equipment in a way that leaves the beekeeper new aspirations. Building hives and nuc boxes, adding strength to comb frames and practical personalized elements like landing entrances are key parts. Even honey removal is discussed.

Slade takes the time to explain seasonal arrangement of comb, feeding and keeping bees alive. The health of the bees and their contentment seems to be his foremost concern – keeping bees in their natural configuration and letting them thrive. His observations are explained so even new beekeepers would want to attempt a top bar. Pros and cons of keeping top bars are covered.

Jim Slade believes this construction will be the new way that top bar hives are built. Smaller cavity, crown boards and drops of comb that can be manipulated. His passion for letting the bees do what they want and giving them the means to do it is expressed in this book.

I would keep this book for reference for building new equipment and for the progressive top bar ideas.

Peggy Garnes



The HiveSaver Ant Barrier is a non-chemical, low maintenance, and portable solution protecting bee hives. The concept is simple, force ants to crawl through weather proofed DE (diatomaceous earth, a natural occurring substance), damaging the endoskeleton of the ants. We have all used oil in tin cans, to find them later flooded with water and debris. If you're looking for a hassle free turnkey solution for your ants, this is it. The ant barrier is designed to be strong, stable, portable, and low maintenance. Clear polycarbonate plastic is rated at over a 1000 lb. and everything has been thought through. The heavy duty clear plastic allows for inspection to make sure the trap has not been breached by spider webs or foreign objects. The groove at the top of the trap is designed for a 2X4 to connect with another unit, making a perfectly simple and highly functional stand. The ant trap has been in development for two years and thoroughly tested and used by beekeepers in Southern California. We have been working hard to make this the best non-chemical solution for ants attacking beehives. If you want to make it yourself out of wood, PVC, or even tin cans we would be more then happy to share the designs with you. The drawback is the shear time to produce it and the inability to easily inspect the trap. If you want to build something, rather spend your time working on solving other problems, as for this ant problem it's been solved! Check out our time lapsed photography showing the effectiveness of the product. May your bees thrive and have one less problem to deal with. www.hivesaver.com 760-897-HIVE.

Robert Parsons, who has been involved with honey bees for almost 50 years and is now in the bee business selling equipment and bees, has produced a set of DVDs for the beginning beekeeper. They are Beekeeping Simplified!, Hiving Packaged Honey Bees Successfully!, Honey Comb Production and Bee Pollen Collecting!, Catch a Swarm/Work the Bees! and finally Extracting Honey for the Small Beekeeper! All aimed at the beginning beekeeper.

This collection can be purchased separately at $24.00 each plus $8.00 shipping and handling, or as a collection of five DVDs for $112.00 plus $8.00 shipping and handling. Credit cards are accepted. Available now by phone 419.273.3066 or at the website **www.parsonsgold-honeybees.com** or by email **sales@parsonsgold-honeybees.com.**

A Closer LOOK

KIN RECOGNITION & NEPOTISM

Clarence **Collison**

Blood is thicker than nectar.

Honey bee queens typically mate with five to 17 males (Adams et al. 1977; Koeniger 1987; Haber and Tautz 1999) and use sperm from all males continuously (Taber 1955). As a consequence of this extreme polyandry (mating pattern in which a female mates with more than one male) and pattern of sperm use by queens, supersisters and half sisters cohabit in the same nest (Page and Laidlaw 1988). Supersisters have the same mother and father with an average coefficient of relationship of 0.75, while half sisters have different fathers and share an average coefficient of relatedness of 0.25. The utilization of sperm from multiple males has far-reaching consequences for colony structure; it creates subgroups of sisters (patrilines; paternal subfamilies) in the colony which might be expected to work for their own survival and reproduction, rather than that of their half-sisters, which have a different drone father.

Proponents of kin selection theory have attempted to demonstrate how individuals can gain fitness by increasing the reproductive output of relatives (kin). The social interactions of individuals or patrilines (subgroups) should be influenced by the genetic structure of the population. The ability to recognize kin can increase the adaptive value of social behavior by modulating it according to genetic relationship. From this, the specific prediction emerges: if individuals can distinguish among others with which they interact on the basis of the degree to which they are related, then behavior should be biased preferentially toward more closely related reproductive individuals (Page and Breed 1987).

The functioning of patrilineal subgroups within colonies requires that workers be able to recognize their sisters and there is a growing body of evidence that kin recognition occurs between workers and both larvae and adults within the nest (Winston 1987). Cues used in the discrimination of relatives from nonrelatives by the honey bee reflect both genetic (the bees themselves) and environmentally acquired odors from flowers, propolis and other sources providing differences between groups (Breed et al. 1988a). The environmental and genetic components of recognition are difficult to separate even in controlled conditions. Honey bees are able to discriminate between full and half sisters raised in the same hive, on the same brood comb in neighboring cells, thus demonstrating a significant genetic component to the recognition process (Getz and Smith 1983).

Discrimination is behaviorally expressed by acceptance into or agonistic rejection from the social group. The development of these cues was examined in field colonies and in controlled laboratory settings. Newly emerged worker honey bees are accepted by honey bee social groups at a high frequency. When bees are kept in a controlled laboratory environment for five days, acceptability into laboratory groups is determined largely by relatedness. Cues indicating relatedness develop in the laboratory within 12 hours after the adult bee emerges. Bees older than 12 hours are not accepted by field colonies regardless of relatedness. Bees maintained in a hive until five days after emergence are not accepted by related or unrelated laboratory groups (this is termed the "hive effect"). Bees maintained in hives for times as short as five hours acquired the hive effect. In a cross-fostering experiment, the hive effect completely masked genetic differences.

Honey bees acquire nest-mate recognition cues from wax, the predominant material used in nest construction. Exposure of a newly emerged worker bee to wax-comb substrate significantly reduced the acceptability of that worker to sister bees. Cues acquired from the comb provided colony-specific information about the identity of worker bees; moreover, the effect of comb exposure has been previously shown to override individually produced cues. Food odors (anise oil), when dissolved in paraffin wax, affected worker-recognition characteristics but food odors did not affect these characteristics when fed to bees in sugar candy. Paraffin wax alone did not affect the recognition cues of bees, showing

"The extended phenotype of a colony enables selection to act at both the individual level and at the colony level."

that the wax can be a neutral medium for the transmission of cues. The wax comb in the colony and the hydrocarbon outer layer of the bee cuticle may be a continuous medium for any hydrocarbon-soluble substances used by honey bees in nest-mate recognition; if so, a mechanism by which environmental cues are acquired by honey bees is provided (Breed et al. 1988b).

Breed et al. (1998) addressed the general question of how kin recognition cues develop by investigating cue differentiation between colonies. In honey bee colonies, exposure to the wax comb is a critical component of the development of kin recognition cues. They determined how the cues develop under natural conditions (in swarms), whether the genetic source and age of the wax affect cue ontogeny, and whether exposure to wax, as in normal development, affects preferential feeding among bees within social groups. Cue development in swarms coincided with wax production, rather than with the presence of brood or the emergence of new workers; this finding supported previous observations concerning the importance of wax in cue ontogeny.

Effective cue development required a match between the genetic source of the workers attempting to enter the hive, the wax to which they were exposed, and the guards at the hive entrance. The wax must also have been exposed to the hive environment for some time. Cues gained from wax did not mask or override cues used in preferential feeding interactions; this finding supports the contention that two recognition systems, one for nestmate recognition and the other for intra-colonial recognition, are present.

"Honey bee workers are able to discriminate the degree of relatedness to themselves of larvae and to preferentially rear queens from related larvae."

Honey bees have the ability to discriminate sisters from nonsisters (Breed 1983) and half sisters from full sisters (Getz and Smith 1983), by using cues that are correlated with genotype. Breed et al. (1985) tested the hypothesis that in a genetically mixed assemblage of worker honey bees, individual workers would behave differently toward unfamiliar sisters than toward unfamiliar nonsisters. Groups of worker honey bees of mixed genetic composition were assembled by collecting pupae from separate colonies and placing the worker bees together on eclosion (emergence of an adult insect from a pupal case). A total of 10 workers, five from each of two kin groups, were used to form each group. When the workers were five days old, a worker of one of the two kin groups was introduced into the mixed group. This worker had previously been held in a group of its sisters, without contact with queen or non-sister bees. The interactions with the introduced bee indicate that in a mixed kin group, individual workers learn the composite identity of the group and do not attack unfamiliar bees differentially on the basis of kinship. However, kinship does influence the total number of interactions in which an introduced bee engages when placed in a genetically mixed group; bees interacted significantly more often with sisters than with nonsisters. There was a trend for bees to be involved in more feeding interactions with sisters. This finding indicates an ability of a bee to learn and use its own cues. In mixed groups, each bee maintains it genotypically correlated identity; the bees' odors do not comingle into a "group" odor.

Experimental colonies of honey bees consisting of two patrilines were observed as they reared worker brood (Noonan and Kolmes 1989). Seven behavior patterns that relate to brood care were recorded. Worker bees biased the care they provided to eggs and larvae destined to become workers on the basis of brood patrilines. Both patrilineal and antipatrilineal preferences in various behavioral patterns were observed. There was variation among colonies that may have been the result of the frequencies of brood of each patriline and the total amount of brood available to be reared. In addition, there were some differences between workers of the two patrilines in the way

"In the polyandrous honey bee, workers can potentially increase their inclusive fitness by rearing full-sister queens."

that they cared for the two patrilines of brood.

Kin recognition and nepotism between workers was analyzed in a trophallactic bio-assay (Moritz and Heisler 1992). Donor workers were fed dyed sugar syrup and introduced into a recipient group consisting of 12 to 15 workers of the same colony. After allowing for one hour of trophallaxis, the distribution of dyed food was analyzed with spectrophotometry. The subfamily composition in the recipient group was varied such that the donor bees had to discriminate between workers of two to seven different patrilines. Donor bees preferentially fed super sisters if few patrilines were present in the recipient group. However, preferential feeding was not observed if the recipient group consisted of workers of more than three subfamilies. Since the natural degree of polyandry causes intracolonial genetic variance to exceed the genetic variability in the experiments, nepotistic behavior among workers may not reveal intranidal subfamily recognition.

The extended phenotype (observable physical or biochemical characteristics as determined by both genetic makeup and environmental influences) of a colony enables selection to act at both the individual level (within-colony selection) and at the colony level (between-colony selection). Genes produce individual-level phenotypes and individuals produce colony-level phenotypes. Whether a particular trait persists over time depends on the relative within- and between-colony selection pressures (Tarpy et al. 2004). Queen replacement exemplifies how selection may act at these different levels in opposing directions. Normally, a colony has only one queen, but a colony rears many new queens during the process of colony reproduction. The replacement of the mother queen has two distinct phases: queen rearing, where many queens develop and emerge from their cells, and queen elimination, where most queens die in a series of fatal duels. Which queens are reared to adulthood and which queens ultimately survive the elimination process depends on the strength and direction of selection at both the individual and colony levels. If within-colony selection is predominant, then conflict is expected to occur among nestmates over which queens are produced. If between-colony selection is predominant, then cooperation is expected among nestmates. Tarpy et al. (2004) reviewed current evidence for conflict and cooperation during queen replacement during both the queen rearing and queen elimination phases. They examined whether workers of different subfamilies exhibit conflict by acting nepotistically toward queens before and after they have emerged from their cells, and whether workers exhibit cooperation by collectively producing queens of high reproductive quality. They concluded that although workers may weakly compete through nepotism during queen rearing, workers largely cooperate to raise queens of similar reproductive potential so that any queen is suitable to inherit the nest. Thus it appears that potential conflict over queen replacement has not translated into actual conflict, suggesting that between-colony selection predominates during these important events in a colony's life cycle.

Honey bee workers are able to discriminate the degree of relatedness to themselves of larvae and to preferentially rear queens from related larvae (Visscher 1986). They employ cues of genetic, not environmental origin, and workers which have only experienced unrelated brood nonetheless prefer related (but novel) over unrelated (but familiar) larvae. Thus worker bees possess the sensory capabilities and behavioral responses that would enable them to maximize their individual inclusive fitness through nepotism in queen rearing.

Several experiments with different experimental designs have been conducted to test the hypothesis that worker honey bees can recognize the phenotype of larvae and use this information to favor closely related individuals when rearing queens. Breed et al. (1984) required colonies to rear emergency queen cells which

represents a "natural" condition.

Queenless bees of one sibling group were given the choice of rearing queens from larvae of the same or a different sibling group. In the second and third experiments larvae were grafted using standard commercial techniques for rearing queens. In one experiment, worker bees could choose between rearing larvae from their own or a different racial group, in the other the choice was between their own and genetically similar larvae. The results of these experiments do not support the original hypothesis; no phenotypic preference in rearing emergency replacement queens or in choosing grafted larvae was noted. From these experiments, they concluded that under normal conditions, information concerning the phenotype of honey bee larvae does not allow discrimination between related (half- or full-sister) and completely unrelated individuals. Results from another experiment, however, indicated that honey bees have the ability to distinguish among groups of larvae that are destined to become queens and preferentially rear highly related nestmate larvae over less related larvae that are not nestmates (Page and Erickson 1984).

In the polyandrous honey bee, workers can potentially increase their inclusive fitness by rearing full-sister queens. If the mother queen dies suddenly, workers feed a few larvae in worker cells with royal jelly and rear them into queens (emergency queen rearing). Using DNA microsatellite markers, Châline et al. (2003) determined the patriline of emergency queens reared in two colonies headed by naturally-mated queens before being made queenless. They found that some patrilines were reared more than others in one colony, but not in the other. These differences between colonies suggest that selective rearing is not always present and this might explain the mixed results of previous nepotism studies in the honey bee.

Most studies of discrimination in the context of queen rearing have been performed in Spring or Summer, but the influence of environmental conditions on nepotism in honey bees has not received attention. Mohammedi and Le Conte (2000) experiments were designed to test the hypothesis that restricted resources influence honey bee workers to express bias towards rearing related larvae more strongly than under favorable conditions. Three experimental designs were employed. In the first experiment, larvae were grafted using standard commercial techniques for rearing queens. Nurse bees were presented with sister larvae and alien larvae placed each in a cup, side by side in alternating positions. In the second experiment, nurse bees were offered the choice between sister or alien larvae placed in the same cup. The third experiment was similar to the first except that the objective was to harvest and weigh the accepted larvae and the remaining royal jelly. This study demonstrated that their colonies did not display nepotism in the context of queen rearing, whatever the season. BC

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The Curious Beekeeper

Susan **Kegley**

The National Honey Bee Advisory Board

About NHBAB

Now in its fifth year, the **National Honey Bee Advisory Board** (NHBAB) encourages the development of balanced pesticide policy through evidence-based decision-making. A key part of this process is providing proactive education on the primary issues affecting honey bees and other pollinators. This article is NHBAB's most recent outlet for engaging stakeholders and the public with potential factors causing the decline of honey bee colonies worldwide, such as mites, viruses, disease, environmental extremes, loss in foraging habitat, and increased exposure to agriculture chemicals. All of the NHBAB individual members have experienced colony losses over the past several years and are committed to addressing the issues that affect all beekeepers. NHBAB's parent institutions are the American Honey Producers Association and the American Beekeeping Federation.

About PRI

Pesticide Research Institute (PRI) is an environmental consulting firm providing research, analysis, technical services, and expert consulting on the chemistry and toxicology of pesticides. Since its founding in 2006, PRI has worked on a variety of projects, from human health and ecological risk assessment to environmental monitoring of pesticides in air, water, and plant materials. PRI principal and CEO, Dr. Susan Kegley, and associate scientist, Dr. Timothy Brown, are authors of *The Curious Beekeeper*, on behalf of NHBAB. Dr. Kegley is a beekeeper and an organic chemist with over 25 years of experience in the chemistry, toxicology, fate and transport, and regulation of pesticides. Dr. Brown has been working at PRI since 2012 in the areas of scientific research, technical writing, quantitative data analysis, and environmental monitoring.

Pesticides of Concern to Beekeepers

Concerns have been mounting in recent years over the agricultural use of some of the newer bee-toxic pesticides on prime foraging grounds and the potential effects of these chemicals on honey bees and other pollinators. Older insecticides, including organophosphates like Lorsban® and Imidan®, and carbamates like Furadan® and Sevin® have been responsible for their share of bee kills over the last 50 years. But in the mid-1990s, a new class of bee-toxic insecticides was introduced – the neonicotinoids – and in the early 2000s, several new fungicides were introduced that are also quite toxic to bees. They differ from the older pesticides by their water solubility – they are soluble enough to be taken up through the plant's roots or leaves and systemically distributed throughout the plant, including in the pollen and nectar that bees need to thrive.

Some examples of the neonicotinoid insecticides include acetamiprid, clothianidin, dinotefuran, imidacloprid, thiamethoxam, and thiacloprid. Dinotefuran applied to blooming Linden trees was responsible for the massive bumblebee kill in Wilsonville, Oregon this past Summer.

Although more readily apparent, acute bee kills like the bumblebee incident in Oregon are not the only symptoms of poisonings by systemic pesticides. For example, exposure to neonicotinoid concentrations that don't cause immediate bee death can still kill bees following chronic exposure. Longer-term, low-level exposures can also impair colony health through effects on the immune system (making bees more vulnerable to the diseases carried by *Varroa* mites), learning and memory (affecting the ability of bees to find food and return to the hive), and reproduction (reducing queen fertility).

The systemic and persistent nature of neonicotinoids means that honey bees can be exposed to neonicotinoids in pollen and nectar for weeks or months after a single application, both from the plants and from the collected pollen and nectar brought to the hive. In addition, neonicotinoids are capable of producing toxic effects at extremely low doses, provided the exposure time is sufficiently long.[1] For example, chronic toxicity studies have shown that honey bee exposure to field-realistic levels of imidacloprid (0.1, 1, and 10 micrograms per liter (parts per billion), results in mortality within as little as 10 days.[2]

Behavioral changes, learning impairment, and homing failure are also associated with low level neonicotinoid exposure. A recent study demonstrated that field level exposure to imidacloprid adversely affected the pollen-collecting efficiency of worker bees, leading to reductions in brood development and colony success.[3] Homing failure following low-level thiamethoxam exposure has also been observed in field experiments using honey bees.[4] Other studies have shown that honey bees exhibit reduced activity levels,[5] short- and long-term memory impairment,[6,7] and reduced ability to recruit foragers following neonicotinoid exposure.[8] All of these symptoms have the potential to severely impact colony health, even to the point of collapse.

Neonicotinoids, in addition to other systemic pesticides, also weaken the immune response in honey bees. A number of independent studies have shown increasing mortality in bees that are simultaneously infected with Nosema and exposed to neonicotinoids relative to those only infected with Nosema or exposed to imidacloprid alone.[9,10,11] Worker bees were also less able to effectively disinfect larvae and promote hive immunity under the combined stress of Nosema and neonicotinoid exposure.[9]

It is not only insecticides that have been linked to

problems with colony health. A recent study found correlations between exposure to two systemic fungicides that have been associated with reduced colony viability include chlorothalonil and pyraclostrobin. US EPA continues to register new systemic pesticides, with sulfoxaflor (Closer®) being the most recent, a registration that was challenged by the National Pollinator Defense Fund.

Pyrethroid insecticides like permethrin, cyhalothrin, malathion and others are also highly toxic to bees. Malathion and phenothrin, for example, are frequently used in mosquito fogging operations that are particularly hazardous to bees. Unlike the systemics, pyrethroids are not very water soluble and are not taken up systemically by plants. But if they are carried into the beehive on pollen and nectar, they contaminate the wax and don't degrade quickly.

In future articles, we'll also be taking a look at studies on pesticides used in hives against the *Varroa* mite, including the active ingredients in Apistan®, Apivar®, For-Mite®, Apiguard®, and others.

How Are Bees Exposed to Pesticides

Much of the recent bee research and regulatory activity (at least in Europe) focuses on the systemic pesticides, which have certain physical properties that make them more of an exposure hazard to bees. Whether applied as seed dressings on corn, soybean and canola prior to planting or used as soil drenches and foliar sprays on squash, blueberries, tomatoes and more, traces of these systemic pesticides can find their way into pollen, nectar, and guttation water that is exuded from plant leaves overnight. Because of their high water solubility, these pesticides can leach out of soils into surface waters that may serve as a water source for bees, making honey bee exposure to these chemicals unavoidable for both agricultural and urban bees.

The dust raised during planting of treated seeds has caused a number of high-profile beekills in both the U.S. and Canada in the Summer of 2013. The fact that so many acres of corn and soy are planted with treated seeds makes this hazard particularly hard for bees to avoid during spring planting season. In the U.S., there are approximately 94 million acres of corn and 72 million acres of soybeans, most of which are planted from treated seeds.

One more problem associated with pesticides is exposure to multiple pesticides. In the interest of saving time and fuel, often a farmer will apply a fungicide, an insecticide, and any adjuvant chemicals such as stickers, spreaders or drift control agents as a tank mix. Indeed, even if only a single product is applied, there are often multiple active ingredients and several "inert" ingredients. And if bees are gathering pollen and nectar from several different fields treated with different pesticides, they will bring them all back to the hive. Penn State researchers analyzed 887 wax, pollen, bee and associated hive samples from 23 states and one Canadian province and found 121 different pesticides and metabolites comprising 5,519 total residues. On average they found six pesticides per sample, with a high of 39 pesticides in one sample.[12] There is no honey bee toxicity data on any of these combinations of pesticides, but recent research shows that is possible for them to have additive or even synergistic effects.[13]

NHBAB board members, Jeff Anderson and Darren Cox, examining almond pollinating colonies

Regulatory Agencies Don't Have Sufficient Data or Enforcement Capacity to Protect Bees from Pesticides

Right now, when a new pesticide is registered, the U.S. EPA only requires data on acute toxicity (i.e., how much pesticide does it take to actually kill the bees). But as we describe above, less toxic effects can be equally damaging to the colony, so it is important to do studies at lower doses on both adult and larval bees to find out more about these effects, *before* registering a new pesticide. Field studies are important too, but are also not yet required for pesticide registration.

While U.S. EPA is working on requiring new tests, new data is not likely to be generated for several years. Even then, it will only be required for new pesticides and older pesticides as they come up for Registration Review. Registration Review happens only once every 15 years for the thousand or so active ingredients. With about 30-50 new pesticides started into the five-year Registration Review process each year, you can see that it will be a while before the regulators have sufficient information to definitively pin down the adverse effects. In the meantime, researchers are collecting useful data now, and demonstrating that bees are being affected by pesticides in ways that could be prevented by a strong regulatory response.

Evaluation of New Studies on Bee Health

Critical evaluation of new scientific studies on bee health requires an understanding of the scientific method, which guides the design of experiments and how the results are interpreted when the data are all in. This process of investigation is characterized by systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses.

Beekeepers are very much like experimental scientists, trying out new ideas for maximizing honey production or protecting colonies from pests and pathogens. But as all beekeepers know, a beehive is a complex system, with quite a few moving parts that are interdependent. For example, the colony's success at brood-rearing (and subsequent honey production) depends not only on the queen's egg-laying ability, but also on the number of foragers available to bring in pollen and nectar to make the necessary brood food and on the number of nurse bees available to feed and care for the developing larvae,

not to mention environmental impacts like pesticides and pests like *Varroa*. The weather can even have an impact! Which suggests that designing a study that will actually provide useful (and representative) information takes some careful thought. BC

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Funding Honey Bee Research

A speech delivered by Dr. A. Gary Shilling to the California State Beekeepers' Association 2013 Annual Convention on November 20, 2013.

The public has a love-hate relationship with honey bees. Whenever someone learns I'm a beekeeper, they invariably ask, "Do you ever get stung?" When I answer, "Yes, about 400 to 500 times per year," they wince.

Honey Bee Fad

At the same time, there is tremendous interest and sympathy for honey bees in this country, and it's reached fad proportions. Three years ago, New York City legalized beekeeping, and colonies now adorn the roofs of the Whitney Museum of American Art, the National Resources Defense Council, schools, many midtown Manhattan penthouses and are also found in backyards and community gardens. Beekeepers no longer operate clandestinely and their services are in demand. One hive in the Red Hook section of Brooklyn is next to a maraschino cherry factory and the opportunistic bees produce bright red honey!

Six hives adorn the 20th floor terrace at the Waldorf-Astoria hotel on Park Avenue. Each week, the hotel's culinary director, David Garcelon, or his staff check the hives and they've designed dishes that feature honey, like lemon-and-thyme infused honey-glazed fried chicken, habanero and honey scallop sauce, and strawberry, honey and goat cheese soup.

In Dallas, the Texas Honey Bee Guild is a conservation group that stresses the importance of honey bees in maintaining the environment and sees hives as part of urban conservation. It has placed colonies at a number of restaurants. It's also located hives at the Fairmont Hotel, and 20 other hotels in the Fairmont chain also host colonies. In Dallas, the restaurants and hotels get half the honey produced on their properties to use in recipes. The new Fall edition of the magazine *edible Boston: Celebrating the abundance of local food* has eight of its 16 articles on shops that sell honey and related items, Boston area beekeepers, and area restaurants and hotels that have hives and use honey in their cuisine.

Divine Honey

The June 20, 2012 edition of *The Wall Street Journal* had a picture of my friend Mark Sisk, the Episcopal Bishop of New York, blessing the bees in a new hive installed at the Cathedral of St. John the Divine in northern Manhattan. Mark is in his clerical robes with no veil but the beekeeper holding a frame of bees in the picture is a chicken like me with bee gloves, veil and jumpsuit. I sent Mark a note, complimenting him for his calmness. He wrote back: "Thank you for your kind words about the 'Blessing of the Bees event.' I say event because I got more press coverage for that 15 minute blessing than anything and everything I've tried to do over the past 14 years! Though they had a beekeeper's hood available for me to put on, I decided against it: first because I know that 'domesticated' honey bees are not very aggressive, but second and most importantly, recollections of Mike Dukakis swirled through my head. I know that the press likes nothing more than to make the Church look silly. I thought I'd give them at least one less chance."

The output of this hive, "Divine Honey," is being sold in the Cathedral's gift shop.

Six years after the October 28, 2007 "60 Minutes" show, worried friends still ask if Colony Collapse Disorder is wiping bees off the face of the earth. And they mention the quote attributed to Albert Einstein that "if the bee disappears from the surface of the globe, man would have no more than four years to live." I have to carefully explain that CCD is cyclical, recurring about every 25 years and was first observed in this country in 1869. I also tell them that the major bee malady is *Varroa* mites, not CCD. Furthermore, I note, bees are unlikely to disappear, but with all their pests and diseases, it's getting much more expensive and time-consuming to keep them alive and producing.

People also remember vividly the 1997 movie, "Ulee's Gold," starring Peter Fonda as a Florida beekeeper whose bees produce tupelo honey. My favorite scene in the movie is at the end when Ulee is visiting his son Jimmy in jail and the son asks, "How are the bees, Dad?" Ulee then reels off the bees' maladies – *Varroa*, nosema, American foulbrood, European foulbrood, small hive beetle, tracheal mites and various others – before concluding, "The bees are fine." Only a beekeeper can understand that joke!

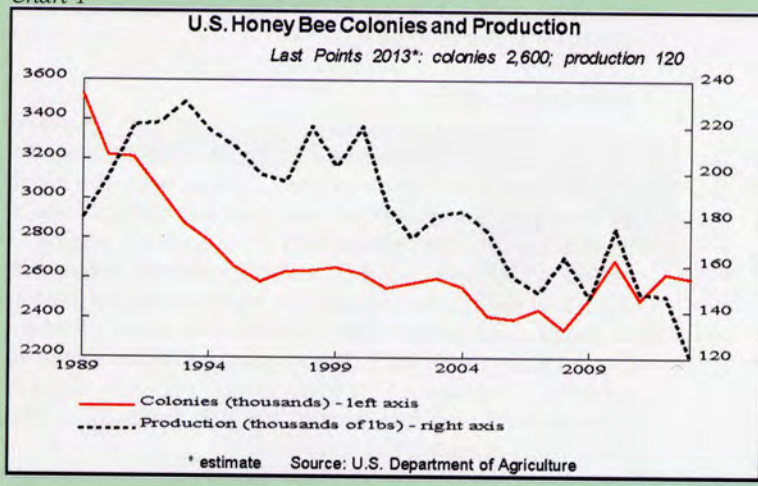
Colonies and Production Down

The public concern over honey bees is well-founded, as we all know. Honey production this year at a predicted 120 million pounds is about half of the early 1990s level (*Chart 1*). It took another nosedive in 2013 despite the leveling of hive counts in recent years. Part of this plummet, however, was due to bad weather in California, the Dakotas and Florida where 70% of honey is produced and is, therefore, temporary. But since 1993, average honey production per hive has fallen 42% from 80 lbs. to 46 lbs.

With all the beekeeping woes, many hobbyists have hung up their veils and the total number of beekeepers is about half as many as 70 years ago. But the decline in hives from 5.8 million in 1946 to 2.6 million today is also due to cheap honey imports and the shift of population from rural locations to cities since World War II.

In the first eight months of this year, honey imports totaled 242 million pounds, or 363 million at annual rates. Assuming no change in inventories this year so

Chart 1



all the imports and the 120 million pounds produced domestically are consumed, imports will equal 75% of total honey consumption.

As we're all aware, there's no simple answer to what's bugging bees despite considerable study by the USDA and university entomologists. This is very disappointing for beekeepers but even more so for the media, which always wants short, one-line answers to complex questions. The Europeans think the key culprit is pesticides, specifically neonicotinoids, and have banned them, but the USDA isn't sure. *Varroa* also is clearly a major problem, and this mutating mite forces pharmaceutical companies to run hard to keep ahead of no longer-effective treatments.

Then there's nutrition, with the disappearance of open land that produces a wide variety of nectar and pollen sources due to urbanization and increased agricultural use. This was especially true in the U.S. this year since 2012's bad weather and poor grain harvests induced farmers to plant fence-row-to-fence row due to leaping prices (*Chart 2*). High crop prices also made it more attractive for farmers to plant than to rent land to the government's Conservation Reserve Program. This year, 25.3 million acres are held in the CRP, down a third from the 2007 peak and the smallest acreage in reserve since 1988.

The inevitable outcome, of course, was good weather this year and a price-depressing record harvest of corn and near-record production of soybeans. Also, corn prices have been pressured by the EPA's reductions in mandatory requirements for the ethanol that's blended with gasoline. Corn prices are down 40% this year (Chart 2). U.S. farmland prices, which leaped earlier in response to soaring crop prices, are now moderating (*Chart 3*). So farmers may leave more marginal land fallow in coming years.

Fortunately, the nutrition problem is being addressed in other ways as well. Recently, beekeepers, farmers and representatives of public and private organizations met in Sacramento to consider how beekeepers can have more access to public and private lands with desirable forage. A partnership between beekeeper John Miller and Justin Wages, land manager for the nonprofit Placer Land Trust, is an example of a successful venture.

Related to this, Kathy Kellison of the Partnership for Sustainable Pollination has proposed that the USDA hire a honey bee conservation advocate to implement the pollination provisions of the 2008 farm bill for honey bees. This advocate would work with beekeepers, farmers and ranchers, conservation and wildlife groups and others to develop an action plan to increase honey bee forage and pollination services.

A New Orientation

With leaping colony death rates and high imports, the orientation of beekeeping has shifted dramatically. Earlier, honey production and pollination were the focus with bee raising only needed to replace the normal 10% to 15% deaths over the Winter and for colony expansion.

Now with fewer colonies and big imports, the action is found in pollination, especially pollinating the $4 billion California almond crop. Around half those nuts are exported from the Golden State with a value twice that of California's famous wine. Furthermore, with one-third of the hives dead over last winter, up 42% from 2012, bee raising has ascended in importance.

Chart 2

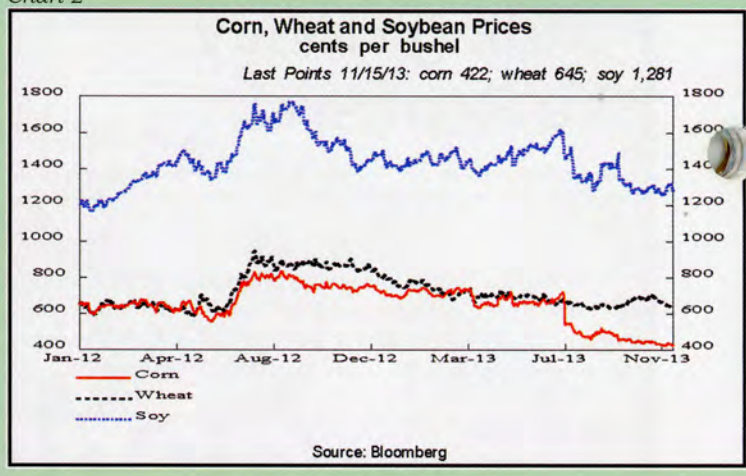
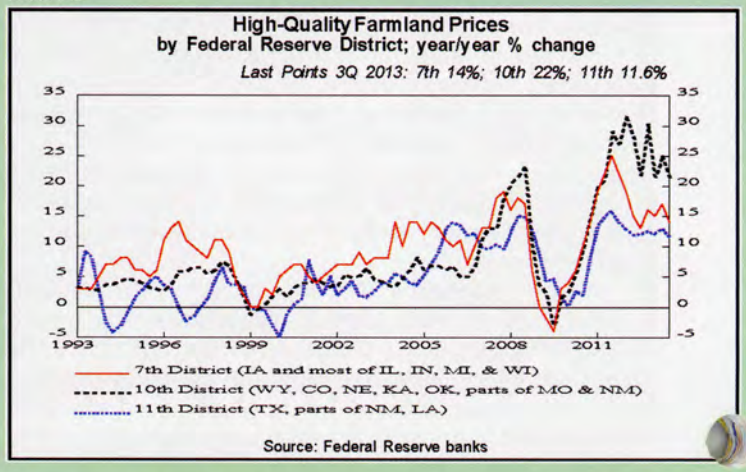


Chart 3



Many of the problems besetting bees can be solved with more research, but it certainly needs to be much better organized and coordinated. In preparing this speech, I couldn't even find a total dollar amount for spending on honey bee research, regardless of how it's defined. This tells us quite a lot!

The USDA is reallocating $40 million in response to leaping losses of bee colonies and other pollinators, but this isn't new money. The USDA's Agricultural Research Services spends about $120 million per year on beef and dairy research, $80 million on pork and $60 million on poultry. Its outlays on bee research are just $13 million even though my good friend Kim Flottum, Editor of *Bee Culture*, assures me that the total *value* of bees exceeds that of poultry. The USDA also provides $5 million for bee research at land grant colleges.

Research Money

About 70% of bee research is funded by the federal government, with 30% from the private sector. This latter figure includes $215,000 in annual grants from the California Almond Board, $800,000 from Project Apis m, $200,000 from the National Honey Board, $75,000 from the California Beekeepers Association and $174,000 in outlays from corn, soybeans and cotton producers. Crop-protection product manufacturers provide $11,000. This includes Bayer, Syngenta and BASF. Monsanto is spending $5 million on *Varroa* and viruses using RNAi.

This list obviously isn't complete and what's regarded as "research" can include a lot of overhead, data collection and other non-hard core research outlays. Nevertheless, it

Chart 4

U.S. Human Health Research Outlays

	FY 2012 ($ mil.)	$ per capita		FY 2012 ($ mil.)	$ per capita
Alcoholism	455	14.4	Infectious Diseases	3,867	122.0
Alzheimer's Disease	503	15.9	Lung	1,286	40.6
Behavioral & Soc. Sec.	3,682	116.2	Mental Health	2,287	72.2
Biodefense	1,791	56.5	Minority Health	2,487	78.5
Bioengineering	3,498	110.4	Neurodegenerative	1,671	52.7
Biotechnology	6,089	192.1	Neurosciences	5,618	177.3
Cancer	5,621	177.4	Nutrition	1,692	53.4
Cardiovascular	2,040	64.4	Pediatric	3,612	114.0
Clinical Research	10,951	345.5	Prevention	5,924	186.9
Depression	429	13.5	Rare Diseases	3,623	114.3
Diabetes	1,061	33.5	Stem Cell Research	1,374	43.4
Genetics	7,632	240.8	Substance Abuse	1,634	51.6
Health Disparities	2,740	86.5	Vaccine Related	1,691	53.4
Health Services	1,317	41.6	Women's Health	3,833	120.9
Hematology	1,091	34.4	Youth Violence	77	2.4
HIV/AIDS	3,074	97.0	Youth Violence Prevention	27	0.9
Human Genome	2,271	71.7	Total	147,226	4,645.3

Source: U.S. Department of Health and Human Services

suggests a total of $20 million to $30 million per year on honey bee research. This is less than two ten-thousandths of the $147 billion spent on human health research last year, according to the Department of Health and Human Services (*Chart 4*). About 40 times as much is spent on diabetes research alone than on bees.

If the spending per colony were only 1% of the $4,645 spent per capita on human malady research, the total for honey bee research would be $120 million, four-to-six times the current levels. And that $46 per hive compares with the $200 to $250 it costs per colony per year to feed, medicate and replace bees.

Money Sources

Significant additional money for honey bee research isn't likely to come from the deficit-ridden federal government, whose red ink will again jump in future years as more postwar babies retire and draw Social Security and Medicare benefits (*Chart 5*). Beekeepers themselves and through their associations may not have much more blood to give. That's especially true of the 1% that provide 50% of charitable donations for bee research. And suppliers to the industry don't look like a huge pool of untapped funds. So meaningful research money must come from users of honey and those who benefit from pollination services, directly or indirectly.

We're all familiar with the study by Roger A. Morse and Nicholas W. Calderone, published in *Bee Culture* in 2000 (and the updated study by Calderone released in 2012), that determined the value of honey bee pollination by calculating the dependence on bee pollination for a fairly complete list of fruits and nuts, vegetables and melons, and field crops (*Chart 6*). The numbers range from 100% for almonds to less than 1% for citrus fruits, olives and peanuts. About a third of the food in our diets relies to some degree on honey bee pollination. And as you can calculate easily from Chart 6, non-honey bee pollinators in most cases are no match for the highly efficient *Apis mellifera*.

Calderone updated this study in 2012 and found that the value of the increased yield and quality achieved by honey bee pollination was $17 billion in 2009. Another study found that the worldwide economic worth of insect pollination in 2006 was $207 billion, or 9.5% of the value of human food.

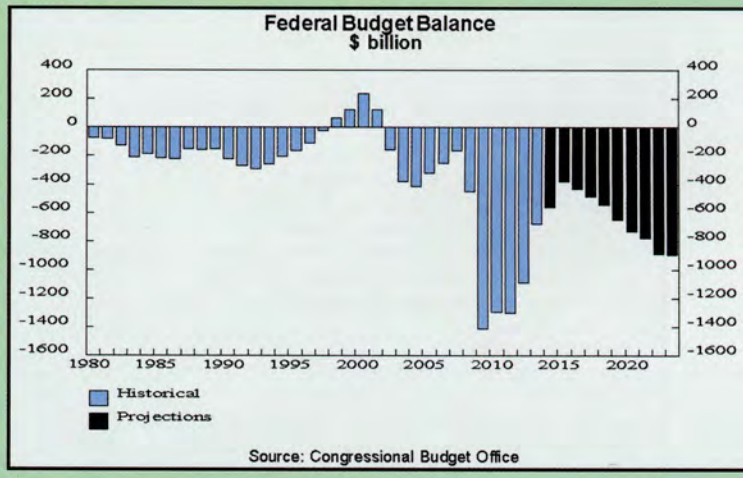
To emphasize the importance of honey bee pollination, a Whole Foods store in Rhode Island last June pulled all the produce from its shelves that depend on pollinators. That eliminated 237 – or 52% – of 453 items including apples, zucchini, cherries, blueberries and watermelons.

Raw Ingredients

Of course, the value of raw food is tiny compared with the ultimate cost to consumers. That $17 billion value from honey bee pollinators is just 3% of the $566 billion that Americans spend in grocery stores per year and also 3% of what they spend dining out. The rest is transportation, processing, restaurant preparation costs, retailing expenses, profits, overhead – and advertising outlays.

Ah! Advertising! Now there's a source of serious money for honey bee research! The widespread sympathy for bees and love of honey has caused a stampede into honey-laced processed foods, beers and even booze. There's the *push* of getting away from refined sugar and

Chart 5



Source: Congressional Budget Office

Chart 6

Crop Dependence on Honey Bees for Pollination

Fruits & Nuts	D	S
almond	1.0	1.0
apple	1.0	0.9
apricot	0.7	0.8
avocado	1.0	0.9
blueberry	1.0	0.9
brambleberry	0.8	0.9
cherry	0.9	0.9
grapefruit	0.8	0.9
lemon	0.2	1.0
lime	0.3	0.9
orange	0.3	0.9
tangelo	0.4	0.9
tangerine	0.5	0.9
temple	0.3	0.9
cranberry	1.0	0.9
grape	0.1	0.1
kiwifruit	0.9	0.9
macademia	0.9	0.9
nectarine	0.6	0.8
olive	0.1	0.1
peach	0.6	0.8
pear	0.7	0.9
plum/prune	0.7	0.9
strawberry	0.2	0.1
Vegetables & Melons		
asparagus	1.0	0.9
broccoli	1.0	0.9
carrot	1.0	0.9
cauliflower	1.0	0.9
celery	1.0	0.8
cucumber	0.9	0.9
Veg. & Melons		
cantaloupe	0.8	0.9
honeydew	0.8	0.9
onion	1.0	0.9
pumpkin	0.9	0.1
squash	0.9	0.1
vegetable seed	1.0	0.9
watermelon	0.7	0.9
Field Crops		
alfalfa	1.0	0.6
cotton	0.2	0.8
legume seed	1.0	0.9
peanut	0.1	0.2
rapeseed	1.0	0.9
soybean	0.1	0.5
sugarbeet	0.1	0.2
sunflower	1.0	0.9

D = dependence on insect pollination P = proportion of pollinators that are honey bees
Source: Morse and Calderone

the *pull* of pure, unadulterated honey – and then the sympathy for the beleaguered honey bee.

My firm cashes in on this love of honey and the good feeling for bees. I have about 90 hives – it's a vastly overgrown hobby – and we give away all the 2,000 to 3,000 pounds of output each year to clients and friends. If we ever sold any, I'd have to keep track of the costs and I don't want to make myself cry because my time in beekeeping would likely work out to be worth a quarter an hour, probably with a minus sign in front of it.

Still, we get tremendous goodwill from the recipients of our honey. The client meetings at the end of the year when I give out the honey are always well-attended. Also, friends and clients like the labels on our honey jars, which have timely themes. Last year, in response to Federal Reserve Chairman Ben Bernanke's flooding the country with liquidity, our label was, "Bernanke's Money Can't Buy Our Honey." This year, it reads, "Our Bees Didn't Skip Town When The Government Shut Down." (See all of these labels in the August 2013 issue.)

These labels often have been picked up by *The Wall Street Journal* and other media. Every time I am on Bloomberg radio or TV with well-known anchor Tom Keene, I know he'll ask about the health of my bees and their honey production.

The Tour

I recently sent my staff on a tour of a local supermarket, and *Chart 7* is a partial list of the consumer food products that contain honey, or at least were labeled that way. Included are breakfast foods like Quaker Oats Honey & Almond Oatmeal, snacks such as Nature Valley Granola Bars and lunch and dinner foods like Pepperidge Farm Honey Whole Wheat Bread. With honey already in the bread, you apparently don't need to spread it on top as well!

Then I turned them loose in a liquor store and they found – but I assure you they did not sample on the spot – items such as Samuel Adams Honey Porter Beer and Blue Moon Honey Wheat Beer (*Chart 8*). In the hard liquor department were Jack Daniels Tennessee Honey whiskey, strictly for sipping, of course, Seagram 7 Dark Honey whiskey and Wild Turkey American Honey. For the non-drinkers, there's Brisk Honey and Ginseng Iced Tea. Burt's Bees, owned by Clorox, puts beeswax in everything from lip balm to hand lotion. On the way out here on the plane, my snack included a chocolate bar made from "Swiss chocolate with honey and almond nougat."

Since the producers of these foods and beverages believe there's enough consumer appeal to honey that they add it to their products, they probably can be persuaded to divert some of their advertising or other funds to honey bee research.

Costco is doing so by donating to honey bee research 2% of the value of every jar of honey it sells. In the last

Chart 7

Consumer Food Products With Honey

Breakfast Foods
Honey Nut Cheerios (General Mills)
Honey Bunches of Oats (Post)
Kashi honey Almond Flax (Kellogg)
Quaker Oats Honey 7 Almond Oatmeal (PepsiCo)

Snack Foods
Honey Maid Graham Crackers (Kraft)
Planters Honey Roasted Peanuts (Kraft)
Powerbar Harvest Energy Bars (Nestle)
Emerald honey Badger Roasted Peanuts (Diamond Foods)
Yoplait Greek Yogurt With Honey (General Mills)
Nature Valley Granola Bars (General Mills)

Lunch/Dinner Foods
Kraft honey Mustard Dressing (Kraft)
Gulden's Honey Mustard (Conagra Foods)
Peter Pan Natural Honey Roast Peanut Butter (Conagra Foods)
Pepperidge Farm Honey Whole Wheat Bread (Campbell Soup Co.)

Chart 8

Consumer Beverage Products With Honey

Samuel Adams Honey Porter Beer (Boston Brewing Co.)
Blue Moon Honey Wheat Beer (Molson Coors Brewing Co.)
Jack Daniels Tennessee Honey (Brown-Forman)
Seagram's 7 Dark Honey (Diageo)
Wild Turkey American Honey (Campari Group)
Jim Beam Honey (Beam Brands)
Fuze Honey & Ginseng Iced Tea (Coca-Cola Group)
Brisk Honey & Ginseng Iced Tea (PepsiCo)

Advertising and Revenue of Consumer Product Companies That Use Honey Bee Products in Their Latest Fiscal Year

Chart 9

	Advertising ($ mil.)	Revenue ($ mil.)	Advertising/ Revenue	CEO
General Mills	895	17,774	5.0%	Kendall J. Powell
Post Holdings	126	997	12.7%	William P. Stiritz
Kellogg Co.	1,120	14,197	7.9%	John A. Bryant
PepsiCo	3,700	65,492	5.6%	Indra K. Nooyi
Kraft Foods Group	640	18,339	3.5%	W. Anthony Vernon
Diamond Foods	42	864	4.8%	Brian J. Driscoll
Conagra Foods	474	15,491	3.1%	Gary M. Rodkin
Campbell Soup Co.	419	8,052	5.2%	Denise M. Morrison
Boston Brewing Co.	169	629	26.9%	Martin F. Roper
Molson Coors Brewing Co.	424	5,615	7.5%	Peter S. Swinburn
Brown-Forman Corp.	408	3,784	10.8%	Paul C. Varga
Beam Inc.	399	3,070	13.0%	Matthew J. Shattock
Coca-Cola Co.	3,342	48,017	7.0%	Muhtar Kent
Clorox Co.	500	5,623	8.9%	Donald R. Knauss
Nestle[1]	n/a	98,279	n/a	Paul Bulcke
Diageo PLC[2]	2,803	24,294	11.5%	Ivan Menezes
Campari Group[3]	305	1,724	17.7%	Robert Kunze-Concewitz
Unilever PLC[4]	8,678	65,854	13.2%	Paul Polman

Currencytranslated:1.0.938CHF/$;2.1.5687$/GBP;3.1.286$/euro;4.1.2831$/euro Source:Companyfilings

six years, Häagen-Dazs has donated $800,000 for bee research and related programs. Corporations producing the products we've listed in Charts 7 and 8 spend a lot of money on advertising, running up to $3.7 billion per year for Pepsico (*Chart 9*). And those advertising outlays range from 3.1% of total revenues for Conagra up to 26.9% for Boston Brewing Company, the brewer of Samuel Adams Honey Porter Beer.

The Approach

How can beekeepers convince these corporate giants to donate meaningful money to honey bee research? Two approaches come to mind. The first is the guilt trip. Let's say we get an audience with Muhtar Kent, CEO of Coca-Cola. We show him all the evidence of rampant honey bee pests and diseases, skyrocketing costs for beekeepers and plummeting honey production. Then we hit him right between the eyeballs. "Mr. Kent, if you don't support honey bee research in a serious way, you may not have any honey to put in the iced tea you sell."

Of course, a man of his stature isn't happy with being bullied, and since his staff did their homework, he knows there is plenty of imported honey to fill any domestic shortfall. So he thanks us kindly, hands us a six-pack of Coke and shows us the door.

Approach Number 2. We secure a meeting with Matthew J. Shattock, CEO of Beam Inc. "Mr. Shattock," we start, "we know that Jim Beam Honey whiskey is a very successful product and that your customers not only like its taste but also feel good about the addition of pure, natural honey. Why don't you amplify this good feeling with an advertising campaign that spells out the generous contributions you're making to honey bee research? Think of the excellent PR that will result! And, of course, the more Jim Beam Honey your customers drink, the more they help honey bees." He jumps on the opportunity and arranges for a case of Jim Beam Honey to be delivered to us.

Which of these two approaches should we pursue in garnering the financial support of companies that use honey in their products? It's obvious: The second of the two. You catch more bees with honey than with vinegar – or is it flies?

Our Homework

Still, before Beam Inc. writes a check, Mr. Shattock, as a good steward of his firm's resources, wants to know how much is now being spent on honey bee research, by whom, on what projects, with what success, under what controls, etc. And to continue Beam's support, he'll want to see clearly-demonstrated progress and meaningful results in attacking bees' maladies.

So for this strategy to succeed, I see three obvious next steps for the beekeeping industry.

First, we need to gather, analyze and total what's now being spent on honey bee research, by whom and with what efficiency and success.

Second, we need to set priorities for the continuation of current projects and the establishment of new research efforts. Where is the biggest bang per buck? Who's best equipped to do it? The USDA? Which universities? Other researchers?

Third, the beekeeping industry needs to prepare periodic updates of research and outcome for Beam Inc. and, we hope, many other corporate supporters.

Who should plan, execute and spearhead this whole effort? I think it's up to professional beekeepers, the people with the biggest stake in the successful revival of honey bees. I'm not suggesting the establishment of a new organization, and I hate bureaucracy. Furthermore, I don't know which existing beekeeping groups are best equipped to handle this project.

But I hope you agree with me that it's worth the effort. What's our alternative? BC

The Settled Beekeeper

Larry **Connor**

Networker, Mentor, Teacher, Traveler

What are characteristics of a beekeeper who has settled into his or her operation, and finds considerable comfort with both the challenges and successes of keeping bees? It may take some time – years – for a beekeeper to feel settled and find peace with the bees and beekeeping activities. During the last three months of 2013 we looked at the suggested levels of proficiency of first, third and fifth year beekeepers. Now we will look at the characteristics of the well-established beekeeper, one with any numbers of years of experience.

Control

Certainly the established beekeeper has a greater sense of being in control of their bees. We all have worries and doubts about our bees making it through the pollination season, surviving the spring dearth, not swarming out, being lost to miticides, experiencing queen failure, being robbed by other colonies and being alive in the Spring. What each of these concerns involves is the need to be able to control each component.

If bees are being trucked to California for almond pollination, or moved across the state for apple pollination, either a beekeeper must make the commitment to be there for the bees or find only the most trustworthy person they can to manage the hives, and to make sure the bees return in good health and the beekeeper a fair share of the pollination fees. Moving bees to any area involve multiple risks. Minimizing the impact of these risks is a key requirement of the beekeeper who controls their bee operation.

This may involve an intensive feeding program both before and after the first pollination event of the season. Rigorous feeding seems to be the trend and necessary fate of the sustainable beekeeper – not letting the colonies languish and die from poor nutrition. Quality food fed during the buildup season will help maintain bee populations as well as ensure essential food reserves for future breaks in natural food supplies. It is not unusual to have a break in nectar and pollen production in areas where there may have been an excellent early Spring nectar flow from willows and early maples, and then fruit bloom a few weeks later. In some years the blooms may overlap, but in other seasons there may be days if not weeks between the two blooming cycles. The beekeeper who is in control has kept excellent records about these matters and constantly checks for the status and abundance of each plant source the bees are expected to visit for both pollen and nectar. Then they feed if needed to prevent nutritional stress of their rapidly developing colonies.

Swarming is the topic of my latest book publication, written by Steve Repasky with my help (*Swarm Essentials*, 2014. Wicwas Press). There is no easy method for swarm prevention and control for many bee hives, although this book deals extensively with various methods being used for control by different beekeepers. Three popular methods are:

- Make new colonies from strong overwintered hives, reducing the population of bees BEFORE swarm cells appear in the hive.
- Cage the queen as the swarm season is about to launch, leaving the queen in the cage for two or three weeks so the population growth of the hive is slowed, the congestion of the hive is reduced, and the bees have a break in the mite cycle.
- Raise brood above a double screen and provide the bees with a new queen. When the main nectar flow begins, the double screen is removed and either the old queen is removed or the beekeeper lets the two ladies fight it out.

Recent work shows that miticides used by beekeepers kill sperm in drones. This fact should have everyone's attention, so that we all have a clear plan to make sure we have:

- Abundant drone production
- No use of sterilizing miticidal agents that kill sperm in drones
- A rigorous feeding plan to keep drone production at a high level throughout the queen mating period in your area. This is not always easy for many hives shut down drone production in mid Summer only to start up again in the late Summer and early Fall.

Queen failure is undoubtedly related to the issue of poor semen viability. If a young, well-reared queen does not find adequate numbers of drones containing viable

Larry filling the role of teacher and mentor in the beeyard.

sperm, she will start laying at least some drone eggs, and the percentage of worker sized drone production will increase over time. This fact upsets the balance of the hive and initiates early supersedure. Then that replacement queen also faces difficulties of poor mating success as well as heavy predation by birds, dragonflies and loss through disorientation. We cannot overlook the impact of various viruses and diseases and their degradation of queen health and performance. Queen failure is a major part of colony failure and as a beekeeping community we do not appreciate all the ways this can happen, and how it lowers our beekeeping success.

Much robbing takes place in our apiaries every year, as one colony robs out another, and a third hive robs out the first. This generates unnecessary and unnatural stress on the hive (single hives in the wild are probably rarely robbed out until the colony has died). Many colonies are robbed by other Hymenoptera – hornets, wasps and yellowjackets. It is hard to control the production of these pests, but evidence shows that these species forage quite locally, so a search for local social insect colonies, and their careful elimination, may reduce the number of wasps at every crack and opening of the hive from August to November, when these species reach maximum population.

Winter losses continue to plague beekeepers in many areas. This is partially related to *Varroa* mite predation, virus population buildup, and low levels of winter stores. Leaving honey for the bees (and keeping the robbers out), as well as providing adequate protection from the wind, upper ventilation, top insulation and top feeding with candy boards all reduce losses. Your goal should be to lose no more than ten percent of your overwintered colonies. This number can be influenced by taking losses in the Fall and not trying to Winter tiny colonies or those filled with old bees.

Paperwork

Is there a benefit to good record keeping? Successful beekeepers seem to agree this is true, but they may not agree on the width and depth of this level of detail. Let's start with the obvious:

1. Does someone know where your bees and bee equipment are located? Bee inspectors tell of 'found' abandoned beeyards, their location not known by the family of the beekeeper. Perhaps you should keep a list, with photos of the site and directions and GPS maps to each apiary. Update this two or three times a year. This is good animal husbandry – not letting bees die unattended and perhaps spreading disease. If you are a solo beekeeper, make sure someone is ready to help out in an emergency.
2. After you have invested in the bees and sold some of their products produced in the hives, your beekeeping status should become a business activity. If you generate income from your bees and run your beekeeping in a business-like manner you should formally form a business. You are the person who decides that your beekeeping hobby, or habit, is now a business. Financial records, sales and other tax payments, and a good set of books are essential to any business. Take a Winter class in business record keeping to learn what you records you should keep and what you can let slide a bit. Many beekeepers use Quicken or Quickbooks for their records, invoicing and bill payment. This will probably mean that you need to start a separate checking (and hopefully savings) account for the bee funds. If you have a family farm, you probably already have the mechanism in place to add beekeeping to your farming business.
3. Plan to make a profit from your bees. I am always encouraged to see young beekeepers reinvesting the money they made from honey and hive product sales, pollination fees, and other income back into their business rather than borrow money. It is terrifying to hear of beekeepers who use a credit card to expand their bee operation. Pay off your outstanding debt and stay that way. Expand within your means. Even in a small-scale operation, put some of the income from the bees aside for yourself as a savings cushion, and some aside for the bees.
4. Consider individual proprioritorships, partnerships, limited liability companies and corporations – each type need to be carefully examined with you by some professionals who know you and your beekeeping business.
5. Get insurance on your bee business if you cannot afford to write a check for the amount you have invested in your business as a replacement after a flood or fire. Some homeowner policies offer limited coverage, or check

out some of the firms that sell agricultural insurance at state and national meetings.

6. Set goals and have a plan to reach them. Do not be afraid of growing your business, but develop the tools to do this by researching new methods and procedures you will need in your hive manipulations, new product development and perhaps as a speaker talking about bees and beekeeping to the general public or bee clubs.
7. Develop an 'exit' strategy. What happens if you get sick and cannot work your bees? Who will do the work? And pay you back on your investment? I have heard many stories by beekeepers who have had major health issues a few days before their packages or nucs are set to arrive. Develop what I call the Mack Truck Plan – what happens if you are run over by a Mack Truck! You will need to have someone who knows your business well enough to step in to keep the bees from dying and maintain any contracts you are obligated to fill. Don't become that dead beekeeper whose family lost all the bees to disease, and all the equipment was burned. Have a plan to turn over your bees to someone who understands what to do, and will do it.
8. Use contracts. Use them for pollination agreements, sales areas, employment of contract labor – you will develop your own items to add to this list.

Have Fun

Network. Beekeeping involves a wonderfully social community, and the most successful beekeepers are those that work together to get the job done each season. The sharing experience many beekeepers find from other beekeepers will stimulate you to try new things and increase your depth in many subjects. Set a time once a month that you and other beekeepers in your immediate area get together for coffee or something stronger (test that new mead recipe) and socialize.

Mentor. Volunteer to take on a teenager or retiree as your student. Don't be afraid, as it can be a lot of fun. If you are in a bee club that sponsors mentor training sessions, make sure to attend so you learn how to teach new beekeepers – one or many – to start their hives. Teach them how to assemble equipment correctly, install nuclei properly, and harvest honey efficiently. Some of this you will do for free, and some of this you should include in a fee for training, equipment and bees. Develop a simple one page agreement or contract for any mentoring arrangement.

Teach. Every bee club worth it's organizational effort should be sponsoring one or more beekeeping classes every year. These classes may be simple one day events that introduce beekeeping to non beekeepers, or they may be two or three year programs that run eight or more weeks per season that get into the details of Beekeeping 101, 102 and 103. There are books for that. Develop a series of talks on topics you know and enjoy, and don't be afraid to charge $100 per hour for your time as an instructor. When you add in all the time you took to develop the talk, you might earn the equivalent of average wage in China. If you need to drive or fly to a meeting ask that all expenses be covered.

Travel. Dr. Roger Morse at Cornell University once arranged bus tours for commercial beekeepers. I don't know of anyone who does that anymore. He brought a group to visit Ohio beekeepers in the 1970s and we went to a series of commercial beekeeping operations to visit along with some fine country restaurants to swarm into. Morse said to me "Most (commercial beekeepers) will walk into another beekeeping operation and learn what they want in about ten minutes." Sometimes they went home and adapted a new idea. Or they returned saying "I hope I am never that bad a beekeeper."

Many small-scale and sideline beekeepers need to travel to beekeeping meetings outside their usual comfort zone. Most beekeepers will benefit from the National meetings (but there is no Sideliner program at ABF this year), but some of the other state and provincial meetings might be even more interesting. I have had great visits to British Columbia, Alberta and Ontario beekeeping groups, and I highly recommend that more U.S. beekeepers travel to these meetings and share the wealth of knowledge these events offer. Take some time to visit while going to and from the meeting if you drive, or rent a car and plan some visits to see other beekeeping operations.

Enjoy your bees! BC

Get information about Swarm Essentials and other titles from Wicwas Press at ***www.wicwas.com****, or look at the Wicwas Press LLC advert in this issue. See you in Baton Rouge and San Antonio!*

Sitting On Top Of The Hive

Ross **Conrad**

Hive Covers – An Overview

The cover of the bee hive is primarily used and designed to keep out rain, ice and snow. Despite this similarity in purpose, the covers beekeepers use on their hives come in various types depending on beekeeping needs or goals, style preferences, the depth of one's pockets, and the type of hive being used. Top Bar Hives often have a single cover for example, while Langstroth hives typically sport an inner and outer cover.

The Inner Cover

On a Langstroth hive, the inner cover sits directly on top of the uppermost super or hive body of the hive, and is positioned under the outer cover. The inner cover is sized to fit squarely over the top super reducing access to the hive from the top. This helps protect the colony from robbing or attack from insect predators. The inner cover will also have a rim around its perimeter creating a bee space between the inner and outer covers. This dead air space helps insulate the top of the hive from cold and heat. The inner cover also has at least one opening in it, usually oblong in shape.

Because it is positioned directly on top of a super or hive body containing frames, overtime the inner cover will be glued down by the bees with propolis. It is relatively easy to slide a hive tool between the super and inner cover and break the propolis seal the bees create. This is likely the original reason for the development and use of an inner cover. Leave a telescoping outer cover on a hive for an extended period of time and you will discover just how difficult it can be to remove after it has been propolized by the bees. In such an instance you will be forced to pry up on the telescoping edge of the cover. Failure to use an inner cover on hives that collect a lot of propolis can result in having to pry so hard with your hive tool trying to remove the cover, that you may end up damaging the cover if it is new or in good condition, or completely ruining the outer cover if it is older and already starting to show signs of wear or rot.

The oval opening in the center of a commercially produced inner cover is designed to accommodate a Porter bee escape. The bee escape acts as a one-way door helping the beekeeper to remove bees from honey supers placed above the device and prevent their return. This is a relatively easy way to remove bees from honey supers during harvest time. Openings in the inner cover can also help provide ventilation for the colony, and may facilitate the use of buckets or mason jars for providing feed directly above the cluster. Often the rim of the inner cover is notched providing the bees with an upper hive entrance when the outer cover is positioned so it does not close off the notched opening.

Lincoln Sennett of Swan's Honey in Maine, has designed an inner cover with a deeper rim and sealable vent holes. The cover functions as a standard inner cover during the warmer months but can double as a candy board for Winter feeding.

Some beekeepers will use screened inner covers for increased ventilation and additional cooling during warmer months or during long migratory journeys. To accommodate the screen, the screened inner cover will tend to have sides that are thicker and taller than a standard inner cover.

Alternatively, some beekeepers will use an empty poly grain bag as an inner cover. Besides being an inexpensive and repurposed product, a big benefit of using an empty poly bag is that the bag can be folded down to fit snugly over the hive eliminating any openings at the top of the hive that will allow bees to escape. This can be extremely handy when moving bees relatively short distances. The

The propolis seal that the bees will build between the top super and the inner cover is easily broken when a standard hive tool is slid in between the two.

An inverted outer cover can make a great temporary resting area for supers when conducting hive inspections.

The migratory outer cover, can also double as an inner cover, and eliminates some or all of the telescoping sides so hives can be packed tightly together.

This Top Bar hive features two standard sized telescoping outer covers and two standard inner covers allowing for Langstroth honey supers to be added to the hive during heavy honey flows.

poly bag as an inner cover is ideal for beekeepers who raise two four- to five- frame nucleus colonies in one eight- or 10-frame hive body. This is because it provides the ability to fold back the bag covering the colony on the side being inspected while leaving the second nuc on the other side of the hive undisturbed. Unfortunately bees, especially in strong colonies, will tend to chew away at the poly fibers of the bag and will make holes in them when left on hives for long periods of time.

The outer cover

Designed to handle the elements, the outer cover is the hive's first line of defense against precipitation. The sides of the outer cover often "telescope" down over the sides of the top super to protect the hive. Most telescoping outer covers have a metal covering on top, usually made of galvanized or aluminum material. When inverted and placed on flat ground during hive inspections, the outer cover makes an ideal place to rest supers and hive bodies so that they don't get grass and dirt stuck to them.

While most outer covers have a flat top, some beekeeping supply companies offer a fancier telescoping outer cover that features a pitched roof, often covered in copper for the "show" hive in the garden. Due to its angled top however, this type of outer cover is difficult to use as a base to set supers on while inspecting a colony.

Migratory beekeepers will use a specially designed outer cover that eliminates two of the telescoping sides of the standard outer cover so that hives can be tightly spaced on pallets and easily strapped for transport. Easier to make and less expensive to buy than a regular telescoping cover, the migratory cover is also lighter weight. Migratory covers are usually made of wood with no metal covering. Unfortunately, the missing telescoping sides may allow water to leak in around the edges especially during heavy wind-driven rains. This excess moisture can be a major concern when overwintering hives in northern climes where temperatures are cold for much of the year.

Taking their cue from migratory beekeepers and their outer covers, some beekeepers will use telescoping outer covers without the metal covering. The theory is that without metal to potentially catch and hold moisture next to the wood, the painted wooden cover will dry out faster and provide longer service before needing to be replaced than the traditional telescoping cover.

Plastic and polystyrene covers are available for those looking for increased insulation. Care must be taken when using polystyrene equipment however, as the styrofoam-like material is not as durable as wood. Covers made from these synthetic materials are often more expensive than wooden covers and they create disposal issues once their life-cycle has reached its conclusion.

Top Bar Hive Cover

While many top bar hives (TBH) do not require an inner cover, TBH designs that feature top bars with spaces between them and a telescoping cover, should have an inner cover for the same reasons outlined above. Due to their non-standard nature, top bar hive covers may be anything that is weatherproof. Care must be taken however, to fasten down the cover in some way so that it will not fly off during windy weather. In hot climates it is advisable to leave an insulating air space between the outer cover and the inner cover or top bars, so that the heat of the sun does not soften the wax combs to the point where they will break loose from the top bars with the weight of bees and honey.

The covers we use on our hives may seem so simple and mundane at first glance, but a hive of bees can not be maintained in healthy condition long without them and if they are not built and used correctly they can create many problems. BC

Ross Conrad is the Author of Natural Beekeeping *and will present an organic beekeeping workshop at the Great Plains Fruit and Vegetable Grower's Conference January 9, 2014 at the Fulkerson Center on Missouri Western State University's campus in St. Joseph, Missouri.*

Bees And Water

Are bees thirsty most of the time – even in Winter?

Water issues in the hive ...Not again....

I know, I know. I carp on various bee issues and this water thing is one of them. To anyone who would listen, I have presented *PowerPoint* programs that included discussions of my water-foraging bees disrupting thirsty birds at my neighbor's bird watering device. I have written about water foragers upsetting other neighbors at their swimming pools. Time and again, I have presented water source problems, but I continue to have precious few recommendations. This issue is a fundamental one that will not go away and is somewhat poorly understood. So, as the season once again closes, I report that my bee water issue is still that – an issue.[1]

A Summer issue being discussed in Winter months

Water issues like these will definitely come up again next Summer. Bees and their keepers are quickly moving to town. Traditional answers like, *"Use Boardman feeders filled with water,"* or *"provide a shallow pan filled with water,"* are short-term bandages that will not carry the day. Beekeepers need practical information on how, where, and when to provide supplemental colony water. Should such water be scented or even slightly salted? How much water should be provided to adequately compete with neighborhood pools? How does a beekeeper keep supplemental water free of algae and scum? How does the beekeeper discourage birds and other animals from contaminating supplemental water with fecal droppings? I don't have many answers but I know many of the questions.

What constitutes a water source?

It has been postulated that bees sense water by perceiving a humidity change as they approach a body of water. Exactly what makes up a *"body"* of water – a 50-acre fresh-water lake or a cattle watering trough? Both. Though both types of water sources will be readily worked; bees that don't have access to large bodies of water will find much smaller water sources. I don't know how they do it. On hot Summer months, I have noticed bees working sources so small that the total quantity of water would not fill a teaspoon. I can't imagine how they found it. Imagine how easy it is for bees to find a neighborhood swimming pool.

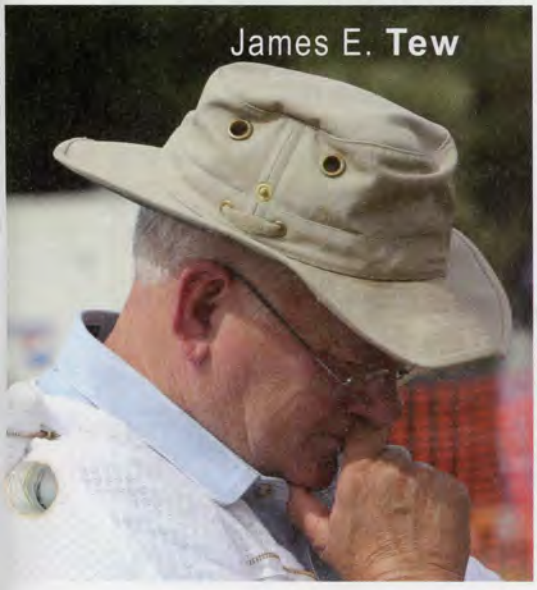
Swimming pools and bird baths

"How do I keep my honey bees away from my neighbor's swimming pool?" is ranked high on my list of difficult questions. Variations of the question are: *"How do I keep my bees away from animal watering troughs or bird baths?"* It used to be that we, as beekeepers, could argue that there was a good chance it was not only our bees doing the collecting, but nowadays, I am afraid that too often it ***is*** mostly our bees at our neighbors' water sources. Swimming pools combined with dry weather and scantily-clad swimmers are obviously a potential problem. Water sources as large as a swimming pool:

1. Have both a distinct odor and taste.
2. Are easily visible.
3. Don't dry up.
4. Are large enough to establish a *"humidity field."*

If you were a thirsty bee and found the neighbor's swimming pool, why look any further? And just when you think things can't get any worse – they do. When your bees visit your neighbor's pool, they will train themselves to specific watering sites at the pool that are frequently on or around the pool ladders or on wet pool decks. There really is not much a beekeeper can do. Provide a dependable water source, provide it near the hive, and never let it dry up.

[1]I have posted a simple video showing water foraging bees at: **http://goo.gl/ilXmd**



Water foragers working on a 40° day. Why?

Suicide bees on the snow. Why?

Another issue – bees and dirty water

Another water-related and troubling situation is: *"I've seen honey bees drinking water (or whatever) from the cement pad of my beef cattle holding pen. Won't this nasty water get into the honey?"* This framework of questioning immediately results in shudders and wrinkled noses around the room and is definitely not honey quality's best hour.

Bees will readily collect from manure pits, stagnant pools or other questionable water sources having nitrogenous byproducts or trace minerals that bees need. Obviously, the physical size of many undesirable water sources, combined with the smell and taste, would make such a site much easier for a water forager to find when compared to a drum or some other manageable container of clean water. Consequently, I hypothesize that bees probably have more difficulty locating and collecting from a small, clean water supply. If you watch water foragers while they collect from a clean source, foraging bees will expose their Nasanov gland (the scent gland) in order to help other bees find the same source.

As honey consumers, our saving grace is that honey has a novel system for safeguarding against such nastiness by having a system producing hydrogen peroxide within honey. Also, honey has a very low moisture content which will desiccate microscopic invaders. Consequently, honey is, by its nature, a very clean product. But . . . be assured that the audience will not soon forget that the question was asked. You may want to consider moving colonies that are collecting from suspicious sources. But you never really know where all the other water collecting sites are. I would not make this a high priority.

Why bees drink

Thirsty bees forage for water for many of the same reasons that we need water. They need it for themselves, for their developing young, and to cool the hive during hot weather. The hive reception procedure is interesting. Water foragers probably make the decision to collect water individually. Maybe an individual bee is hot and simply went out for a drink. Regardless, if water foragers are eagerly met by house bees at the hive entrance and the water is quickly unloaded, water foragers are stimulated to make more water foraging trips. If such tanker bees are unloaded within 60 seconds, they take off on another flight for more water. Anything longer than 60 seconds seems to discourage water collection and unloading times longer than 180 seconds will outright stop water collection. (Winston, 1987).

Controlling the internal hive temperature is critical for the colony's development of immature bees. In hot weather, bees collect water and put it in indentations in burr comb along the top bars and within cells near brood. Fanning bees evaporate the water thereby cooling and humidifying the hive. So much water will spill out when a frame is moved during times of active water collection, that it may appear that a nectar flow is progress. Bees given the task of holding water until needed have been dubbed *reservoir bees* (Park, 1923) in the beekeeping literature. Like the office water fountain, they stand quietly near the brood areas and dispense water as needed. They serve a particularly important function for providing water during hot nights when foraging is not possible.

Hive nurseries are kept in the range of 94-96°F. As temperatures increases to 96°F in the brood area, the demand for water increases. Initially, nurse bees deposit the contents of their crops in a thin film into or near brood cells. This has been called *"tongue- lashing"* (Winston, 1987). If these procedures still do not bring rising temperatures under control, nurse bees and house bees begin to eagerly search throughout the hive for bees having crop contents of dilute nectar or even better – plain water. That would leave foragers having good, sugar-laden nectar load standing idle while bees with lesser sugar contents or water are suddenly in demand. Communications within the hive swing toward using the foraging force to collect water. Finally, temperatures drop, and attention again shifts to either pollen or nectar collecting bees.

In hot climates, staggering supers in order to allow for upper level ventilation will make evaporation more efficient and help in keeping the hive interior cooler. Beekeepers have occasionally pointed out that so many extra openings may incite robbing of weaker colonies – a point that I can't deny, but weak colonies are at risk anyway. It has been my observation that hot bees are not friendly bees. Many beekeepers have special stories of moving colonies at night with hot bees hanging from the front. Hot bees are defensive bees and would be alert for robbing.

Having little to do with hive temperature, bees also collect water to dilute honey in order to feed it to developing bees. The time-honored line is that bees can also use metabolic water (water produced as a physiological byproduct). Also, during cold months, water for brood can be gotten from either frost or ice within the colony. More on that.

Just a few days ago, the outside temperature was around 40°F and yet 70-80 bees were water foraging at my water source. I don't really know why. Recently, at a meeting, Dr. Gordon Wardell made me realize that bees must convert all their food to a liquid before ingesting it (Wardell, 2013). What were these bees doing with this water? How much water does a colony need during cold seasons? Without water, can a wintering colony easily consume thick, cold honey? Can bees really use ice as a water source?[2]

My next unanswered question is nearly scientifically irresponsible – *Are bees that die on the snow on*

[2] I have posted a short clip showing these cool season water-foraging bees at: **http://goo.gl/763HCC**

bright clear days, nothing more than suicidal water foragers? Think about it. I have always been told that these sad bees are *diseased bees that are leaving the colony, or that they're on cleansing flights* or that they are *eager foragers that made a serious mistake on a cold bright day.* The most probable explanation is that the bees are simply trying to take cleansing flights to relieve their bowels, but why do so many have to die?

This Winter-dead-bee situation has always tasted funny to me – so many bees making so many fatal mistakes. Many of these *sick* bees are far from the hive so how sick could they have been? True, some are in bad shape, but others dead on the snow don't appear sick at all. If the die-off event is simple defecation, why not stay closer to the hive? Give me your thoughts on this Winter phenomenon. Sorry, but you folks in warm climates will have a more difficult time seeing this Winter occurrence.

Water – one way or the other

Clearly, bees need abundant supplies of water all year. If you don't provide it for them, they ***will*** find it somewhere else. In fact, they will frequently find it somewhere else even if you do provide water for them. Let a facet drip, provide an internal water supply, keep a bird bath filled nearby, install a landscape pond or provide a plastic child's swimming pool filled with water and stones, but by all means, keep your water sources wet. Once your source dries out, bees will be forced to move to other sources. Bees must drink – one way or the other.

Beehive Water Facts

1. Time for a bee to load up – one minute
2. Normal time for the water run – three minutes or less (67%), 10 minutes or less (92%).
3. Rest period between trips – two to three minutes
4. Water trips per day – 50 (100 max)
5. One quart of water will take 800 bees working all day
6. Daily water use per colony – around 1/2 pint - 2 1/2 pints

(From Park, 1928)

Someone must have an idea

You folks are creative bunch. What are your ideas? Maybe a hive top feeder can be converted to a hive top waterer. Maybe use of a five-gallon bucket can serve as a storage reservoir on top of the hive (This would keep the outer cover on and provide water reserves to the internal hive top waterer, but then you must remove it when you open the colony.) Maybe some kind of trickle irrigation component could be modified so you water your plants while you water your bees. Maybe a plastic spray tank could be modified to provide slow-drip water. I don't know, but I do know this – in general, we don't have a good watering system for our bees. Many beekeepers don't need to supply supplemental water, but for those of us who do, we are stuck with the traditional techniques that are inadequate. If we don't come up with something, our bees are going to be hanging out at the neighbor's pool next Summer – just like last Summer and the Summer before that. BC

An unintentional water source behind my storage barn.

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

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BUILD A HIVE BODY

Ed **Simon**

A hive body is the main working part of the hive. It is an easy box to make assuming that you have the correct tools and the saw is in alignment. A square cut must be a true 90 degree cut.

The following description details how to make an individual hive body. After making one, I recommend making them in batches of at least ten and preferably more than ten. In general, it is not economical to invest your time in the setup required to create a single hive body.

The definitions used throughout this article for the parts of a hive:

- Hive Body – Any box that is to make up a hive (no function is associated with the physical box)
- Brood Box – A Hive Body that has been dedicated to the raising of bees.
- Super – A Hive Body that is used for the purpose of storing honey that will be processed by the beekeeper.

Parts (Thickness x Width x Length)

1. ¾" x 6⅝" x 19⅞" – Sides (2)
2. ¾" x 6⅝" x 14¾" – Ends(2)
3. 1 ⅝" Construction or Drywall Screws (16 for a medium, 20 for a deep)
4. Exterior wood glue

A standard 1" x 8" x 6' board will provide all the wood you need to construct a single medium hive body. Adjust the board width for the shallow or deep hive body.

A standard 1" x 12" x 6' board is used for deep hive bodies.

Hint: Watch the sales at the local lumber store for dimension lumber. A 1" x 8" x 6' pine board costs $3.00 to $3.78. (2013 prices) This is normally a #3 pine that I hand pick. When hand picking boards watch for warping and damaged edges. If you get there when they have just broken open a bundle, you can usually get boards that are #2 or better quality.

Unique Tools

Building a hive body can be accomplished without the jigs mentioned in this article. But, if you are going to create more than two or three hive bodies, the time spent building the jigs is well worth the effort.

Construction

All hive bodies have the same length and width. The difference is in the height.

Step 1: Starting with a 1" x 8" x 6' board, trim a ⅛" slice from one end of the board. This squares the end and will also remove some of the printing on the board. For safety, remove all the staples that lumber companies use to attach price tags. They usually result in some very nasty words when they gouge your fingers.

Step 2: Rip the 6' board to the correct width for your hive body. The hive body heights are:

- 5-11/16" – shallow
- 6⅝" – medium
- 9-⅝" – deep

Cutting the height in one pass saves time and insures the finished heights of the hive body's ends and sides will match up with each other.

Hint: Use the ripping of the board to eliminate any edges that are gouged, have loose knots or other defects.

Step 3: Cut the sides (parts #1) from your board.
Hint: If you are making multiple hive bodies, attach a "Stop Block" to your saw at the correct length. This will ensure consistent lengths and make the cutting go much faster.

Step 4: Cut the ends (parts #2) from the remainder of your board. (See the previous hint on a stop block)

Note: If you are using a router or a shaper to make the frame rests, it is easier to cut the frame rests before cutting the end parts (exchange step #4 and step #5).

Step 5: Cut a ⅜" x ⅝" frame rest in the top edge of the two shorter (end) boards.

Note: A router is perfect for this operation.

Step 6: If you are going to use recessed hand holds on your hive bodies, cut them now.

Note: for information on how to build a jig to cut recessed hand holds using a radial arm saw see the chapter "**Hand Hold Jig**" in the "Bee Equipment Essentials" book available through WICWAS Press. The instructions are also available on the following web site http://www.thebeeshed.com/publications.html under the heading "Build a Hand Hold Jig – Unpublished".

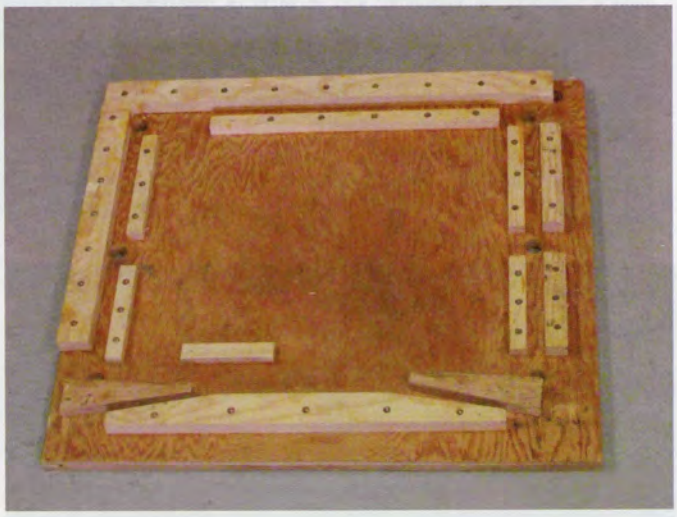
Step 7: Drill four screw starter holes in the ends of your long boards. These holes should be positioned ⅜" from the edge of the board.

Note: For a deep hive body use five screws per corner.

Step 8: If you want an entrance hole then drill it at this time in one of the shorter (end) boards. To create a neat hole, drill from one side until the point of the drill pokes through the board. Then flip the board over and use the pilot hole for positioning and finish the hole from this side.

Step 9: Now is the time to assemble the box. Use carpenters square or a picture frame squaring tool to hold the box square for gluing and screwing.

Note: For the mass assemble of hive bodies build a "**Super Jig** to keep the boxes square. For instructions on how to build a "**Super Jig**" see *Bee Culture* magazine September 2008 page 47.



Step 10: If you are using external hand grips, then add the external hand grips at this time. When positioning these grips, make sure they are far enough from the top of the box to allow for the telescoping cover to be positioned without hitting the grips.

Hint: Add **Gargoyles** to the upper corners of your hive body to reduce rotting. Use a sander to bevel the top corners of each hive body. This bevel will give you a start when you want to separate the hive bodies with your hive tool.

Note: For information on "**Gargoyles**" see "Bee Culture" magazine January 2013 page 48.

Step 11: Paint you hive body with the free external paint you got from your recycling center.

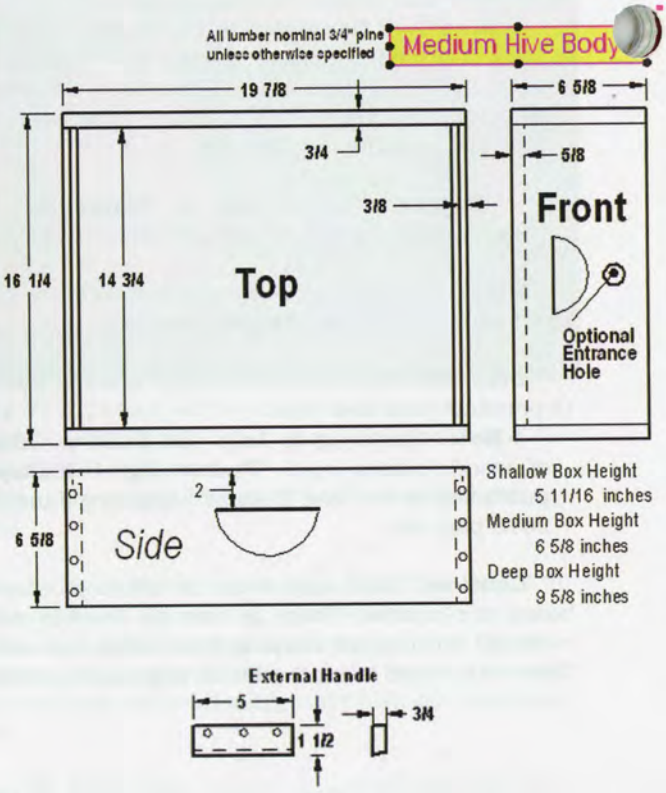
Step 12: While the paint is drying build the frames to populate your new box.

Note: For a jig to help you build a volume of wood frames read "**Frame Jig – Multiple**" published in the "Bee Culture" magazine Janurary 2013 page 46.

Caution: Extra care must be taken to ensure the boxes are square. There is enough trouble with the eventual rotting and warping that will occur over time. There is no need to start off with alignment problems.

Note: Regardless of the care you use when selecting wood, you will end up with unusable pieces. Because of this you will have incomplete boxes. Save the mismatched pieces and eventually you will have enough for a complete hive body.

Note: I have been using brood boxes and honey supers built with hand selected #2 and #3 pine for over seven years. The combination of two coats of paint, screws instead of nails and high quality exterior glue has kept them in excellent condition. The use of butt joints does not seem to



have any effect on the longevity of the boxes. As a matter of fact, it seems as though the simple butt joint is less likely to rot than a fancy joint. BC

This article is the fourth in a series that will provide instructions on how to build a complete bee hive. Get a copy of Ed Simon's book Bee Equipment Essentials *with detailed drawings, construction hints and how-to-use instructions for dozens of beekeeping tools and equipment from www.wicwas.com. Ed can be contacted through Ed@TheBeeShed.com.*

The Social Impact Of Honey Bees: The Problem With Problems

Richard **Crespin**

No one owns honey bee pollination. As with almost anything in a highly specialized society, a commercial beekeeper owns her bees but not the means of making the inputs or outputs of bee pollination. She doesn't own the land or the crops and flowers that her bees depend on for forage, that is to say, for food. She relies on farmers and other surrounding landowners to feed her bees. Nor does she own the distributors and stores that bring the crops and flowers her bees pollinate to market. This specialization has wonderfully increased the production and distribution of food.

It's a problem, though, when a tough problem arises where no one party stands to lose or gain in the short term, but where we all stand to lose or gain in the long. These are problems "in the commons." Just such a problem threatens honey bee health.

Colony Collapse: Who's Problem Is It?

The recent Honey Bee Health Summit held at Monsanto's Chesterfield Village Research Center in St. Louis and co-hosted by Project Apis m identified a set of potential problems causing declining honey bee populations. These included poor nutrition due to lack of a multivariate diet, the *Varroa* destructor mite and its accompanying viruses, and pesticides which exacerbate the other two problems.

The beekeeper doesn't really "own" any of these problems. She can't control what is planted on the land where her bees look for food. The *Varroa* mite, an invasive parasite that burst on the scene in the early 2000s that attaches itself to bees and weakens their immune systems making them susceptible to a battery of viruses, isn't owned by the beekeeper. She owns the decision about whether or not to use miticides to treat her bees, but that's it.

Bees come into contact with pesticides when they forage near agriculture, mainly when they pollinate treated crops, but the beekeeper doesn't have the decision of whether or not to treat crops with pesticides, nor does she completely control where her bees range.

"Bottom line: the vast majority of managed colonies in the U.S. contain a population of bees that requires intensive husbandry, chemical control of parasites, and is dependent upon supplemental feeding, similar to other livestock," wrote Randy Oliver in a recent entry on his Scientific Beekeeping blog.

What Does This Mean for Improving Honey Bee Health?

It means even if you had the perfect scientific solution, you would still need a complex social solution.

Let's take forage. Bees, like humans, need a multivariate diet. "What is important to bees, other pollinators and beneficial insects are the weeds, native plants and brush between the rows [of crops], on the field margins and ditch banks and in hedgerows and woods," writes Oliver. "It is these plants that provide the steady mix of diverse nectar and pollen upon which colony health is dependent. Such bee-friendly flora used to be a common feature in agricultural lands. But today's farms often appear 'sterile' – all the pasture and biologically diverse 'natural' areas have been cleared and herbicided right down to bare soil."

Many activists blame large agribusinesses for creating these bee food "agri-desserts" through the proliferation of monocultures; when in fact, the spread of monocultures are due to, "the application of the recommendations of [USDA] agricultural extension agents and the economic reality of farming." These recommendations and their resulting intense and highly specialized farming practices arose in response to a growing population worldwide with an expanding demand for more and more food produced on less and less land by fewer and fewer people.

Scaling Long-term Investments

Solving the forage problem lies outside the control of the beekeeper. If the answer is to plant more varied crops, weeds and wildflowers, the farmer would need to do it on his land, thereby giving up production capacity, i.e., revenue. Planting more varied crops raises his cost to plant, manage and harvest. Solving the bee nutrition problem requires the active cooperation of at least three parties: the USDA to change its recommendations on farming practices, the farmer to plant forage and the beekeeper to place her bees in the right fields.

And this demonstrates the problem of problems in the commons. No one party stands to gain or lose in the near term but we all stand to gain or lose in the long term. In fact, the short-term incentives may actively work against long-term solutions. The USDA, the farmer and even the beekeeper have limited to no short-term interest in solving the problem. In fact, the farmer's immediate interest is to maximize production on his land, so giving up land to plant forage runs directly counter to his interests. Solving this problem will require developing solutions that benefit farmers and beekeepers while addressing the need of an ever hungrier planet.

When we work to solve big social problems, we need to take a step back and look at the social aspects as well as the scientific – what some might call the "soft" as well as the "hard" problems. Even if we come up with great "hard" solutions, if the social structures aren't in place to implement them, they will persist. BC

Richard is the CEO of Crespin Enterprises, a boutique consulting firm working to bring companies, NGOs, and governments together to create commercial innovations that solve problems in the commons.

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The Honey Tasting Contest

Peter **Sieling**

Every Beekeeper Thinks His, Or Her Honey Is The Best!

The Steuben County Honey Bee Association holds an annual honey tasting contest. Members bring one or two samples of honey in a squeeze bottle and everyone votes. First place receives the coveted trophy cup, which can be displayed where you sell your honey. It says, above all, that this is the place to buy the best tasting honey in Steuben County, and maybe even the whole state. There are additional prizes for first, second and third place – neat things like a hive tool, a capping scratcher, and sometimes when the club is flush with money, a smoker.

This contest isn't to be confused with or compared to, say, an EAS honey judging contest. We don't care how light or dark the honey is. We don't look for bubbles under the lid. We make no pretense of fair play. Like proud parents who think their little Emily or Isaac is the prettiest, smartest, and most precocious child in the world, every beekeeper thinks his or her honey is the best. So every beekeeper, except the really compliant, uber-conscientious ones votes for his own honey and brings family members and friends, hoping they'll vote for it too.

The meeting before the contest, everyone is supposed to receive identical containers to fill with honey. This year, as usual, the contest chairman got a late start and requested that everyone bring their samples in their own squeeze bottles. Once again the lineup contained honey bears with a rainbow of lid covers, glass honey jars, canning jars, peanut butter jars, jelly jars, and one plastic tub.

I had almost forgotten to bring my honey this year, but one of the prizes was a hive tool and I lose two or three every year. Just before the meeting, I popped the lids on two buckets in the honey room, dipped some into a couple plastic bears, and stuck them in my pocket.

Most meetings are full of laughter, hearty greetings, and back slapping good humor. On contest nights, greetings are short and terse, the air chilly. Each beekeeper eyes the samples as they come in, trying to remember who brought which jar, plotting strategies, wondering who invited the most guests, and who might bribe whom.

After the close of the business meeting, Lash, our contest organizer, stood up. He had an expression like a cat with a mouse tail hanging out of its mouth or an IRS auditor who has just discovered an "irregularity" in your books. "This year," Lash explained, "to be fair, you have to select your first, second, AND third place honeys. If you only vote for two, we'll throw out your vote. That way you can't just vote for your own."

I heard gasps of disgust. I didn't care. Always fair and objective, I voted for the best tasting honey no matter who brought it. It helped that my honey usually tasted best, anyways.

The jars were numbered and lined up on the table. Beekeepers surrounded the table, pouring samples on spoons, working it around their mouths and marking their papers. There was a bewildering variety of colors and tastes, but judging isn't as hard as it seems. You run through the samples, immediately eliminating honey that is watery, bitter, sharp, or burnt tasting. You can skip your own if you intend to vote for them anyways. That leaves just a few samples to try again for a final decision.

I recognized my bears, number 12 and 13, and not remembering the flavor, I sampled them. Number 13 tasted odd. No, it tasted awful, kind of bitter and yeasty. Did someone adulterate my honey? Then I remembered. Oh! Why don't I mark my buckets the second I snap down the lid? This honey came from my "external use" honey. When removing colonies from houses, I sort clean honeycomb into one bin and old black honey and brood comb into another. I strain out the old black comb, containing brood, bee bread, and dead bees into a bucket of dark pungent honey which I sell at a discount to several young ladies who use it on their faces and hair. I marked #13 as my third choice.

I heard people muttering about #13. The general consensus was that Jay, the beginner among us, must have brought that honey. Lash was counting the votes and a silence fell on the group. Lash counted the votes a second time, then a third. Finally he stood to announce the winners. My #12 won 3rd place. I accepted my new cappings scratcher amid a deafening, stony silence. Jay, to everyone's surprise, won second place – a ball of baling twine for smoker fuel.

The best honey in Steuben County – #13 by one vote. There were cries of "rigged!" and "bribery!" I almost didn't stand up, but Lash was holding up that bright yellow hive tool. Feeling hot around the ears I went forward to claim the coveted trophy cup and hive tool amid catcalls and boos. I considered skipping the next couple meetings.

Afterwards Fred drew me aside. "I voted for that s--- honey of yours," he admitted. "Figured it didn't have a chance and it improved my chance of winning if I voted for my honey first and the worst honey for my last choice. I wonder how it won. You think Lash can't count?"

I said. "I guess enough of the others voted like you."

"You actually sell that s---?

"It's not s---, Fred," I said. "I call it 'ultra naturel raw wild honey', and I sell it for $10.00 a pound." (It's always best to keep your competitors just a little off balance.) And that's how I won the prize for the best tasting honey in the county with the worst tasting honey in the state. BC

Peter Sieling keeps his bees, sells his honey and makes beautiful things out of wood from his home in Bath, New York.

Got A Question?

Ask Phil

Phil **Craft**

He Knows!

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

A beekeeper in Indiana writes:

I subscribe to Bee Culture and really enjoy your answers to questions. If you would be kind enough to send me your address I'd like to send you a small 6 oz jar of honey I put up last fall. For some reason it has become hard in the bottle and, unfortunately, I have a number of bottles in the same condition. It has an almost surgery grainy taste to it.

Appreciate your response.

Phil replies:

You can send me that honey and I'll be glad to give it a taste test, but I'm sure that it has crystallized - turned into a sold form made up of sugar crystals. This is a natural process. Honey is a super saturated liquid, which means that it is a liquid on the verge of crystalizing into a solid phase. In the mountains where I grew up, people would say it had "went to sugar." Some honey crystalizes more readily than others, its tendency to do so depending on the flowers that the nectar came from and the various types of sugar that made up the nectar. Nectar collected from a particular flower consists of a unique combination of sugars and other components. Differences in nectar give honey from different plants a distinct taste and color, as well as affecting its propensity to crystalize. Temperature also plays a role, the ideal temperature for honey to crystallize being 57°F. The more the temperature at which honey is stored varies from 57 degrees - either higher or lower - the less likely crystallization becomes. The presence of pollen grains or microscopic crystals also increases honey's tendency to crystalize, by giving crystals a substrate on which to grow.

One liquid, one crystallized. (photo by Alex Zomchek)

This increased rate of crystallization is the price local beekeepers pay for choosing not to over-process their honey. Large scale packers use pressure filtering and flash heating to extend the shelf life of their honey - removing all pollen grains and sugar crystals to decrease the likelihood of crystallization – at the price of altering the taste. (See the question and answer about raw honey in my January 2013 column.) There is nothing wrong with crystallized honey; it just has a different texture and appearance. In some parts of the world, where most of the nectar is from sources which promote rapid crystallization, honey is habitually consumed in a solid form. In this country, some beekeepers market a form of solid honey called creamed honey or honey butter, which is made using a process of controlled crystallization. It is often enhanced with cinnamon or fruit flavors, and is quite popular.

When bottling honey that we plan to sell later, sometimes we can have a problem with the honey's crystallizing in the jars - after bottling, but prior to sale - or even in five gallon buckets before bottling. I suspect that I am not the only beekeeper who has removed honey from a bucket with an ice cream scoop! Consideration of temperatures at which honey is stored can help prevent this problem. Keeping honey in a room significantly warmer than 57° is one solution, however high temperatures can hasten the darkening of honey and affect its taste. Storing honey at temperatures well below 57° avoids these problems. Freezing it is an excellent way to prevent crystallization. Frozen honey is hard, but it is not crystallized, and upon thawing it resumes its liquid state. A chest type freezer could easily store five gallon buckets as well as cases of bottled honey.

If your honey has already crystallized, it can be reconverted by heating. It is important to do this slowly and to avoid overheating. Overheating can degrade the taste of honey and will soften and distort the shape of plastic. Heating crystalized honey in plastic jars requires special care. This wasn't a problem when beekeepers used only glass containers, but times and materials change, and most beekeepers now use plastic - especially for smaller jars. You can either heat the jars in a double-boiler, or heat water in a pot and pour it into another container over the jars of honey. It is important to avoid bringing the bottles into direct contact with a heating element. Honey will start to re-liquefy when it gets above 105°F. As it warms, you will see it change from a solid state

into a liquid with some solid crystals floating in it. When it's sufficiently warm, the last of the crystals will melt. Another method is to heat the jars in a microwave on low power (defrost cycle works) for short bursts of about 30 seconds. Check after each burst, and repeat until the honey is re-liquefied. This alternative requires close attention to avoid overheating, but will not damage labels as a water bath will.

Enjoy.

A note from Phil:

My November '13 column included a question about what to do with extracted honey with an excessively high moisture content. As part of my answer I said that, at my house, we keep such honey and consume it ourselves - before it has time to ferment. Preventing fermentation is the reason honey needs to be at 18% moisture or lower for long term storage. I recently received a suggestion from a Bee Culture *reader who takes my advice one step further. Read her comment below.*

A beekeeper in Florida writes:

In regards to honey that possibly exceeds 18% moisture in your November 2013 Ask Phil column.

My process is to centrifuge all my fully or 90% capped frames first and set that aside as sellable honey. On all the frames that have more than 10% uncapped cells I run them last and use it for my personal honey. I have found that I can keep this honey frozen in either glass or plastic containers until I want to use it and there will not be any yeast activity in this state. Freezing expansion and container breakage is not a factor as 7% (expansion of water when frozen) x 19% (moisture percent of the honey) = only 1.3% of the total volume so it is minimal.

Phil replies:

Good idea! I always appreciate comments and suggestions from readers.

A beekeeper-to-bee in Missouri writes:

I have long been interested in becoming a beekeeper. Both my grandfathers were beekeepers but, unfortunately, both of them passed away before I learned beekeeping from them. I plan to start next Spring and would like to know what suggestions you might have for me in getting started.

Phil replies:

I frequently receive similar questions from folks who, like you, have caught the beekeeping bug and want advice on how to take the first steps. Many, also like you, have had a beekeeper or beekeepers in their family, and are now seeking to re-establish a broken link in a family tradition. While it is possible to purchase a beekeeping book and get started on your own (as many have), I do have some suggestions to help you prepare and make it more likely that you will get off to a successful beginning.

First, seek out a local beekeeping association or club. With the resurgence in popularity of beekeeping, most people can find a group within driving distance of their home. To locate an association near you and get contact and meeting information, visit the webpage of the Missouri State Beekeepers Association (**http://mostatebeekeepers.org**). Like most state association webpages, it has a list of local associations within the state and a map showing where the different groups meet. Your local agriculture extension office may also be of help. Many county extension agents work with beekeepers, and local associations often hold their meetings at extension offices.

Why should you join a local association? They provide numerous resources for anyone interested in hive craft, not the least of which is the opportunity to meet and make connections with other beekeepers. The meetings, most often held monthly, typically include an educational program, often featuring an outside speaker or local expert, as well as question and answer sessions. During warm weather, many associations hold weekend "field days," typically in a member's backyard apiary, where hands-on "in the hive" activities are the focus of the meeting. This gives the new or beekeeper-2-bee an opportunity to learn the workings of an active honey bee hive and what is actually involved in being a beekeeper. Not all the hives opened and examined at such meetings are in perfect condition. Often the host will have a "problem hive" where new or prospective beekeepers can learn first-hand how to identify honey bee diseases, parasites, and other management problems. It is a plus that these field days, as well as many evening meetings, usually include a pot-luck meal!

The next thing to do is to find and attend a beginning beekeeping class - if possible, before setting up a hive or even ordering equipment. Many local associations organize classes, sometimes one day events, and sometimes more in depth classes over a period of time. Another source of beekeeping education which has grown greatly in recent years, is large, one day, all day, regional beekeeping schools, held during the Winter or early Spring, usually on a Saturday. While you may need to travel further to attend one of these schools, it is well worth the trip. These larger beekeeping schools normally include a beginning track of classes, especially designed to teach those with zero or minimal beekeeping knowledge what they need to know to get started almost right away.

Since these are large events with hundreds of attendees, beekeeping vendors are typically present, displaying beekeeping equipment and supplies either for immediate sale or for later delivery. Some also take orders for packages of bees. A big advantage of having vendors present is the opportunity to see and examine equipment from several different suppliers before deciding on a purchase, whether you buy there or order later from a catalogue.

You can also ask questions - both of the vendors and of experienced beekeepers who often are there to purchase or pick up pre-ordered equipment - questions about different types of equipment, how it is used, and what basics you need to get started.

Talking to other beekeepers and asking questions is an important part of all of these educational opportunities. Beekeeping schools offer advanced as well as beginning classes so they, as well as local meetings, give novices a chance to talk to and benefit from the experience of "old hands." Beekeepers are enthusiastic about their craft and generous with their advice. There is often as much to be learned in conversations in the hallways between classes as in the classes themselves. Not that the old hands always agree with each other; there are different schools of thought in beekeeping, and every beekeeper has his or her own favorite tricks of the trade. The new beekeeper will have to synthesis all the advice and find out what works for him or her, but it's all food for thought. The regional schools, due to their larger size and attendance, often attract nationally known speakers as keynote speakers and instructors, which provides another opportunity for learning. They, too, are usually generous with their time and advice, though even the experts may differ on some issues.

I referred earlier to books on beekeeping; there are a number of good ones available. You can get suggestions for titles from other beekeepers at local association meetings, or you can visit the Bee Culture Book Store at **http://www.beeculture.com/store/**.

You have obviously already acted on the other suggestion I always make to new beekeepers, which is to subscribe to a good beekeeping magazine!

Best of luck!

A beekeeper in West Virginia writes:

We had a warm day recently and the bees in my three hives were flying nicely. I removed the outer cover to take a peek inside. I noticed on one of the three hives a lot of moisture, appearing to be condensation, on the inside of the outer cover. Should I worry about this?

Phil replies:

What you observed is probably due to a lack of ventilation inside the hive. Excess moisture in a hive, especially during Winter, is not good for the bees. Like

all animals, bees breathe and their respiration produces moisture. Think of a room with closed windows and doors, crowded with people at a party. Over time, the air becomes moist and the atmosphere feels uncomfortably warm and stuffy. If someone opens a couple of windows slightly, allowing cross ventilation, the relief is almost immediate. The internal climate of our hives works the same way. In nature, bee trees have lots of openings. Some the bees may fill with propolis, but others are too large to seal or will be left open on purpose. These openings allow for excess moisture to be vented away from the colony. We beekeepers sometimes err in making our hives as airtight as possible, and then in Winter we further restrict air flow with entrance reducers.

I always suggest that beekeepers assist their bees with ventilation year round - in Summer to help lower the moisture content of honey – and in Winter to maintain a drier hive.

Beekeepers have come up with many slight hive modifications, mostly involving the lid, to help increase ventilation within the hive. I use small sticks placed on top of my inner covers year round to prop up the outer cover just slightly and allow air to flow between the inner and outer covers. Some beekeepers utilize notches cut into inner covers to accomplish the same purpose. I also use metal entrance reducers with holes. These keep mice out as effectively as wooden reducers, but allow more air to move through the hive. When you're providing Winter ventilation, don't worry about the bees' getting cold. The clustering behavior of the colony will keep them sufficiently warm. BC

BIGGER PICTURE

Jessica **Lawrence**

Wedding Bells and Honeycomb

Some of you may have read my other articles that covered the Great Disasters of 2013, such as the Great Chicken Massacre or the Great Power Outage, but there was the one super awesome event that negated the ill effects of all the bad luck events – my wedding! Anyone who knows me would guess that it wouldn't be a typical wedding, and I think I came through on that idea. The entire wedding was bee themed, straight down to the yellow and black wedding dress! Now, I know that everyone wants to be like me, but maybe you don't have a handsome wonderful man waiting in the wings to jump into your own honey bee wedding. In such an event, I thought I'd share some of the details for the planning that could be applied to anything from a birthday party to a Summer cookout, just to give your soiree a little bit of sweetness.

First of all, I would totally recommend the black and yellow color scheme for clothes. I was lucky that my soon-to-be mother-in-law is an excellent seamstress and made both my wedding dress and a matching kid version for my new daughter (she was definitely not getting a corset on her dress) as well as ties for the boys. It was an unusual step for a wedding, but I think it brought the idea home of a united family.

If you were hosting a party and wanted some bee-themedness applied to yourself, there are a slew of online sources for black and yellow dresses, or just one or the other. It turns out bees are pretty popular right now in pop culture, so there are all kinds of accessories that could accentuate a black dress if owning a pointedly bee-related dress is too much. I tried to find antennae for the wedding but they were strangely hard to find even in the Halloween season. In this case, bee bobby pins were the hair decoration of the day (courtesy of Etsy), but a cute headband would have worked too (you could probably also find this on Etsy). I learned during this that if there's something you want, there's someone on Etsy that can custom make it for you.

If you are looking for a theme for something like, say, a holiday card, it would probably be in your best interest to find something that could be used again, but would work as a cohesive piece for a photo. One other clothing piece that really stood out at the wedding was our hoodies, which also came from Etsy. They were another custom order, black zip-up hoodies with yellow writing. Each one of us had our names on the front, and our last name on the back with our "order" from 01 to 06. Maybe you don't want to go this far for a holiday card, but it makes a super cute photo and it has been one of my favorite purchases from the wedding fiesta. I love going out with the kids and having the family tie. I ordered a size up for the kids so they would be able to wear them longer and hopefully they will last at least a year. They were a bit pricey, but to me it was worth every penny.

There are a lot of planning pieces that partygoers take for granted that can drive the planner crazy. I really wanted black and yellow everything (plates, napkins, forks, etc.) but I couldn't get enough of the same shade of yellow for as many guests as we were expecting. For a small backyard party or birthday party, it would be easy to supply everyone in black and yellow. I also wanted something a little extra special for Bobby and me, so I turned to Etsy again. It is amazing what you can have custom ordered! I found a shop that would custom make us a pair of forks with our wedding date on the handle along with a bee, and then our names on the bottom. I have seen other friends do this with things like special birthdays or anniversaries, but it was difficult to find the person who also had a bee stamp. They looked really cool, but as it turned out no one thought to mention that the bride and groom don't actually get to *eat* at their wedding reception. If you were having a bee-themed party for your

kid, and planning on letting them eat their cake (unlike a wedding apparently) I think a personalized silverware set with the bee stamp would be a really neat memento of their super cool gathering.

I really wanted to give out little jars of my own honey as party favors. Then, I really wanted to give out boxes of honeycomb with a little wedding sticker on the top. THEN, I remembered the Great Bee Demise of 2013 where I didn't extract any honey this year and I have been fervently hoarding my remaining honey like it was the One Ring and my name was Smeagol. I didn't want to order some on the internet and face the possibility of sub-par honey, so it was decided to forgo that idea. If you guys are reading this, there's a pretty high possibility that you have the capability to harvest your own honey, and we all know that our own honey is better than anyone else's. It also doesn't get much more personal than giving away a jar of all that hard work. There is a really cool website called Specialty Bottling Company that sells two oz. and four oz. jars that are really pretty. These are my favorite sizes for presents, because it's enough to eat, but not so much that you feel like you are giving all your honey away for free. The two oz. jars are a bit small, but they are great if you want to give someone a bunch of different kinds of honey to try.

There is usually a traditional champagne toast with a wedding, but I am not a big fan of alcohol – that is to say, I don't drink at all. I do like to taste mead, but my uses for alcoholic beverages extend only into my cooking realm. Mead is awesome when you make ice cream if you choose your flavors accordingly (try making avocado ice cream with avocado blossom mead, or citrus mead with orange ice cream). I had once thought of doing the toast with mead, but I didn't want any of the guests to have a complimentary spit shower, so we skipped that tradition too. For the adult party, offering a taste of mead is a curiosity for your non-beekeeping friends. Many of the "normal" people in our lives don't see a lot of the products of the hive outside of honey (sometimes they catch on about candles, but that's just the occasional observant friend). If you make your own mead, this can be an opportunity for some free marketing. If you're not up for mead but still want to be in on the theme, there's a glass skep beverage dispenser that would work perfectly with honey-sweetened lemonade. When I used mine for a cookout last year, I had frozen lemon slices in it and you can dye ice cubes black and add in for an added color contrast if you like.

Last but not least, there's always the food! We had a coconut cake and a red velvet cake besides the wedding cake. I guess coconut is always decorated the same, but the lady who made the red velvet broke out the fondant and wrapped it in yellow with a black bow and tiny bees. The wedding cake itself was a honey cake! The top tier is stored safely in our freezer for our one-year anniversary, but everyone else had a piece from the lower parts. We did the customary cake-eating, and no, there was no face-smash of the cake. It was absolutely delicious, but it may have also been because it was the only food we had a chance to eat. One of my mom's neighbors made other desserts as her wedding present to us, which included a variety of fruit cobblers. She hid away a whole peach cobbler in her car for us, made with honey instead of sugar to match the theme! I guess she was "in the know" about the bride and groom not being able to eat.

There are some really good recipes for honey cakes out there, and with a little bit of effort you can always modify them to your personal taste. I put honey in almost everything I bake, but I try to use my darkest honey because the lighter honey burns faster and sours the flavor. With the explosion in cooking interest, it is easy to find multiple colors of fondant at craft stores and you can make your own bees too! I am also a fan of bee cake molds. Nordic Ware makes the best ones I've used, including a skep design and a pull-apart honey cake pan.

A bee themed wedding might be a bit much for some people, but most of us beekeepers are pretty flamboyant with our *Apis* love and we love to entertain our friends by talking about bees longer than anyone wants to hear about them (unless they are also beekeepers, but let's face it – we know they are just waiting for their opportunity to talk about *their* bees!). If you are planning a party this year, I hope you are able to throw a few bee ideas into your décor! BC

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

DOWNTOWN

Making Urban Work

Since it's Winter for many of us, and the best we can do for our bees is wonder and worry about how they are doing, we could consider doing something else with our mental energy: making alliances and building bridges.

There are very few things you can say about Big Cities that begin with "always . . ." and "never . . ." but here is one I'm pretty sure of: "You can *always* rest assured that one city beekeeper will *never* own all the resources that the bees in those colonies will need in a year." The bees forage for anything from a mile or two to four or five in any direction, each hive sucks up a gallon or two of water (and whatever is in it) on a hot day, your bees bring home in the nectar and pollen what your neighbors put in the soil.

In the city, we depend on the aggregate choices of people who will never see inside a hive, including some folks who would oppose their presence at all. We therefore need friends, especially folks who are working on urban green spaces, and they need us. They might need to be told that, however.

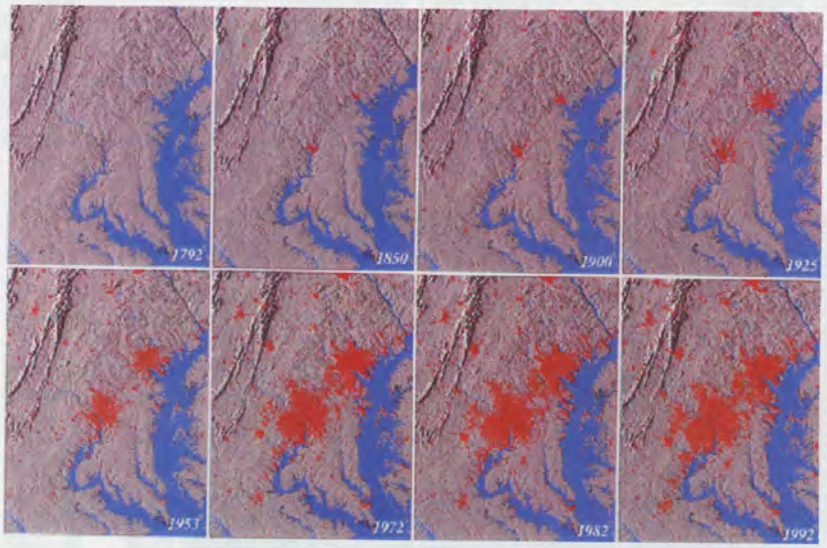
If urban beekeeping is going to gain a safe and permanent foothold, it needs to be woven in with the fabric of the organizations and activists who strive to make cities a decent place to live (for everybody in them). My secret evil plan is to have urban beekeepers wind up, in the minds of the average citizen, as somewhat less boring than the orchid growers and somewhat more boring than the model railroaders. Normal, run-of-the-mill geeks.

Why is this so important? The future is urban, and lots of groups are trying to figure out how to make that work. For example, here's a picture of the Chesapeake Bay Watershed, the place that nine million Washingtonians and Baltimoreans (and our suburban neighbors) call home. It shows land use changes between 1792-1992. In 1997, Maryland's governor predicted that by 2020, if trends held, the amount of land you see used for development would double.

Trends held. They held almost everywhere in North America (the exception is Maine, but if you move there you might ruin everything). [Source, *United States (Census) Summary: 2010*]

There are all kinds of predictions about urban growth, some based on percentage of the population (the WHO says 70% of us by 2050) or by land use (triple the current space by 2030/Sante Fe Institute). Many of us are urban beekeepers because we want to play a role in making this work somehow.

If you talk to the hardcore landscape restoration groups, they might not think that there is an obvious place for honey bees in their mission. At a recent conference of the Chesapeake Conservation Landscaping Council – a lovely group with whom I have no problem at all – most of their



Co-opting, "Corrupting" and Otherwise Cooperating With Other Urban Greenies

eight guiding principles include some version of the word "native," and *Apis mellifera* is not that.

But here in the US, cities are about as native as honey bees (most towns less so). Eva Crane points to the first arrival of European honey bees in 1622, Dr. Deb Delaney of UDel has found traces of Spanish Conquest DNA in West Coast bees that may be older than that. As crazy as our neighbors might think us for harboring colonies of 50K (or more) stinging insects in our gardens or on our roofs, colonists on small wooden ships 400 years ago thought it was a great idea to travel in close quarters for months on end. For about 5,000 years that we know about, people and honey bees have lived together in cities and countryside. Any reason for getting rid of one sort of logically requires you to think about extirpating the other. (Personally, I do not feel like being removed.)

And, in desperate cases, you can point out that North America did have native honey bees – 14 million years ago [Engel, M. et al. 2009].

So why should folks who work on greening the city listen to us? Some maintain that there is plenty of pollination without the presence of bees, but the anecdotal data from managed gardens in DC points to higher yields with managed bees, especially for non-native crops and early bloomers. As for native species, it *is* possible and instructive to have kids make and place *Osmia* tubes and blocks, for example, but participants have to take your word for what is going on inside unless you destroy the nest to show them, there's activity for maybe six weeks a year, and repopulation of your block is a roll of the dice unless *Osmia* are already common in your area (begging the question of why you needed to bring any in...just like honey bees).

From a program development standpoint, it is tough to overestimate the effectiveness of honey bees. If you want to help people, especially kids, connect to the insect world, *Apis mellifera* is hard to beat.

Why? Honey bees are there all year (if we can keep them alive). You can open up their colonies and see everything that is going on without killing the subject, you can watch the foragers go out and the pollen go in, and connect it with what is blooming right-here, right-now. At some point, you can experience what your hometown tasted like that Summer, and link it to probable source plants. You can put hives on imperfect land in almost any neighborhood, and later move them around if your program has to shift. Over time, you and your participants can develop a gut relationship to them and their ties to the green world based on human/bee cooperation. If that does not restore the relationship between people and the ecosystems around them, I do not know what does.

And presenting honey bees to people is almost cheating. In my town, the hardest sell comes from the lowest income areas. DC's arborists, for example, report that poorer wards both request fewer trees and resist the expansion of the green canopy. For them, nature is a place where assailants can hide, and leaves are things that clutter the sidewalks and clog the drains. This Spring in the Washington Post, a longtime DC resident said "The trees create more problems than when they weren't there." So you can imagine the response when yuppies show up with boxes of stinging insects.

But in schools and community gardens, face to face contact with bees has an almost magic effect: fear turns into advocacy. An observation hive will first bring titters of concern, but will soon be surrounded with kids and adults glued to the drama within. Find the queen, show the eggs, try the honey, joke about the drones, link the whole thing to pumpkins and apples and ice cream, and then release your new battalion of converts onto the streets. Our bees can make the gardens of landscape restorers come to life in new ways.

What can the activists whom we are trying to persuade do for us? There's the political part, where they show up for hearings and defend our right to bee here; they also create potential apiary spaces, reach widely

Toni answering questions in the classroom.

different populations and neighborhoods, support issues like limitations on pesticide use, and might choose to join our ranks. They plant bee forage, clean waterways, insist on remediating contaminated areas, and educate adults and children about why nature matters. They are part of our habitat, and we are glad!

In times when our communities are prone to tearing themselves apart over the issues about which we cannot agree, rather than riding the principles which we share as far as we can take them, beekeepers can make another contribution to a crowded future. We can make friends and take them for what they are, and make other friends for different goals. We could do a lot worse than joining up with people who plant stuff and mind the soil and the water in the best way they know how. A healthier place for people is probably a better place for bees. BC

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

The Voice Of The South

Applauding Good Farmer-Beekeeper Partnerships

In recent years, honey bee health has become a primary focus of researchers in response to several episodes in which commercial colonies were lost in unusually high numbers throughout the U.S. and Canada. These episodes became known as Colony Collapse Disorder (or CCD). Although not fully understood, high bee mortality stemmed from multiple factors that included the parasitic mite *Varroa destructor* Anderson & Trueman (*Varroa* mites), viruses vectored to bees by *Varroa* mites, pesticides, residues of agrochemicals in hives, and poor nutrition.

Although there is no concrete evidence that the high mortality of honey bee colonies in CCD was related to specific insecticides, some people argue that the major cause of these losses must be either a specific class of insecticides, or the global use of all insecticides. Although insecticides almost certainly contribute to the deaths of bee colonies, the current scientific conclusions are that huge losses of bee colonies were due the additive effects of multiple stressors. *Varroa* mites and the viruses that they vector are currently viewed by scientists as the primary killers of bees worldwide.

Generally, there does not seem to be an extensive problem with losses of bee colonies caused by pesticides in Mississippi. Occasionally, there are bee kills from insecticide drift onto bee yards from aerial applicators treating row crops. The frequency of these incidents seems relatively low. However, it is difficult to know if the actual incidence is low because beekeepers are hesitant about reporting such incidents. Many commercial beekeepers fear that they will be asked to move their bees if they formally complain about bee kills from drift. Some of the largest commercial beekeepers in Mississippi say that the problem here is much smaller than in other states.

The potential for great tension between beekeepers and farmers exists in the Mississippi Delta because some commercial beekeepers keep thousands of colonies near soybean and cotton for honey production. These two crops bloom during hot and dry periods when no other major food source is available. Beekeepers often produce large amounts of good quality honey from these crops. Farmers must manage pest populations that could significantly impact their crop yields, and various pesticides are frequently used in these highly agricultural areas. Therefore, there is a relatively high potential for honey bees to be killed accidentally by pesticide applications.

Honey bees provide little benefit to most of the top commodities produced in Mississippi. However, many horticultural products, especially grapes, muscadines, apples, blueberries, watermelons, melons and other cucurbits, clearly benefit from pollination by bees in the state. It is difficult to generalize, but most of these commodities need one to three colonies of bees per acre for adequate pollination. A colony of bees here is defined as at least six to eight standard deep combs covered by adult bees. The usual practice is to place colonies on the ground a week or so before the bloom, and keep the bees there until flowering has finished. Many growers pay the beekeeper for this pollination service (especially true for blueberries, cucurbits and watermelons).

Despite receiving little direct benefit from the pollination activities of honey bees, most row crop farmers understand the overall importance of honey bees to agriculture and do not want to harm honey bees. Additionally, several thousand colonies of honey bees that are kept in agricultural lands in Mississippi are transported every year for pollination service in places like California for the production of almonds. Therefore, factors affecting the health of honey bees in Mississippi can directly influence agricultural production resulting from pollination by honey bees throughout the U.S.

Recently, discussions were held among stakeholders from beekeeping and agriculture to discuss ways to foster a better working dialogue among the state's row crop farmers and beekeepers, all in the spirit of coexistence and cooperation with the hope of affording better protection for honey bees. Deliberations led to the development of a communication effort armed with a set of standards or general operating suggestions targeting the state's beekeepers, farmers, and other pesticide applicators. Although these standards reflect best management practices that have already been identified by many other people, we clearly wanted to begin a dialog between our farmers and beekeepers as a way to better protect (1) honey bees and beekeepers, and (2) the best pest management practices of our farmers. I present our program as a model for initiating the conversation between beekeepers and farmers, who really are more alike than either group realizes at times.

Cooperative Standards of the Mississippi Honey Bee Stewardship Program

A program to be presented for adoption by the following stakeholders: Mississippi Beekeepers Association, Mississippi Farm Bureau® Federation, Mississippi Agricultural Aviation Association, Mississippi Agricultural Consultants Association, Mississippi Department of Agricul-

ture & Commerce, and Mississippi State University Extension Service.

Background

In light of global decline of honey bee populations, discussions were held among stakeholders from beekeeping and agriculture producers to discuss ways to foster a better working dialogue among the state's row crop farmers and beekeepers, all in the spirit of coexistence and cooperation. Deliberations led to the development of a communication effort armed with a set of standards or general operating suggestions targeting the state's beekeepers, farmers, and other pesticide applicators. This general outline is a product of these deliberations and is not intended to account for all aspects of the relationship between cooperators (farmers and beekeepers), but will serve as a basic guideline for *cooperative standards that should exist between row crop farmers and beekeepers when bees are located in or near row crop production areas. Mississippi hopes to be proactive in advancing educational efforts leading to sustainable practices that are beneficial to beekeepers and producers.*

Communication & Education Starts With Everyone

- **Know Your Farmer, Know Your Beekeeper:** Farmers and beekeepers are encouraged to foster a strong level of communication with each other during any cooperative arrangement. Both the farmer and beekeeper should exchange some very basic information with each other. This information includes: *name, phone number, location(s) of hives on the farm property, commodities grown in the fields adjacent to hive locations, and general information concerning insecticides applied on these commodities and timing of these application during the normal growing season.* Cooperators are encouraged to have open dialogue about this information every year to foster that strong level of communication that should exist in such arrangement.

- **Mississippi "Bee Aware" Flag:** The stakeholders involved in the Mississippi Honey Bee Stewardship Program have developed a unified flagging system to be utilized in the state of Mississippi to clearly identify hive locations that are near adjacent fields. The goal of this program is for all beekeepers, farmers, and other pesticide applicators to be familiar with this flag, its use, and application to provide added safe guards to protect bees in areas of pesticide use. The flag would be placed in a location that can be highly visible by farmers operating ground driven equipment or by the aerial applicators. The "Bee Aware" flag will serve as a constant reminder that bees are in the vicinity and care should be taken with insecticide applications. The beekeeper should work with the farmer to select the best area near the hive to place the bee flag so that it is visible by both the ground and aerial applicator.

- **Organizational Outreach Component:** The stakeholders listed above have all committed to educate their respective members on the components of the Mississippi Honey Bee Stewardship Program and advancement of its goal and purpose.

Important Considerations for Farmer-Beekeeper Partners

- **Hive Placement:** In any strong working cooperative agreement between farmers and beekeepers, all parties will discuss proper hive locations on the farm property where the bees will be kept beforehand. The farmer knows the property and can best help mitigate damage from farm equipment and other obstructions. The beekeeper knows the best honey bee habitats and can help select an apiary location that: (a) uses natural barriers such as tree lines to mitigate against exposure to insecticide drift, (b) will best facilitate the entrances to hives from directly facing fields, and (c) are not too close to the immediate edges of fields. Beekeepers should discuss the bee yard or apiary location with the farmer and come to an agreement that works for both parties.

- **Hive Identification:** The beekeeper should have a placard posted on a prominent hive or sign within an apiary that clearly identifies the owner of the hives with emergency contact information. This placard should be highly visible from a distance.

- **Bee Flag Placement:** The beekeeper should work with the farmer to select the best area near an apiary to place the bee flag so that it is visible by both ground and aerial applicators.

- **Everyone Should Know Apiary Locations:** Both the beekeeper and farmer should generate and review a comprehensive list of all apiary locations that occur on the farm property annually. This is especially important if hives are moved from more traditional locations of several years to newer locations. It might even be helpful to pencil in the apiary sites onto a map.

- **GPS Locations:** It is encouraged that beekeepers provide GPS coordinates to the farmer and his applicator to show exact locations of hives on the farm property.

- **Notify Ground & Aerial Applicators of Hive Location(s):** The farmer will make his employees (or other contractual parties) aware of all apiary locations and the associated bee flags on the farm property and will notify his aerial applicator (if applicable) of apiaries on farm property as well.

- **Timing of Insecticide Applications:** When possible, farmers should consider *applying insecticides as late in the afternoon as possible on fields that are immediately adjacent to hive locations.* Selecting this time to apply insecticides in sensitive areas near hives will help mitigate many risks of bee damage. Further, farmers and applicators should always follow label guidelines when applying

insecticides and other pesticides, and treatments should be made only when pests reach economic threshold levels.

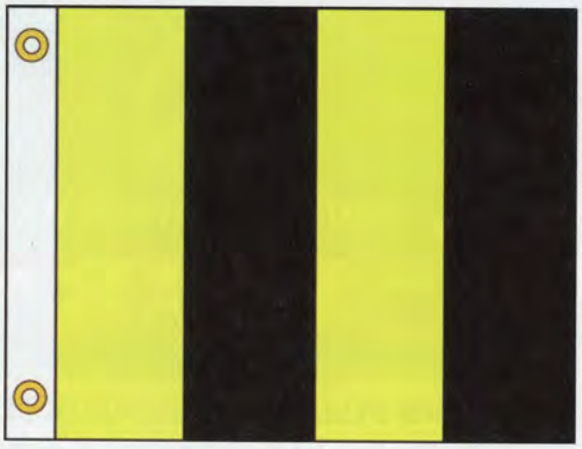
- **Wind Direction:** Insecticide applications should only be made when winds are blowing away from the hive location(s).

Contact Information:

For specific questions concerning the MS Bee Stewardship Program, contact: Dr. Jeff Harris, MSU Extension Apiculturist, 662.325.2976, **jharris@entomology.msstate.edu**; Dr. Angus Catchot, MSU Extension Entomologist, 662.325.2085, **acatchot@entomology.msstate.edu**

More about the Bee Aware Flag

A flagging system had already been developed for protecting non-herbicide-ready crops from the drift of herbicides during aerial applications in the Delta. The flags are brightly colored and patterned, and they are attached to bicycle flag staffs made of fiberglass. The staffs are eight to 10 feet tall, and they are positioned on boundaries of fields to warn aerial applicators when to turn off the nozzles. The pilots can readily see the flags, and the height of the flags ensures that they are visible when the row crops have grown tall. The flags are placed into rows and not the tire ruts used by ground applicator rigs or watering sprinklers so that the wheels of the machinery do not crush or knock down the flags. The fiberglass staff allows the flags to bend as a sprinkler or rig passes directly over it, and once the machinery advances, the flags pop back to the original vertical position. We plan to issue out more than 300 flags in the upcoming season to help identify apiaries located near row crops in the Mississippi Delta or other agricultural areas.



The "Bee-Aware" flag serves as a signal for pesticide applicators that honey bees are nearby. Flags will be flown so that they are visible to ground and aerial applicators of pesticides. The goal is to increase the visibility of apiaries to applicators in order to reduce accidental drift of pesticides onto hives.

This plan of cooperation between farmers and beekeepers is only a beginning. It certainly cannot mitigate all aspects of pesticide and honey bee interactions, but the dialog and initial effort at protecting honey bees from acute toxicity from insecticide drift is important. Dr. Angus Catchot tells me that more than 85% of all insecticide applications in the Delta are done by planes. I do not have firm numbers, but there are probably at least 8,000 – 10,000 colonies of bees kept there as well. BC

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

Connie's Bee Culture Interview –

The Brown Family

Homesteaders, Foragers, Locavores, Sustainable Living

Although this article was initially about my beekeeping niece, Wendy Brown, it came to feature the Brown family and their homesteading, foraging, locavore, sustainable lifestyle. They enjoy rich, fulfilling, purposeful lives that bring true satisfaction. Their simple, frugal way of living is an example for others.

The Browns left behind a comfortable middle class lifestyle to become as debt-free and self-sufficient as possible by homesteading on their quarter acre lot in suburban Maine. Achieving this goal requires the support of all family members, which includes Eric, Wendy's husband, who works full-time as an electrical engineer in his hometown of Biddeford, Maine, and their three daughters (Kaya, Etain, and Tehya) under the age of 16, who willingly gave up cable and television.

Eric, an accomplished actor, has a private pilot's license and is very close to earning a commercial one as well. He has completed a shaman apprenticeship and advanced shaman studies, and is studying ballroom dancing and guitar.

Shortly after buying the house, the Browns began gardening and raising small livestock (rabbits, chickens, and ducks) for meat, eggs, and fur. Sometimes, the girls have sold extra eggs to neighbors. The surplus is also traded for other foods the family doesn't raise.

In recent years, the couple added bees to their livestock with the expectation that these would provide honey and pollinate the fruit trees. As the Browns have done with all of their homesteading projects, the couple spent much time learning about beekeeping before getting a hive.

The three hives are located in the fenced backyard. Wendy says, "We bought one package. The other two hives were swarms that we caught." The couple chose top bar hives, which they hope will experience fewer problems than Langstroths and be less apt to alarm the neighbors.

During a recent visit, their young grandson was fascinated with the bees and became determined to hold one. The family dissuaded him from doing so for fear he might have an allergic reaction to a sting.

Wendy says, "The girls are all interested in being out there with us when we're taking care of the bees . . . Most of our working with the bees is pretty controversial. We do not have any protective gear. We don't smoke the bees, either. We use sugar water, and so far, it's worked out pretty well. Eric has been stung a few times. (Only one other family member has been stung while outdoors.)

"I help with things like installing the packages and wielding the spray bottle filled with sugar water. Eric is primarily responsible for the hives' general maintenance . . . We check the hives a couple times through the season to be sure they are building brood comb and honey stores.

"At the end of the season, we will move all of the honey to one side of the hive so that the bees can work their way through the honey and have enough food to get through the Winter.

"We've planted a lot of bee-friendly plants. (Bee forage is also available in the neighbors' yards.)

"From one hive – we harvested 20 pounds of honey (some of which was used for mead). Until this year, we only had one hive, and so we didn't really have a surplus (to sell).

"The only problem we've had is overwintering. We will wrap the hives in foam. The top bars need to be protected from moisture and winds.

"We're not in it for a short-term gain and neither are we looking for some financial profit. We are investing in the future of our homestead and every little thing we can learn to do for ourselves now will make us more comfortable later."

Wendy's advice to prospective

The Brown Family – Eric, Wendy, Kaya, Etain and Tehya.

Farm dogs taking a break.

Eric and Wendy working on one of their hives.

beekeepers is simple, "Read a lot! Find a mentor – someone local. Don't be afraid to make mistakes, because you will, but if you allow the fear of failure to keep you from trying, you've already failed."

The family conserves water and uses rain barrels. The Browns practice forest farming and permaculture methods. This means they choose woody plants or perennials that provide medicine, food, or other useful material for the household.

The rabbits produce manure for the garden, which supplies many of the household's veggies and herbs as well as some berries and nuts. The fruit trees are still too young to be fully productive.

Their space-saving gardening techniques include potato towers and espaliered fruit trees. Raised beds help to minimize garden chores.

Foraging edible plants and hunting supplements what the family produces. For years, the Browns have made maple syrup and maple beer and collected enough apples from wild, neglected, and abandoned apple trees in their area for wine and cider.

Foraging need not mean a boring diet of greens. Imagine spruce and eastern hemlock beer, dandelion pesto, acorn-honey pie, milkweed pod lasagna, and pickled milkweed pods. These recipes and ideas appear in the couple's recently released book from New Society Publishers, "*Browsing Nature's Aisles – A Year of Foraging for Wild Food in the Suburbs.*"

Wendy says "That book is based on the presentation we had given at the Mother Earth News Fair the previous year. We both wrote all of it together. We were hoping that the book would come across as one voice."

Eric, who has a hunting license, has taken up bow hunting. He mostly gets turkey. Extra meat and broth is canned. Wendy explains, "He does hunt deer, but hasn't got one. Kaya, 16 is also proficient with a bow. She hasn't gone hunting yet."

Food preservation is a key part of the family's approach to self-sufficiency. In addition to home-made vinegar, sauerkraut, applesauce, and jams/preserves, the Browns also dry, can, freeze, and pickle other foods they've foraged or produced.

As avid locavores, the family participates in the Eat Local Challenge in their community. Dairy products and some meat and fresh produce come from local farms. Their heat source is also local. Instead of using the oil furnace, the Browns installed a woodstove, largely powered by free local wood that they split and cut by hand into firewood. Some foods, particularly soup and water for tea, are cooked on the stove during Winter.

For Wendy and Eric, self-sufficiency means developing the skills and resources needed to be truly independent should it become necessary to live off the grid due to power disruptions and the like.

They've learned to make bread and soap and dip candles using left-over wax from burnt ones. During extended power outages, their solar-powered devices still work as well as the non-electric wringer washer – purchased with such events in mind. The family has no clothes dryer.

In the same vein, Eric also tans furs and hides. Rabbit fur makes good mittens and other items for the household.

Fiber comes from the angora rabbits and chow chows. Wendy hopes to get a spinning wheel someday. Meanwhile, one daughter has learned to use the age-old drop spindle. Wendy has a scarf Kaya knitted from chow hair, which was spun locally.

The daughters are tremendously helpful when it comes to homesteading. Wendy says, "The girls love spending time with their rabbits and chickens and helping Mom in the garden and kitchen."

Each daughter has a garden plot where she can grow whatever she chooses. Etain (12) says, "My garden is doing great this year! I have growing in my garden nasturtiums, fennel, radishes, dill, lettuce, and poppies."

These youngsters are quite accomplished, talented, resourceful, well-mannered individuals. They present their own plays using the family's marionettes. Wendy reports, "I've taught them to sew and knit, and Kaya can knit better than I now. She taught a class on setting up a home aquarium last year to home-schoolers." One daughter, who makes buckskin pouches, was asked to make extras for a vendor at their local farmers' market.

In addition to Girl Scouts and 4-H, the daughters have taken dance and music lessons for years, and are quite good at both. Wendy says,

Swarm in the hive.

"Kaya even teaches a dance class." Etain, a violinist/fiddler, was asked to perform at a TEDx event in their area.

All of the youngsters are home-schooled, including another daughter from Wendy's previous marriage who graduated from home-school in 2006. When it comes to their education, the girls are in good hands for both parents have undergraduate degrees.

Wendy, a former public school teacher in Kentucky, is a certified teacher in Maine. She works as a teacher/evaluator in the local home-schooling community.

Family members and others in the community support the parents' home-schooling efforts. The couple has also hired teachers to teach certain classes and signed their daughters up for numerous outside classes, such as math/junior engineering sessions at the local college. Judging by the results thus far, the Browns' home-schooling efforts have been very successful.

One of the traits I admire most about Wendy is the fact she is adventuresome and unafraid of change. Perhaps, her resilience developed when she moved around a lot during her childhood (her father was in the military).

When the girls were young, Wendy was a stay-at-home-mom. Later, she had a home-based business and worked as a transcriptionist and a virtual assistant. She is a notary public and performs weddings.

Wendy and I share several interests, including sewing and crafts. She sews the costumes for the daughters' dance recitals. We love history, reading, and literature, and have huge libraries.

Wendy has had a blog for years. Ever since she was a child, she wanted to write a book. Her first one, released in 2011 by New Society, was "*Surviving the Apocalypse in the Suburbs – the Thrivalist's Guide to Life without Oil.*" According to Wendy, the support of her family made this possible.

The Brown Family chicken yard.

That title was followed by the foraging book. A casual conversation over a meal with an editor at the recent Mother Earth News Fair could possibly lead to a series of magazine articles on foraging by the couple. This is the second year they gave presentations at the fair.

Although the transition to a homesteading, sustainable lifestyle has largely been a smooth one, a few outcomes were less favorable. Unfortunately, local officials won't grant permission for the Browns to build a solar-heated greenhouse on their property. This could have provided fresh, home-grown foods all Winter.

Although the couple successfully grew portabella, shitake, and blue oyster mushrooms, they view this project as unsustainable since one must buy a new batch of spores each time. Unaccompanied by an experienced clammer and lacking the proper clamming tools, they went clamming for the first time and got enough clams for chowder. However, the venture emphasized the need for proper preparation when foraging. BC

Connie Krochmal is a writer and beekeeper in Black Mountain, NC.

12 Honey Ideas –

There sits a jar of honey. What to do with it? Well, perhaps after reading this you will have to use a much larger jar. Remember – these are *just* 12 things – you will think of many I have missed.

1 Put it on a hot biscuit. Don't fuss. Biscuits are very easy to make, especially if you choose to make drop biscuits. They save all that rolling out and cutting and the texture and flavor are exactly the same as the rolled out and cut ones. The biscuit needs to be hot so the honey oozes into all the cracks and crevices making every bite totally delicious.

2 Fix a cup of hot tea to accompany your hot biscuit with honey. Sweeten the tea with a spoonful of your honey. Honey, hot biscuit and tea – what a perfect snack for a January day.

Yes, those are the two ordinary things to do with honey. But they are so enjoyable. Now let's go on to some other uses.

3 Honey is a perfect ingredient for baked goods. Use a recipe that has been written for honey to insure success.

HONEY COOKIES

1 cup honey
1 cup butter
2 eggs
1 teaspoon vanilla
2-1/2 cups flour
3 teaspoons baking powder
1 teaspoon salt

Cream honey and butter until light. Add eggs and beat until light creamy color. Add vanilla and dry ingredients. Beat until well-blended. Drop from teaspoon, leaving room for batter to spread. Bake at 375° for 12 to 15 minutes.

The Honey Kitchen ed. Dadant

4 Oh oh – with all that baking you just did you were careless and got a nasty burn on your forearm. Perhaps it formed a blister. Honey to the rescue! Apply honey to the burn site. You can cover it with a loose bandage so you do not get your clothes sticky. You can reapply honey at any time. There is no need to clean the burn site before adding more honey. Doctors around the world have been using honey on burns for a long time. Honey does not leave scars.

5 Make honey part of your exercise routine. Some of you like to go jogging several times a week. Others prefer a good gym workout. And for those who prefer couch-potatoing perhaps the lure of delicious honey would get you up and running. A spoonful of honey, taken before exercise, helps those muscles store energy. During exercise you need to drink water to keep your body hydrated. So add a spoonful or two of honey to your bottle of water. Every sip will deliver that energy you need. Don't stop now. After exercise your body needs to recuperate. So have another spoonful of honey to restore those tired muscles. Think honey before, during and after exercise. No, just getting up off the couch is not exercise.

6 It's wintertime. That means it is head cold, sore throat and cough season. Once upon a time – before modern medicines – honey was an important part of cold treatment. In fact many people only bought honey for treating wintertime coughs and sore throats. Well, perhaps they used some in tea and on biscuits. A small spoonful of honey does soothe a sore throat.

Although drug store shelves are lined with various cough medicines, a study, done in 2007, by the Penn State College of Medicine found that a spoonful of honey before bedtime decreased nighttime coughing, especially in children. The study used buckwheat honey but if not available try your own local honey. *However, do not feed honey to children under one year old.*

Just think! Medicine that naturally tastes good! So make a place for it in your medicine cabinet as well as in your kitchen.

7 Make mead! Mead is said to be man's oldest alcoholic beverage. I think that with today's interest in wines mead could indeed compete very well with other table wines. Mead can be a dry dinner wine, a sweet dessert wine, a sparkling wine and a flavored wine.

You can make all the types of mead for your own use. Who knows – you may even expand into producing it commercially. However, you will have to find what the alcohol beverage laws of federal and state are before you give or sell even one bottle.

Books on mead making are few. Perhaps the best comprehensive book is *The Compleat Meadmaker* by Ken Schramm (2003). It is inexpensive and available both in paperback and Kindle. The book discusses fermentation problems as well as the various types of mead.

If you prefer making beer you can indeed use honey. For information you can visit the National Honey Board website, **www.honey.com**, and open up Honey in Commercial Products, then click Food and Beverage Formulations. Here you can find information on mead also, and for hard cider. True hard cider is a delicious beverage, sweeter than beer but still not too sweet.

Of course honey can be used in non-alcoholic beverages, too, since it mixes well and leaves no gritty granulated sugar in the bottom of the glass.

8 Honey can be used in many cosmetics, such as shampoos, skin care, scrubs, baths, and lotions. You can use just plain honey to give a soft soothing feel to your hands. Rub them with some honey – yes, you will be very sticky for a while – rinse off and gently dry. You probably have noticed how nice your hands feel after extracting your honey and getting your hands quite sticky.

Put a teaspoon of honey into four cups of warm water and use as a rinse after shampooing. You can also use this rinse after giving your dog a bath. Hair, yours and the dog's, will feel and look silky and shiny.

Caution! Do not use this and then go out to your beeyard! Your bees will find your hair very interesting.

If you want to know how well bees can smell try this simple experiment on a nice sunny, warm morning. Put a teaspoon of honey on a saucer and place on your picnic table. Note the time. Watch for the first bee visitor. Note the time. Those bees can be quite quick.

HONEY-AVOCADO FACE MASQUE

2 tablespoons honey
2 tablespoons dry buttermilk powder
¼ of a medium avocado, mashed

Combine ingredients and stir until smooth. Cucumber purée may be substituted for the avocado, using ¼ cup purée. Avocado is good for dry skin, while cucumber is better for oily skin. Makes enough for one application.

A Honey of a Cookbook
Alberta Beekeepers Association

9 I am certain that you have customers who request local honey for their hay fever allergy. I even had a customer who fed it to her dog who seemed to be allergic to Springtime pollens. Never make any health claims to your customers. If honey helps their allergies then they benefit. If it does not help, at least it tastes good.

10 Honey can play an important part in the life of diabetics. Of course diabetic people must follow the recommendations of their physicians but honey can be important in two ways. For those whose sugar level is hard to control a dose of honey can help by providing instantly digestible sugars.

In addition, elderly diabetics frequently have non-healing ulcers, especially on feet and legs. Poor blood circulation delays healing. Topical antibiotics do not seem to help. However applying honey topically on the ulcers speeds healing. As with burns, a loose bandage protects clothes.

11 Yes, you can purchase a food-grade lubricant for your extractor gears and bearings. Have you ever tried honey as a lubricant? It works just fine. Pour a little on the clean gears and a little on the bottom bearing. These places will, of course, get honey on them as you spin the extractor but an initial dose makes starting up much easier. What could be better than using honey to make honey?

12 In some ways this use of honey could be the most important one of all. Since honey is probably the best food for honey bees, could you put a few frames of honey in your freezer – for the bees!

Feeding bees during the Winter is difficult. In many parts of the country the bees are clustered. Feeding syrup means water is being introduced into the hive and may contribute to moisture problems. Bees have to move to the syrup container, perhaps not possible in bitter cold conditions.

It is possible to slip a few frames of honey into a hive, next to the cluster after removing some empty ones. The frames provide food – honey, and insulation – the comb. The 'filling station' bees can then move only a short distance to obtain honey for the cluster. Please remember that these frames must come from healthy colonies.

Perhaps you had some frames of honey that is bitter or otherwise not good market honey. What better use for that honey than a winter banquet for your colonies. Just think – honey used to keep bees well fed and healthy.

There you have 12 ways to use honey. Add your uses to the list. Thank your bees and hope for a bigger crop of honey in 2014. BC

Ann Harman keeps her bees and comes up with new ways to use her honey at her home in Flint Hill, Virginia.

How To Make A Wax Dandelion

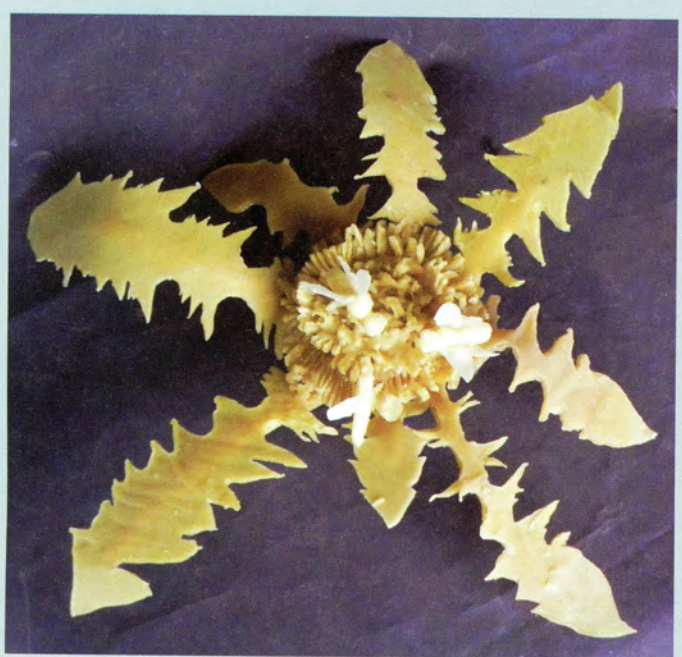
Rose Marie **Lee**

Many think of the dandelion as an unwanted weed. But I chose to make a beeswax dandelion to enter in the Art Design category at the 2013 Kansas State Fair because it is one of the earliest nectar sources for the honey bee. It is also a harbinger of Spring because it does not appear until the ground temperature is frost free.

I remember going out in the early Spring with my grandmother to gather leaves which she fried in bacon fat then added a milk gravy. She topped the dish with slices of hard-boiled egg. In her newsletter, "Weed Wanderings," Herbalist Susun Weed, writes that dandelion leaves contain abundant vitamins, (especially A, C, K, niacin, and riboflavin), and minerals, (calcium, potassium, iron, and manganese). They also contain beta carotene and lecithin. Grandmother's "greens" were indeed welcome after a long winter of pale canned green beans or peas (we lived in a rural area without access to fresh vegetables and before home freezers).

Weed explains that the dandelion nourishes other plants through its long tap root which brings minerals and nutrients from less contaminated parts of the soil to the surface where they are used by shorter roots of neighboring plants.

Fall is the time to dig the roots to grind and roast to make caffeine-free coffee. Its medicinal use includes easing the pain of bee stings by applying the white fluid from the stem.



Wax dandelion.

How to Make a Wax Dandelion

The techniques in forming the wax into a flower were gleaned from Chapter VI, "Beeswax Flowers" by Elizabeth A Duffin in the book *Beeswax Crafting* by Robert Berthold, Jr (Wicwas Press, Cheshire, Ct, pp 55-65).

Criteria: Entries must be minimum of two pounds of 100% beeswax; no non-beeswax enhancements (wire, etc) allowed; may be cast in mold or carved; may be more than one piece but must be firmly joined together.

Equipment:

- Two pounds of beeswax
- A Pyrex measuring cup set in water in which to melt the wax (about 144°F.)
- Piece of wood (about nine-by-twelve-inches) to pour wax onto to make wax sheets
- Rectangular pan of cool water for sheets of wax to slide onto
- Heating pad to make cooled wax sheets pliable enough to cut easily
- Nut pick to cut wax from leaf template
- Exacto Knife, upholsterer's pin, nut pick or wooden scribe to cut shapes
- Soldering Iron, 25 watt
- Table Knife, as form for bee wings

Step 1. Study dandelion plant. Make blossom about three inches in diameter so that bee is about 1.5 inches long, otherwise bee will be too small to be seen. Of course, this makes the blossom too heavy to be supported by a delicate wax stem. Must set blossom on a wax base and secure leaves to the base with heated wax.

Equipment. ⇨

Taraxacum officiale.

Step 2. Blossom. Pour wax in cup for base. Cut strips about one-half-inch wide and snip every quarter inch with scissors. Lay strips in circles and "weld" with wax onto base, each strip a little higher than the preceding to create a mound of petals. Protect from dust, etc, for the blossom is nearly impossible to clean – too many small crevices, etc.

Step 3. Make sheets of wax by pouring melted wax onto a piece of plywood that has been soaked in water Like water behind wallpaper, the wax sheet is released when the wood (with wax) is dipped into the water

Make wax sheets.

Step 4. Cut wax leaves using plant leaf as template. Try to make all leaves about the same thickness. Varying shades of wax and thickness adds interest. Polish leaves with nylon hose to add shine and take time to clean (Windex works well.) because this is your last chance. Once in place, it is difficult and leaves can be dislodged, etc.

Step 5. Shape "candles" or strips of wax to serve as stem to support leaf. "Weld" stem onto back of leaf with additional wax, blending in place with heat gun. Need just enough heat to soften wax so it is pliable but not to melt. May have to unplug gun temporarily to cool it to warm. This process takes patience to allow stem to harden enough to support leaf, and may have to be repeated adding additional wax. Finally, attach leaves to base. Again, patience until leaves are securely attached to base.

Harman bee on dandelion.

Cut your leaves.

Wax bee.

Step 6. Make bee. Study bees and try to duplicate by molding pliable wax with hands until desired shape is attained. Make legs and antennae out of tiny strips of wax (Exacto knife works well to cut these) and, very carefully, "weld' onto the bee's body in appropriate places. The basic shape for the wings is made by moistening the blade of a table knife with detergent, then dipping it in melted wax. Let cool slightly, then slide wax off. The piece will have two sides so gently separate. Trim to make desired wing shape and while wax is still slightly warm, gently massage to make wax as thin as you want it. For delicate-looking wings, the thinner the wax, the better. Finally, very gently, "weld" wings onto bee.

As a precaution, I carefully placed crinkled tissue under the leaves to gently support them. My wax design withstood the 200-mile trip to the Fair in Hutchinson over many railroad tracks and potholes and even a stint in the hot car at about 95 degrees for an hour or so. BC

Bruce's dandelion case.

Those White House Bees

2013 Was A Pretty Good Season

Kim **Flottum**

While attending the Maryland State Beekeepers Association meeting in November I had a chance to catch up with Charlie Brandts, the beekeeper at the White House. Since he retired from his position there he works with Susie Morrison and Bill Yosses, Pastry Chefs in the White House kitchen, to maintain the hive on the White House grounds so he doesn't have to visit quite as often. It's always good to have patient, experienced hands on location to keep an eye on things. That's good since his own operation has grown considerably these past few years and his time, like all of us, gets shorter and shorter.

The Queen that's in the White House hive is one of Charlie's "Maryland Mutts" as he calls her. He raises queens each Summer and is selecting for various traits from his stock, while bringing in new material on occasion. The "Mutts" have been doing OK, and he is comfortable with their performance and their heritage. The colony this year seems to not have a tendency to swarm, so managing that was easy, which makes honey production management easier – not easy, but easier.

And the colony seems to have done pretty well this season, even though many in the area weren't quite so productive. Charlie was able to manage three harvests during the active season, with a grand total of 283 pounds overall. Susie and Bill helped, and they extracted and bottled the crop in the basement as usual. The early honey was similar to spring honeys produced there every year, but this year, after the basswood flow, there was a darker crop that was very pleasant, with a fruity flavor and a nice, mild finish. It's used for everyday cooking, as gifts for guests, and some went to the folks at the UN General Assembly this year. International exposure for the crop made by those White House bees.

Charlie's other hives weren't quite as productive this year, but not bad overall. He's involved in a research project on keeping bees on a city rooftop in the downtown area, and had pretty good luck there, even though there was some moving around due to roof repairs. An uneven flow that quit early still produced over 100 pounds in those colonies, with one producing 140 pounds. The downtown DC area seems to be a pretty good place for bees, no matter where, no matter how high.

One of the things he's found after several years of trials is that his management style works better with 10 frames than the eight-frame equipment the author of a popular beekeeping book promotes. eight-frame management is touchy he says, the timing for swarm management needs to be a lot more fine-tuned.

They want to go, it seems, sooner...as soon as they have capped brood they are out of here...they build fast and when there's no room....gone. So, it's back to the standard size.

Varroa management for the White House hive still remains strictly IPM without chemicals, in line with the Organic garden that's there too. But Charlie's bees need a bit more because they are managed a bit more intensely for honey production, queen production, but not mite production. When tests (Charlie's bees are part of the BIP program run by Dennis vanEngelsdorp and Karen Renick) indicate that if mite populations approach the treatment level a treatment should be made so the colony continues to thrive. When necessary, the current formic acid treatment is used, but there's always questions – outside temperature, ventilation, screened bottom board open or closed, a ventilation shim and inner cover, and should the front door be open or closed. He's worked around all these questions with the BIP people, and the formic suppliers and seems to have arrived at a way to make it work, on time, so mite levels are acceptable and honey bee health remains good.

His bees this year made about 700 pounds of honey this season, down from the 2000 he made in 2011, but it's been a buildup year with a lot of packages brought in this Spring. And packages always are an unknown. Some had queen issues, some had mites and these needed attention and took their toll on honey production, but combining some and splitting others seems to have resolved the major issues. But now it's Winter and that has its own set of issues.

Another season for those White House bees...Thanks for the update Charlie. BC

GLEANINGS

JANUARY, 2014 • ALL THE NEWS THAT FITS

WEEKLY ETHANOL PRODUCTION FOR 11/22/2013

U.S. WEEKLY ETHANOL SUPPLY-DEMAND (ANNUALIZED)

And you wondered where all that corn went.

Here is the weekly ethanol production data for the week ending 11/22/2013.

According to EIA data, ethanol production averaged 927,000 barrels per day (b/d) – or 38.93 million gallons daily. That is up 23,000 b/d from the week before and tied for the highest output rate of the year. The four-week average for ethanol production stood at 915,000 b/d for an annualized rate of 14.03 billion gallons.

Stocks of ethanol stood at 15.0 million barrels. That is a 0.4% decrease from last week and the lowest since EIA began reporting weekly data.

Imports of ethanol were zero b/d for the eighth straight week.

Gasoline demand for the week averaged 374.2 million gallons daily.

Expressed as a percentage of daily gasoline demand, daily ethanol production was 10.41%. That is the highest percentage since June 2012.

On the co-products side, ethanol producers were using 14.056 million bushels of corn to produce ethanol and 103,456 metric tons of livestock feed, 92,232 metric tons of which were distillers grains. The rest is comprised of corn gluten feed and corn gluten meal. Additionally, ethanol producers were providing 4.83 million pounds of corn oil daily.

BRAND NEW U.S. CITIZEN

Long, long, long time contributor to *Bee Culture* magazine Alan Harman, who has lived in Australia, Ireland, Canada and probably other places we aren't aware of, and now lives with his wife Barbara, in Michigan, recently became a U.S. citizen when United States District Court for the Eastern District of Michigan Judge Gershwin Drain performed the swearing in ceremony.

Congratulations Alan!

BUSTED! LARGEST FOOD FRAUD EVER!

Texas honey broker Jun Yang was sentenced to three years in federal prison for illegally brokering the sale of hundreds of container loads of Chinese-origin honey in one of the largest food fraud schemes uncovered in U.S. history.

The honey was misrepresented as originating from India or Malaysia, to avoid anti-dumping duties when it entered the United States.

He was ordered to begin serving his sentence on Jan. 15, 2014, by U.S. District Judge Charles Kocoras, who cited the "inescapable harm" to the U.S. honey industry in imposing the sentence.

Yang, 40, of Houston pleaded guilty in March to facilitating illegal honey imports by falsely declaring the honey originated in countries other than China to avoid $37.9 million in anti-dumping duties. Yang operated National Honey, Inc., which did business as National Commodities Company in Houston, and brokered the sale of honey between overseas honey suppliers and domestic customers.

Yang has already paid financial penalties totaling $2.89 million to the government, including a maximum fine of $250,000, mandatory restitution of $97,625, and agreed restitution of $2,542,659.

Gary Hartwig, Special Agent-in-Charge of Homeland Security Investigations (HIS) Chicago says the jail time is a significant sentence against a perpetrator of one of the largest food fraud schemes uncovered in U.S. history.

"Unbeknownst to Yang, he was dealing with an undercover HSI agent who was one step ahead of his illegal activities," Hartwig says.

Court documents show Yang caused transportation companies to deliver to U.S. honey processors and distributors 778 container loads of honey, which were falsely declared at the time of importation as being from Malaysia or India, knowing that all or some of the honey had actually originated in China.

As a result, the honey, which had an aggregate declared value of nearly $23 million when it entered the country, avoided anti-dumping duties and honey assessments totaling more than $37.9 million.

Yang also admitted that he sold purported Vietnamese honey that tested positive for the presence of Chloramphenicol, an antibiotic not allowed in honey or other food products.

After learning of the unfavorable test results, Yang obtained new test results that purported to show that the honey was not adulterated, and he instructed the undercover agent to destroy the unfavorable test results. This adulterated honey was seized by the government.

Alan Harman

Alan Harman.

NOT A GOOD DAY

The British Beekeepers Association says 2013 honey rose to 24.7 lbs. a hive, three times as much as the 8.1 lbs. last year, but still remains well below the long-term average/

The association says the annual survey indicates the disastrous cold winter of 2012 may have had one positive outcome – causing a reduction in the impact of the *Varroa* mite.

Varroa lays its eggs in bee larvae cells, feeding off the larvae as they grow. The cold, late Spring in 2013 meant queens delayed laying eggs, so *Varroa* died off with no new brood to feed on.

Many beekeepers reported that brood-raising by colonies began much later than normal and when laying did start, it was in unusually high quantities supported by ample quantities of nectar and pollen as flowers blossomed strongly in the warm summer weather.

Respondents indicated a late Spring and warm early Summer produced an intense nectar flow which the bees were able to gather and which helped the recovery of many apiaries.

But there were significant regional variations in honey production with the highest yields in England in the East region and the lowest in London.

One in 10 beekeepers reported taking no honey crop in 2013, being extra cautious in leaving more stores than usual with their bees ahead of what could turn out to be another long, wet Winter.

The says last year's yield is still relatively small per hive compared with 20 years ago when data indicates a beekeeper would expect a hive to produce at least 40 lbs in an average year.

"It is nevertheless an encouraging recovery after the disastrous summer of 2012 which, according to the BBKA's records, saw the lowest honey production," the association says.

There were large variations by region in honey production, which may reflect differences in weather as well as differences in the amount and variety of forage available for honey bees to feed on.

London beekeepers, 10% of whom keep their hives on rooftops, saw just 18.7 lbs of honey a hive this year, whereas beehives in the Midlands produced 26.4 lbs. each, the South East 27.1 lbs. and Scotland (included for the survey for the first time) produced 34.8 lbs. each.

"Next year will show more clearly any long term effect from the cold winter of 2012, the effects of the warm summer this year and the longer term recovery of colonies," the association says.

Association chairman David Aston says it's clear the bees have appreciated the warm summer.

"We hope that all the work put in by beekeepers to support their colonies this year will result in lower over-winter losses and that our bees will emerge next spring ready to carry out their vital role as pollinators," Aston says.

The survey also found that beekeeping is a surprisingly social activity, with 59% of respondents taking part in a social activity related to beekeeping in the past year, and 56% taking part in some form of training.

Even among beekeepers with 15 or more years of experience, 54% attended training in the past year.

The survey results were based on responses from 2,581 beekeepers in England, Wales, Northern Ireland and Scotland. *Alan Harman*

MORE MANUKA SOLD THAN PRODUCED

New Zealand's now fearful manuka honey industry is warning "the British are coming, the British are coming" as its braces for a critical British Broadcasting Corp. television expose of counterfeit product flooding global markets.

Fairfax Media reports BBC investigator visited New Zealand interviewing people for a program expected to claim some manuka honey being sold to British consumers is little different from ordinary, and far cheaper, British table honey.

Manuka honey's active rating, known as its UMF quality rating is a measure of its stable, non-peroxide anti-bacterial properties, sought-after for dressing wounds and as a health food.

It honey sells in the UK for up to £49.99 (US$81.78) for a 500-gram (17.6-oz.) jar.

But the BBC testing of manuka honey bought over the counter in the UK has found some sold as "active" is no more active than lower-priced clover honey.

The BBC investigation comes after the UK Food & Safety Authority issued a warning about the authenticity of much manuka honey sold in the UK, in part because it appeared more was being sold there than was produced in New Zealand each year.

All manuka honey comes from New Zealand and Unique Manuka Factor Honey Association research shows 1,700 tonnes produced each year.

But 1,800 tonnes of "manuka" honey is sold in Britain alone each year with as much as 10,000 tons sold worldwide.

Chief executive Brett Hewlett of Comvita, one of the biggest manuka honey exports says, tells Fairfax Media that UK consumers are being mislead.

"It makes us look stupid," Hewlett says. "There's a real need for the government to get off the fence in order to protect the reputation of NZ as a trade partner. The manuka industry has shown it is incapable of policing itself."

The Ministry for Primary Industries is was considering guidelines for labeling manuka honey. Once the guidelines are in place, it will assess whether regulation is needed, and what form it might take.

Ministry resource management and programs Deputy director-general Scott Gallacher says New Zealand takes the credibility of its products very seriously and consumers had a right to expect products to be accurately labeled.

"MPI is aware that there is some confusion about the definition of manuka honey and what are appropriate label claims," he says.

Alan Harman

MORE ILLINOIS BEEKEEPERS

There has been a 38% increase in the number of registered Illinois beekeepers.

Agriculture Director Bob Flider says the sharp rise bodes well for the future of the Illinois State Beekeepers Association, which held its 122nd annual fall meeting at the Illinois Department of Agriculture headquarters in Springfield.

"Things are definitely looking up in the beekeeping community," Flider told the meeting. "Almost 700 beekeepers registered with the department for the first time this past year. As a result, the number of active, registered beekeepers in the state now totals more than 2,500."

They manage more than 24,000 colonies.

Flider reaffirmed his agency's commitment to help manage and protect honeybee colonies, saying despite significant budget challenges the department has filled a vacant position and now employs a full complement of eight apiary inspectors.

"Since joining the department, I've become aware of the importance of Illinois' apiary industry and the contributions of honeybees to our environment and economy," Flider says.

Alan Harman

BEES NEED ENOUGH GOOD FOOD, ALL OF THE TIME

At a first-of-its-kind meeting in Sacramento, beekeepers, farmers and representatives of public and private organizations gathered to discuss how to improve honeybee populations by allowing beekeepers access to more sources of bee forage.

During the meeting, held at the CA Farm Bureau Federation, beekeepers and bee experts said increased access to forage on both public and privately managed lands would promote the long-term health and sustainability of managed honeybee populations.

CA State Beekeepers Association President John Miller, from Newcastle, described the past 30 years in the bee business as "tumultuous."

"We're at a juncture here where we must address some fundamental issues of forage and access," Miller said, thanking those who attended the meeting for efforts to "collaborate and work on a toolbox of access and forage that might enhance the ability of honeybees to find clean forage, safe forage, and recover from the many challenges they are experiencing."

CFBF President Paul Wenger said that, as an almond grower whose crop depends on bees for pollination, he knows firsthand the importance of honey bee health.

"This is a key issue, not only to the bee industry, but also to those of us who depend upon the bees to produce a crop. The general public is also concerned about pollinator health, because we know how dependent our food supply around the world is on bees," Wenger said.

Miller noted the national number of beehives has shrunk to less than half of what it was 70 years ago and the 2013 honey crop could be the smallest ever recorded.

"We're actually losing this war," he said. "We can do better. We have to do better."

Eric Mussen, an apiculturist with the Univ. of CA, Davis, said it takes about 50 pounds of mixed pollens to keep a bee colony alive for a year.

"There's no one pollen out there that is particularly suited to keep the honey bees going. What they really require is a mix (of floral sources)," Mussen said.

Natural food that bees need, he said, includes wildflowers, weeds, shrubs and trees. Though beekeepers provide bees with supplemental feed, nothing comes close to the mixed pollens found in nature, Mussen said. But he said beekeepers find there are fewer places to store bees where they can have access to the necessary, diverse floral sources.

Suggested examples of potential locations where good bee forage might be found include state and national parks, forests, Bureau of Land Management lands and other public lands, as well as private land. Many agencies that could be partners in providing forage land for bees were represented at the meeting, including the U.S. Fish and Wildlife Service, USDA, BLM, CA Department of Food and Agriculture, state Department of Fish and Wildlife, state Department of Parks and Recreation and the State Lands Commission.

Participants such as Laurie Davies Adams, executive director of the San Francisco-based nonprofit Pollinator Partnership, suggested that beekeepers develop a general framework that could be used as a starting point by various land managers to evaluate possibilites for forage access.

This would include information about what the beekeeper's use of the site would entail – including physical size of an apiary site, number of colonies, security information, seasonal use patterns, beekeeper selection process and length of stay for bees – plus information about the benefits and risks of having honey bees on public lands and the attributes of sites that would provide good honey bee forage.

Cathy Johnson of the U.S. Fish and Wildlife Service, who works with managers of wildlife refuges, recommended that beekeepers start by contacting a local refuge manager. Those managers enjoy partnerships, Johnson said, although she cautioned that refuges are short-staffed and some managers may be concerned about the added workload of accommodating bee colonies.

Robbin Thorpe, UC Davis native pollinator specialist and professor emeritus, said honey bees are more likely to compete with each other than they are with native bees.

Paramount Farming Co. bee biologist Gordon Wardell said he has demonstrated in Southeast Asia that honey bees can be instrumental both in maintaining a natural system and as a tool to help foster stewardship over the land.

"I think we need to start to look at bees – instead of as an invader – look at them as a way we can really make this system whole," Wardell said.

NEONICOTINOIDS LET VIRUS THRIVE IN BEES

Scientists in Italy believe they have found a molecular trigger by which neonicotinoid pesticides may harm colonies of honey bees. The team's experiments suggest that exposure to neonicotinoids results in increased levels of a particular protein in bees that inhibits a key molecule involved in the immune response, making the insects more susceptible to attack by harmful viruses.

Francesco Pennacchio, of the University of Naples Federico II, and colleagues identified a gene in insects that codes for a protein family similar to that found in other animals that is known to regulate the immune response. This leucine-rich repeat protein family, or LRR, has been shown to suppress the activity of a key protein involved in immune signaling, called NF-κB. When the researchers exposed bees to sub-lethal doses of the neonicotinoid clothianidin they saw a significant increase in the expression of the gene encoding the LRR protein, and a concomitant suppression of the NF-κB signalling pathway. These effects were not seen when bees were exposed to the organophosphate insecticide chlorpyriphos.

When the team infected bees with a common pathogen – deformed wing virus – and exposed them to clothianidin and another neonicotinoid, imidacloprid, at concentrations similar to those that would be found in the field, there was significantly increased replication of the virus, which was not seen either in untreated bees, or those exposed to chlorpyriphos. The virus is common in bees and usually remains inactive – kept in check by the bees' immune system. The results suggest that insecticide-induced suppression of bees' immune systems lets the virus replicate unchecked.

'The reported effect on immunity exerted by neonicotinoids will allow additional toxicological tests to be defined to assess if chronic exposure of bees to sub-lethal doses of agrochemicals can adversely affect their immune system and health conditions,' says team member Francesco Nazzi of the University of Udine. 'Moreover, our data indicate the possible occurrence in insects, as in vertebrates, of a neural modulation of the immune response. This sets the stage for future studies in this research area, and poses the question on how neurotoxic substances may affect the immune response.'

Susan Kegley runs the Pesticide Research Institute, an independent consultancy in the US. She tells Chemistry World: 'The EU has already implemented a minimum two-year suspension of the use of the most toxic neonicotinoid insecticides – clothianidin, imidacloprid and thiamethoxam – on bee-attractive crops, to take effect December 1, 2013. The US EPA [Environmental Protection Agency] remains unconvinced that neonicotinoids could be a primary factor in recent pollinator population declines. This new study, in conjunction with other observational studies showing enhanced susceptibility to pathogens caused by exposure to neonicotinoids, should prompt US EPA to re-evaluate the science.'

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Honey bee on a poppy. (photo by Craig Eley, Denver, CO)

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Met up with Ann Harman at Apimondia. She is so charming! Brainstormed about a feature on Ukrainian beekeeping, but ultimately language turned out to be the big hurdle. Very few competent English speakers over there. Anyhow, it didn't happen. I hinted to Victor Yushchenko, but he didn't come up with any ideas, and he personally is a very busy guy. Upcoming Bottom Board piece about Mr. President, and the beekeepers' secret handshake. He and his wife treated us like gold. At the apartment they arranged for us, we found roses, chocolates and champagne on the dining room table. I am not making this up.

The best time to sell honey is Christmas. In the Aspen Mountain ski patrol locker room, I harangue my co-workers, reminding them that my classy glass hex jars of high-altitude wildflower honey are the cheapest made-in-USA stocking stuffers they're going to find. They even have labels! And what man, woman or child doesn't just love honey?

Still, there'd been some grumbling about price. Gorp's one of my best patrol customers. He chided me that my annual price hikes exceeded increases in the consumer price index. "I remember when you were selling quarts for nine bucks!" Jimmy chimed in. My increases reflect the sky-high, nearly doubled wholesale value of honey, my sense of the local competition, along with, of course, my bottom line. I don't want to gouge, but why should I play the fool?

I'm in this sideline business, hobby, whatever you want to call it, not to get rich, but because it's in my blood. It has unique challenges. None of my customers has ever awakened in the night worrying about *Varroa* mites or American Foulbrood. They don't grasp that I work for less than minimum wage. I like to keep it simple. My response to the whiners is almost always the same. "Cheapest honey in the valley." This might even be true. At Christmas, I like to hit the ski school locker room, too. These guys are getting their first paychecks, along with fat tips from all the movie stars and Wall Street bankers. Honey flies out the door. Last year I got behind, and the patrol cleaned me out of locker room honey. They wanted more. Meanwhile, my gal Marilyn was selling honey faster than I could de-granulate it. I wanted to make a special trip to Aspen on Monday – Christmas Eve – to peddle to the ski instructors, but I was running out of liquid honey. I figured I could de-granulate a couple of five-gallon buckets the night before. Who needs sleep, anyway? There was a catch. I'd promised to go caroling with some patrol chums that evening. I didn't see how I could weasel out. The best I could hope for was that this thing somehow fell through. For some folks, anything that smacks of religion is not so cool. Plus, unlike drinking, Christmas caroling is not a traditional ski patrol custom. And you have to sing, whether you hit the notes or not! But my pal Steve has a certain infectious enthusiasm, and this was his baby. He got a few takers. I didn't have the heart to tell him no. On the appointed night, a handful of patrollers sat around the locker room after work, mugs in hand, waiting for caroling reinforcements from the other three Aspen-area ski patrols. "They'll be here," Steve kept reassuring us.

An hour later, we knew we'd been stood up. I was thinking about a long drive, and warming that honey. I figured I'd break up this party. I said, "If we're not going to carol, I need to get home to two lovin' arms!" I headed for the door. Our boss Bud leaped to his feet. "Thanks for throwing down the gauntlet, Ed!" he cried. "Let's do it." My heart sank, but I jumped into the back of Bud's ancient pickup with the rest of the crew. We started off with a rousing chorus of "Jingle Bells" as we headed downtown. This wasn't so bad! Aspen was packed for the holidays. People waved as we put our poor best into Silent Night, Deck the Halls, and We Three Kings. Children stared transfixed, as if they'd just seen the blessed Virgin Mary or even Santa Claus! Outside an eatery where dozens of paparazzi waited for a shot of somebody famous, all heads turned as we passed. I expected somebody to yell at us to take some voice lessons, but everybody on the streets acted as if they appreciated our willingness to get into the spirit, even if we really weren't very good.

I was freezing in the back of that truck and hoping we'd done our due, when Bud announced we were headed for the senior center on the outskirts of town. We arrived unannounced, but the person in charge agreed to ask the residents, most of whom were already in their rooms, if they might like to see and hear the ski patrol carolers. Yes, indeed, they did want to hear some caroling! Seniors filed in on unsteady feet and with walkers and wheelchairs, and they beamed as they joined in on old holiday favorites.

We finally sang ourselves out, somewhat to the chagrin of our hosts. I never in my life felt so popular.

I got home late. I didn't get the honey warmed that night, or make it to the ski school locker room to cash in on Christmas Eve. But maybe I'm the richer for it.

Ed **Colby**

Christmas Story