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Bee Culture

The Magazine Of American Beekeeping

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Pesticide Problems - 12, 26

Wintering - 53, 55, 59

Silent Spring, Again - 11

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On Goldenrod. Photo by Jennifer Berry.

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Bee Culture

FEATURES . . .

DEPARTMENTS & COLUMNS

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Contributor to Mother Earth News

Ag Chemicals

I recently read an article on **www.agprofessional.com** claiming that aerial application of pesticides by professionals were safe for bees, written by a teacher, not a beekeeper. My reponse:

I'm not comforted by any "professional" aerial applicator whose evaluation of his business is by a person with no skin in the game. Let Dr. Scott Bretthauer (the author of the letter) purchase 100 colonies at the market rate of $250 each and place by any field which Ag chemicals are constantly and incessantly applied and leave them there throughout an entire year; then pay for extensive necropsies of the hives which have failed (studies already done by other PhD's) and he will have earned the right to speak. I probably have several decades of practical experience where only ground rigs were used and I learned that apiaries across the road from only ground rig spraying invariably experienced a constant diminution of their population. As a beekeeper with 36 years experience I can righteously assert that in all cases where Ag chemicals were used (there are other methods available which use no chemicals) my bee operation suffered irreparable harm. I would like to reach out and strangle (generically speaking) PhDs who say "studies show," when I can rightfully counter with "my experience is..."

I successfully raised in the ballpark of 350 thousand pounds of honey before the sea of Ag chemicals overwhelmed me. Before one particular farm switched to GMO corn seed I raised the weight of a steer, approximately 850 pounds, from a single hive in Parker, Colorado. That farmer's son-in-law has seen fit to change back to heirloom corn seed and I have hope of seeing good crops there once again. That farmer's father-in-law, now deceased, told me he coped with the alfalfa weevil by baling the weevils into the first cutting. Weevils left alive in July were scorched in the heat and did not present a threat to 2nd and 3rd cuttings.

Dead bees tell tales and they speak loud and clear to scientists who properly exercise the scientific method. The best scientists in history have been run through the matrix of life's experience before tackling such questions as, in this case, "why are these bees dying?" Poison is poison, no matter how you apply it and unfortunately bees don't read the labels on any of Monsanto or Bayer or fill-in-the-blank's pesticide.

Paul & Linda Hendricks
Englewood, CO

Honey Bee Tattoos!

If you have a Honey Bee Tattoo, in a G-rated place, take a photo, email it to Kim@BeeCulture.com and we'll do a Show 'N Tell later this year and we'll put all of them on a page in our calendar. Remember, rated G photos to Kim@BeeCulture.com.

Bees Without Borders

I live in a weird place. There's no question about it. The town is called Point Roberts, a five mile square peninsula that lies beneath the 49th parallel (making it U.S. land) but is isolated geographically from the rest of the United States by water. Unless you have a boat or a plane, a drive through Canada replete with two international border crossings is required to get here. As you can imagine, there are some annoyances associated with living here, from a logistics standpoint, but it's a quirky town where I've somehow become a (quirky) local, and I guess for now at least I'm here to stay.

And since I'm here to stay, so are my bees. I'd have a hard time moving them, too, even if I had to. It was tough to get them here.

Would you believe me if I told you I had to charter a private airplane in order to transport my two nucs of bees bred by Dan and Judy Harvey of Olympic Wilderness Apiaries (www.owa.cc)? Turns out bees don't carry enhanced driver's licenses, much less passports. And honeybees are NOT allowed to cross the U.S./Canadian border, passport issues aside, despite the fact that they do it all the time (shhh, that's classified information).

When it came time for me to finally "start beekeeping" and set up my first two hives, I decided that I wanted to start with locally raised bees showing at least some tolerance for nosema and *Varroa* (I don't choose to use chemical miticides on my bees so this was important) along with the seemingly endless amount of rainfall we get in the Pacific Northwest some years. That meant I was going to start with a nuc instead of packaged bees. Usually, finding nucs is not that difficult. I reserved my bees well in advance so that availability would only be an issue if the year was especially bad and for some reason the bees weren't there. Transport of the nuc boxes is really quite easy. They are screened in and quite easy to handle in that regard. Picking the bees up on the Olympic Peninsula necessitated a long drive and a ferry trip, too, but I was okay with this. The little bit extra that made this excursion something special was that after the bees were driven and ferried, they had to be flown the last 20 miles or so to their new home in Point Roberts.

You can imagine reading this that not all pilots would feel ultra excited about taking even a short

flight with two boxes containing several thousand bees each, regardless of their genetics and winter hardiness. I had heard about Northwest Sky Ferry (**skyferrynw.com**) from a friend in town who had acquired a large pig through a pig rescue program. She had Georgia (the pig) flown in with these guys and I hoped that after helping pigs to fly they'd be willing to consider my situation. General amusement and curiosity greeted these two fine smelling, buzzing nuc boxes. Their plane was ready. The pilot was a fellow younger than me who talked with us a bit about his love of piloting as we carried our nucs out to the tarmac. He wasn't concerned at all about transporting the bees though he was glad to see how effective the screens in the nuc box were at keeping the bees contained. We put the two nucs into the back seat, feeling slightly ridiculous but enjoying the process immensely (as you must learn to if you are going to live successfully in a geographically anomalous place). We closed the door on them securely and listened as the plane revved up. We skedaddled back to our car. It would take us longer to drive to Point Roberts than for the bees to arrive there by plane.

Once we got back to the Point, it was a quick trip across town to the local airfield, operated by a man who used to help his dad keep bees in Saskatchewan (I think it was Saskatchewan). He was tickled about their arrival and a couple of other fellows in town were also at the airfield when we arrived to pick up our winged friends. To this day, those two fellows, Tom and Gerry, always ask after the bees. Once the bees were re-established in the trunk of the car (which had to seem like relatively tame transportation to these bees given their numerous and varied air experiences), it was back across town to install the nucs at their new, permanently grounded location which just happens to be ... within 1500 feet of the international border.

As the responsible (if amused) adult in this scenario, I try to always impress upon the bees that they must never, *ever* cross the border without first chartering a flight and flying only over U.S. airspace since they refuse, one and all, to carry their passports. I like to think that they are paying attention.

Jamie Dehner
Point Roberts, WA

More On CCD

May I share CCD experiences with other readers? My bees have been disappearing since about 1987, not the commonly thought belief of five or 10 years ago. Bee colonies with three or four deeps would dwindle to about no bees, a queen, uncared for brood, and one or two supers of capped honey. No robbing was noticeable. This dwindling seemed to occur in possibly two weeks. No dead or crippled bees were noticed.

The bees were located in central California on hilly cattle grazing grass lands and oak trees. There are no cultivated crops. There is no known use of pesticides. *Varroa* mites are present. Any comments?

Alan Buckley
Portola Valley, CA

July Cover - Lighten Up

I just started reading my August *Bee Culture*, and saw the letter from the couple objecting to the July cover. I guess they don't have a sense of humor! I love the cartoons by Lela Dowling, cut them all out and save them for late nights when I need a smile. Keep them coming.

Jeanne Hansen
Madison, WI

Bee Water Issue

I keep bees in an urban area of Walnut Creek, CA, and have what I think is a good solution to the bee water issue. In my yard, about 20 feet from the hives, I dug a 6 x 16 x 1.5 foot hole in the ground for a fish pond. I lined it with rubber roofing membrane and put gold fish in it. It was a modest source of interest and water for the bees until I put six water hyacinth plants in the pond. Since then the bees cover the floating plants from dawn to dusk. Interestingly while some of the bees land on the plants clearly to dip their tongues into the easily accessible water, most of the bees covering the plants seem to be more interested in licking the leaves. It makes me wonder if the leaves are producing something that the bees find nutritious or tasty. I would be curious if anyone else has had this experience or has any thoughts on why this might be. Whatever the attraction, the number of bees I see makes me think that this proximate water supply with its attractive foliage is keeping most of my bees away from the neighbor's swimming pools. Your journal, as always, inspires.

Norris Childs
Walnut Creek, CA

Silent Spring – A Book Review – 50 Years On

Silent Spring by Rachel Carson

"The citizen who wishes to make a fair judgment of the question of wildlife loss is today confronted with a dilemma. On the one hand conservationists and many wildlife biologists assert that the losses have been severe and in some cases even catastrophic. On the other hand the control agencies tend to deny flatly and categorically that such losses have occurred, or that they are of any importance if they have. Which view are we to accept?"

If you have been waiting for the right moment to pick up Rachel Carson's environmental classic, Silent Spring, now is the time. September 27th marks the 50th anniversary of the publication of the post-war polemic. The questions Carson asks and the answers she suggests – about truth, control and the human cost of dependence on synthetic insecticides – are as relevant today as they were in 1962.

A biologist, Carson commands the names of things. "Chapter One, A Fable for Tomorrow," opens in an idyllic town, inhabited by stands of "laurel, vibernum and alder, great ferns and wildflowers ...." Carson builds tension throughout the seventeen chapters of Silent Spring by toggling between alliterative descriptions of the plants, animals and minerals a small environment holds and brutal anecdotes about poison and death. Yes, it is manipulative. In a lesser writer's hands it would be insufferable, but Carson's writing is clear and precise. Silent Spring reads like a subversive lullaby that lulls and gently rolls before jolting you awake.

"Chapter Five, Realms of the Soil," with its description of the unseen ecosystem beneath our feet held for me the enchanting quality of opening a box of bees and entering their world of wonder and interconnectivity. "Chisels of frost and ice split and shattered the rocks. Then living things began to work their creative magic," as "mosses took hold in the little pockets of simple soil," and so it goes. After creating this finely wrought little ecosystem, and others like it, each its own precious snow globe, she smashes it with poisonous anecdote.

In "Chapter Seven, Needless Havoc," Carson recounts an attempt to halt the progress of the invasive Japanese beetle across the Midwest in the 1950s. In 1959 The Michigan Department of Agriculture in cooperation with the U.S. Department of Agriculture approved the use of Aldin, a less expensive but more toxic alternative to DDT.

"Acting under the Michigan pest control law which allows the state to spray indiscriminately without notifying or gaining permission of individual landowners, the low-lying planes began to fly over the Detroit area. The city authorities and the Federal Aviation Agency were immediately besieged by calls from worried citizens. After receiving nearly 800 calls in a single hour, the police begged radio and television stations and newspapers to 'tell the watchers what they were seeing and advise them it was safe, The pellets of insecticide fell on beetles and humans alike, showers of 'harmless' poison descending on people shopping or going to work and on children out from school for the lunch hour. Housewives swept the granules from porches and sidewalks, where they are said to have 'looked like snow."

The anecdote contains multiple views. There are the regulatory agency employees who approved the use of Aldrin to control a feared pest. There is a government, the City of Detroit, that contracted the aerial application and reassured citizens it was safe with one official stating, "the dust is harmless to humans and pets." Finally, there are the citizens who reported "an alarming number of dead and dying birds," squirrels and pets while the Health Commissioner maintained "that the birds must have been killed by 'some other kind of spraying.'" Which view are we to accept?

Carson is explicit about who's view she thinks is most credible.

"The credibility of the witness is of first importance. The professional wildlife biologist on the scene is certainly best qualified to discover and interpret wildlife loss. The entomologist, whose specialty is insects, is not so qualified by train- ing, and is not psychologically disposed to look for undesirable side effects of his control program.

This is a bold statement coming from the first woman employed full-time as a biologist at the U.S. Bureau of Fisheries, and it invigorates. While Carson's boldness energizes it is a quieter statement about the value of human enjoyment that most moved me.

"To the bird watcher, the suburbanite who derives joy from birds in his garden, the hunter, the fisherman or the explorer of wild regions, anything that destroys the wildlife of an area for even a single year has deprived him of pleasure to which he has a legitimate right. This is a valid point of view. "

As beekeepers, we are no strangers to deprivation and loss. According to Carson, "a great and real harm has been done."

Rachel Carson died of breast cancer on April 14, 1964. Check Amazon for a copy of this book.

Laura Tyler

INNER COVER

You might know who Randy Oliver is. He's a commercial beekeeper living in northern California who writes for the American Bee Journal on a regular basis, and on his web page, too. Long ago he, I and ABJ talked about where his writings could go...ABJ was the default, and so it goes. But you can read everything he does on his web page without having to go to ABJ at all. And since quite a bit more than half of our readers don't subscribe to ABJ, his web page is the best place to find what he does.

Interestingly, we think a lot alike. Even more interestingly, we have been thinking a lot alike at about the same time about the same things. I find his writing refreshing, a bit edgy, more than a bit humorous, and definitely pushing the envelope almost every time he tackles a subject. We're close to the same age so that explains some, but not all of it. We studied many of the same subjects when in school, so that, too explains some of it. But not all of it.

So when I was in California chasing almonds I had a chance to visit his place. We were both invited to watch the opening of the movie *In Search Of Local Honey* in Nevada City, which is near his home, that had been made by friends of his and Kathy Kellison's. Because of his help he was one of the stars, and because Kathy and her Bee Friendly Farm program is a great place to park some of your extra change, that program got a boost from the revenue made by the film. Both were able to attend this rather low-key but entertaining first showing so it was a grand evening.

But the other reason for being there was to visit Randy the next day... spend some time with him, his bees and his research on his turf, and not on the pages of a magazine or from afar sitting in the audience.

If you've ever listened to him talk it's much like listening to a machine gun...it is a constant barrage of information. He's squeezed a two hour talk into 45 minutes every time I've heard him. Even if you pay very close attention you'll miss half of it...most of us don't process relatively technical information as rapidly as he can spit it out. Some of us miss a lot more.

So, in keeping with the nature of his delivery this report will be more like a stream of consciousness rather than an organized collection of informative bits and pieces. It is, however, just like following him around...listen fast and careful, or you'll miss something for sure. Heck, you'll miss something anyway.

He runs between 1000 and 1200 colonies in 35 apiaries all within 20 miles of his home in Grass Valley, a hilly part of northern California. His two sons have come to work with him recently and because of the extra help the operation is expanding. Because of this he needs more trucks, warehouse space and is trying to buy a piece of land adjacent to his present lot just so he can spread out. His view overlooks a stunningly beautiful valley that's all forest, mist and solitude.

Because he's working out of his home his overhead is low, and the distance to his yards is cost efficient. He doesn't hire any help, yet, and makes about 40 or so pounds of honey/colony. He runs about 12 colonies/yard when making honey, and about 20/yard when building up nucs. He and his sons sell all of their honey retail, mostly blackberry, manzanita, clover, wildflower and some starthistle. The imported fly is working and starthistle is declining every year. About July 1 or so the annual dry season sets in and its either move bees up the mountains for more pasture, or feed. His yards cover more than 2000 feet in elevation anyway from low to high.

The colonies we looked at that day were those that weren't strong enough to go to almonds, where most of them were at the time. These colonies didn't take the protein patties fed earlier and thus didn't build up.

Making, and selling nucs has become a very big part of his business, and he's found both the science and the art of being successful at this. They have enough colonies to have extras for the nucing program, a luxury many of us don't have, but when you do, it's a good thing to take advantage of.

Right at the end of almonds queen production begins so that cells are ready when the nucs are ready. This gives the nuc a grace period with no new brood coming on and any mites present have nowhere to hide. It's the perfect time to treat. If you read Randy's research web page you'll see how oxalic acid is used as a nearly perfect treatment for phoretic mites right at this time. That chemical is legal in Canada, and most of the rest of the world, and should be here, also.

After finishing almonds he moves those now fat bees to a large staging yard not far from home for the nucing session. Each fat colony is split four ways, cutting the mite population in each to only 25% of what the mother colony had. He and his sons have this operation down to a science, using the back of his truck as the staging area, each knows what the other is doing and what to expect as the box goes from one to another.

Visiting Randy Oliver. Dangerous Corn.

It's an assembly line operation using a deep with a divider so each side holds four frames. Each side has an entrance but on opposite sides. In the center of the box, next to the divider goes two brood frames on each side, next to these a frame of drawn comb, and on the outside a frame of honey. The honey is on the outside because it's a cold sink, whereas the drawn comb gives the queen an immediate place to start, and it's not cold. When complete the nucs are moved to another yard and spend time building up.

The break in the brood cycle gives the colony a distinct advantage, coupled with a treatment of essential oils to knock down the adult mites, and soon that new queen is going full bore and keeping way, way ahead of any mites that were left, and besides, the colony won't be producing any drones...a mite's favorite...until it reaches the 10 frame size so by then mites are hard to find in that colony, and take a long, long time to rebuild. And by then, it's almond time again and the process repeats.

Many of these are used to replace or increase their colony counts, but many are destined to be sold. And selling nucs, and selling honey retail have become important. It used to be that the colonies were split with most sold, but the remaining colonies were moved to Nevada for honey and mostly the fall pollen flow from rabbit brush. Now, the money's in the honey and staying home to make that crop makes way more sense than moving bees back and forth and sharing the crop, even though there's hardly any fall flow. Retail is the way to go.

Finally the financial advantages of selling retail are dawning on Randy's boys, too, and that market has taken over. And here's some of the marketing advice that came out of that afternoon.

There's two ways to make money with bees goes his theory. First, have productive, live colonies. And second, salesmanship. Everything else is a liability for the business.

For instance...selling comb honey? Bring Ross Round comb honey supers with you to the farm market and show customers where that honey comes from, and then sell it right out of that super. Sales will skyrocket.

And trap, and sell pollen. He sells hundreds of pounds every year at something like $25.00/lb. Get inexperienced help to do the pollen work...collecting, cleaning and packaging. You don't want managers spending expensive time doing that kind of work. They should be making bee decisions.

For small operations there's too many markets to cover so focus on time studies and dollars per hour. Find what you like and do what's profitable.

Every yard has a two-strand bear fence with a soft spring handle. The spring allows some give, because deer come up and lean on the fence. Fences are solar powered and effective. His wood preservative is parafin/rosin wax for his equipment...he makes the lids and bottoms and assembles the boxes for his nucs. With more people building in his area, swimming pools and bees are sometimes a problem. Irrigation ditches are best, if they are close to a beeyard.

Randy had been working with the Beeologics people when I visited, testing some of their products. Recall, they were the folks from Israel who developed an efficient way to deal with RNAi to control Israeli Acute Paralysis virus...one of the villains in the hunt for the cause of CCD. They had been purchased by Monsanto shortly before I visited but he was still looking at the test colonies.

As an aside...I recently had the opportunity to visit with Jerry Hayes, former State Bee Inspector from Florida who was hired by Monsanto to sheppard their new product, (and their new-to-them industry), from purchase to finished product, at Monsanto headquarters in St. Louis. My visit was an eye opening experience, and fodder for more yet to come.

Of course to test the material you have to have colonies with active CCD, and we viewed several ... some that had been treated, some that had not. Of course he was thorough and mentioned the roles of pesticides, other viruses and diseases in the mix also. We looked at frames from a CCD colony...very few bees, mostly on the top center of a frame surrounded by a half circle of spotty brood, with pollen on the outside of the brood area, but when you looked close you could see that the queen was going like mad because every empty cell had an egg. She was doing everything she could to catch up. It wasn't working, and he described it as a "Raging Virus Epidemic".

Genetics...he felt, was the key in the CCD solution. Some colonies came out of it, some came out of it after being treated, and some never did.

And there ends this story, for the time being anyway. It was a quick day, too quick. But I learned a few things, and that's what it's all about, right?

•

In early May we sent out a CATCH THE BUZZ message that warned beekeepers that having bees anywhere near where field corn was being planted could be putting them in harm's way. To read this visit our BUZZ archives at **http://home.ezezine.com/1636/1636-2012.05.11.14.40.archive.html**

Corn planting? Dangerous? Go on, said a lot of people. That just can't be. We heard, via the grape vine, that this is what the people were saying who were responsible for the dangerous corn seeds that the farmers were planting last Spring.

So wait a minute. It's corn seeds that are dangerous? Really? Here's how that works.

Almost every single corn seed planted in the U. S. this year is coated with a witch's brew of contact and systemic chemicals that protect the seed in the ground after it is planted, before and after it germinates, and all the while the plant it eventually turns into grows. Several fungicides are included that stop any fungi at all from daring to invade and rot the seed while it sits in the soil, all damp, dark and warm. Perfect fodder for a fungus to grow and prosper. There must be a lot of fungi out there because they put a lot of those chemicals on those seeds.

Part of that brew is also an insecticide (and sometimes more than one insecticide). One in particular, Clothianidin, one of the neonicitinoids, has risen to the top of this infamous brew. This particular poison, manufactured by Bayer CropScience, has several names...Poncho®, Poncho®Beta and Prosper®.

Continued on Page 72

SEPTEMBER – REGIONAL HONEY PRICE REPORT

	% Important	% Not Important
Price	80	20
Label Design	64	36
Name on Label	71	29
Local Honey	96	4
Variety of Honey/label	27	62
Second Label	17	83
Location I sell	61	39
Time of Year	36	64
Glass Container	52	48
Plastic Container	25	75
12 oz. size	55	45
1 lb. size	74	26
2 lb. size	65	35
5 lb. size	43	57
Quart jar	57	43
Pint Jar	52	48
Specialty Jar	30	70

What's Important? Selling Honey!

We surveyed our reporters this month regarding the importance of various selling techniques and philosophies. Right off you can see two things . . . that price is important. Of course this works both ways – in a competitive market you have to be able to sell, yet keep your profit margin so price becomes very important. If you can't compete, you move, change or quit. Conversely, if competition isn't the game, the perception of quality is, and then prices enters again – sell too cheap and the perception is that your quality is suspect. Too high is seldom the issue in this market.

Of course the biggest, best and most important aspect of what's important is . . . is it Local? That the key to almost any food anymore, but especially honey. Know your beekeeper is the name of the game. If you are NOT putting something on your honey jar that tell customers where that honey came from, then you are missing a golden opportunity. This certainly plays into the pricing structure you are working with too. Personally, I was disappointed that more honey sellers aren't featuring the variety of honey they are selling. Even designating a season – Spring Harvest, for instance – would be beneficial I think.

And of course the 1 lb jar remains popular. Interestingly, it seems to make little difference whether the container is glass or plastic, unless it's plastic. Somebody has yet to convince me that a glass jar is easier to dispense honey from than a plastic squeeze jar…it's the only kind I use.

Another factor to look at carefully is that second label. Almost nobody uses one…an interesting comment on information. Perhaps it has something to do with the level of importance of where the honey is sold. Most of our reporters aren't large scale packers, or sell their honey where they aren't well known, so perhaps a second label…telling variety, season harvested or something similar isn't necessary. And they do have a cost. This is reinforced by the fact that even putting the variety of honey on the label itself isn't important it seems. But, having your name on the label is important, there's no doubt about it. So, like politics and beekeeping, even selling honey is all about local.

	REPORTING REGIONS												SUMMARY		History	
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.88	2.03	1.88	1.60	1.85	2.00	2.12	1.88	1.60	1.85	1.78	1.88	1.54 -2.25	1.87	1.82	1.74
55 Gal. Drum, Ambr	1.75	1.75	1.75	1.56	1.68	1.78	2.05	1.75	1.48	1.75	1.64	1.73	1.40 -2.15	1.72	1.69	1.60
60# Light (retail)	174.75	180.00	150.00	148.25	160.00	153.33	155.43	167.50	130.00	156.00	148.00	178.00	120.00 -210.00	161.29	154.90	141.51
60# Amber (retail)	163.33	167.50	157.50	153.40	160.00	167.50	152.25	135.00	150.00	153.22	132.00	173.75	96.00 -205.00	155.93	148.21	139.36
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	81.76	76.84	48.00	68.34	71.49	60.00	50.57	71.49	71.49	49.92	57.00	90.00	37.20 -115.00	66.88	66.83	62.27
1# 24/case	113.01	105.78	99.60	86.40	90.00	116.00	81.93	91.80	72.00	93.60	95.12	114.85	72.00 -144.00	100.30	101.18	89.27
2# 12/case	106.47	84.51	77.70	73.63	84.00	90.00	77.35	93.00	59.00	86.16	54.50	95.25	34.00 -144.00	84.69	85.02	77.35
12.oz. Plas. 24/cs	95.42	98.22	49.50	77.20	72.00	89.33	64.11	84.00	66.00	64.08	71.88	81.12	31.80 -120.00	79.61	79.82	72.28
5# 6/case	100.72	98.49	94.50	84.90	105.00	120.00	85.21	97.15	72.00	88.98	58.34	107.00	30.00 -126.00	92.60	94.33	83.97
Quarts 12/case	140.00	154.44	126.99	114.00	108.00	109.33	110.40	108.00	126.99	108.96	104.09	133.00	90.00 -180.00	118.99	117.87	114.83
Pints 12/case	80.00	79.65	85.80	69.80	72.00	64.33	73.30	59.40	52.00	75.17	64.50	79.25	48.00 -108.00	72.34	71.88	72.07
RETAIL SHELF PRICES																
1/2#	4.45	4.29	2.90	3.85	3.99	3.50	3.37	2.15	3.99	3.00	3.21	5.00	2.09 -6.50	3.69	3.61	3.38
12 oz. Plastic	5.75	5.38	4.53	4.36	5.00	4.63	4.05	4.43	4.99	3.58	4.34	4.94	2.99 -7.50	4.66	4.50	4.04
1# Glass/Plastic	6.61	6.27	5.76	5.47	7.00	6.33	4.74	5.60	5.99	5.67	5.55	7.66	3.00 -8.99	5.87	5.91	5.37
2# Glass/Plastic	11.33	10.36	10.51	9.92	10.00	9.50	8.42	9.10	7.50	9.57	8.71	11.75	5.55 -15.00	9.85	9.62	8.91
Pint	8.50	8.24	8.50	6.92	6.50	6.46	8.17	7.42	12.50	6.50	8.03	8.58	4.50 -20.00	7.73	7.86	8.43
Quart	15.00	14.78	11.16	12.10	12.00	11.71	11.54	13.26	35.00	13.13	12.78	16.00	8.00 -35.00	13.30	12.80	13.52
5# Glass/Plastic	23.92	21.24	22.30	22.00	22.84	25.00	19.06	20.33	18.00	19.00	20.10	25.00	13.98 -35.00	21.19	19.96	19.30
1# Cream	9.00	7.69	7.60	6.35	7.61	6.00	5.63	5.69	7.61	6.15	8.09	8.00	3.99 -12.00	7.22	7.20	6.16
1# Cut Comb	9.17	8.79	8.19	7.13	9.05	6.67	7.14	9.05	9.05	7.50	8.50	12.66	4.50 -15.00	8.35	8.40	8.15
Ross Round	10.00	6.98	8.19	5.65	8.10	7.00	6.16	8.00	8.10	8.10	10.05	7.00	4.99 -12.00	7.71	7.61	7.77
Wholesale Wax (Lt)	5.80	4.98	4.19	3.75	3.10	5.23	4.60	5.00	4.75	6.00	3.59	4.50	2.25 -10.00	4.72	4.45	3.91
Wholesale Wax (Dk)	5.13	4.48	4.19	3.51	2.90	5.50	5.38	4.75	5.00	4.38	2.88	4.00	1.90 -7.00	4.31	3.97	3.42
Pollination Fee/Col.	89.17	99.75	75.00	56.67	60.00	65.00	55.00	75.00	88.02	88.02	79.75	103.33	35.00 -165.00	76.05	71.68	76.68

– More New For You

Honey bees naturally prefer the vertical and cylindrical shape of hollow tree trunks, so R. Micheal Magnini designed the new Honey Bee Swarm Collector.

Using commonly available materials and an easy to follow construction technique, the **2012 Interceptor** is currently the most efficient swarm catcher available.

The manual available for purchase, outlines in detail everything you will need to do to be proficient at capturing free honey bee swarms in your area. Whether a beginner or seasoned veteran, the design, plans, assembly instructions and deployment methods listed will bring home the valuable bees.

The fifth chapter explains the field operations to select potential sites, prepare prime locations, properly install the Interceptor, and schedule the observations to capture. Finally, the method of bee colony retrieval is outlined and presented.

Plans and instructions $21.95. Send to Sweet Clover Productions, 524 Scotch Lake Road, Scotch Lake, NS B1Y 3W4 Canada.

Not quite 12 inches tall this bee fan is cute and efficient at what it is supposed to do – cool you off. The fan 'blades' are made of a soft pliable rubber material. So if you accidentally bump into it while it's running it doesn't hurt. It plugs into your computer USB port. And it kicks out a good amount of air. It takes up very little space on your desk and has a flexible, adjustable neck. It's great, I love it.

You can purchase this for $12 at **www.Beetlejail.com**.

Kathy Summers

It's Summers Time —

The County Fair

Last week was the week of the Medina County Fair. Now I don't know how it is where you live, but here in Medina for a lot of folks this is the highlight of the Summer. It's what they wait for every year. And it's pretty much always the hottest week of the Summer.

There's the Community Center filled with vendors and all of their wares and also lots of informational booths – the Democrats, the Republicans and most of the churches in town have booths in this building. And the animals. Maybe that's your favorite part. Every year without fail we have one pig that has a brand new litter of babies and that is always a highlight. This year she had her pigs literally, on the way to the fair.

And of course there's Fair Food. This is definitely my favorite part. For the past few years there has been some new deep-fried item to add to the mix. This year, new to me anyway, were deep fried pickles. I didn't try them. My very favorite are the funnel cakes.

Our local Medina County Beekeepers Association has a good size booth at the fair. We take up about a third of one of the big barns. We're in with the Water Conservation people and the hay judging and some of the vegetable judging.

Medina County Beekeepers have had a booth at the fair for at least 30 years, probably closer to 50 years. Over the years the booth has changed a lot. When I first started going to the fair they just sold honey and the booth was sort of dark and dreary. Along the way we've brightened up the booth by painting it white. And we added honey stix and honey candy. Some years we have soap to sell or lotions and lip balms depending on how industrious our members have been. Some years cremed honey and some years, but not this year, comb honey. That is one of our biggest sellers and is gone every year.

A few years ago we started letting kids roll beeswax candles for $1. And that is a pretty good seller for us. We have a dear lady in our group that just loves to sit there and show those kids how to roll candles.

We also have an observation hive that we try to have manned with a volunteer to talk about the bees and point out the queen when folks can't find her. There is a video of Kim that plays continuously showing folks how to harvest their honey.

We offer honey tasting of all of the honeys that we have for sale. All of the honey we sell comes from our Medina County Beekeepers Association. And if you want to sell your honey at the fair you have to work the booth at the fair. So there's incentive to gain volunteers.

As beekeepers we love to talk about the bees and it's amazing how many people come into the barn and end talking to you for 15 or 20 minutes about bees. Some of them walk away with a free *Bee Culture* magazine that we hand out, or one of our brochures about our county group. Some sign up for the Spring class that we hold each year for beginning beekeepers. And everyone, it seems, has someone in their past that was a beekeeper – usually it was grandpa, but maybe an uncle, a cousin or a neighbor.

I worked the Saturday morning shift this year and because we were short-handed there were only two of us there that day. Jane did come in later and rolled a few candles. I think this is the first time I've worked a Saturday morning shift. Usually I'm there at night. It's a very different crowd on Saturday morning – more older folks and more of the people working the fair. Because it's not so busy they can slip away and come check out the honey.

People have heard all the stories about local honey, pollen, royal jelly, allergies, etc. So they come in with local honey on their minds. That's what they want and that's what we sell them. We have several folks who march right in and pick up a five-pound jug, no questions asked, pay, and walk right out. They know exactly what they want. One lady bought two five-pound jugs and as she left said I'll see you next year.

As is customary it was hot this year – very, very hot. But then our whole Summer has been very, very hot.

I hope you are having a wonderful Summer wherever you are. We are off to EAS in Vermont next week. By the time you read this we will have returned and hopefully fully recovered. I'll let you know how it went in the October issue.

The chickens are fine. A couple keep managing to escape the pen so we have to keep improving the set up. We have a team of "volunteers" taking care of the chickens, the garden, and the cats while we're away. See you next month.

Kathy Summers

A Closer Look

NOSEMA CERANAE IMPACTS ON REPRODUCTIVES

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

Host infection takes place after ingestion of mature spores that germinate quickly in the ventriculus (midgut). The spores extrude the polar tube which penetrates the epithelial cells to release the sporoplasm directly into the cytoplasm.

Nosema ceranae, a microsporidian parasite originally described in the Asian honey bee *Apis cerana*, has recently been found to be cross-infective and to also parasitize the European honey bee *Apis mellifera*. Since this discovery, many studies have attempted to characterize the impact of this parasite in European honey bees. *Nosema* species can infect all colony members, workers, drones and queens, but the pathological effects of this microsporidium has mainly been investigated in workers, despite the prime importance of the queen, who monopolizes the reproduction and regulates the cohesion of the colony via pheromones. While both workers and the queen can be infected, the consequences for the hive could be very different. A queen weakened by *N. ceranae* infection might compromise the renewal and stability of the worker population (Alaux et al. 2011).

Transmission of *N. apis* occurs primarily through an oral-fecal route within hives (Fries 1993) when bees clean contaminated comb, consume contaminated water, or exchange food by trophallaxis. Transmission of *N. ceranae* is thought to be similar but additional routes of spread may be involved (Traver and Fell 2011). Host infection takes place after ingestion of mature spores that germinate quickly in the ventriculus (midgut). The spores extrude the polar tube which penetrates the epithelial cells to release the sporoplasm directly into the cytoplasm (Higes et al. 2007; Fries 2010). Within a week, the host epithelial cells are filled with offspring spores (Graaf et al. 1994; Gisder et al. 2011) and the cells burst to release a new generation of primary spores into the gut, where they will germinate again and keep infecting more cells. Eventually spores are released with feces, which are the primary source of infection. While *N. apis* infection is restricted to the midgut epithelium of adult bees, *N. ceranae* has also been detected in the hypopharyngeal and salivary glands (Chen et al. 2009; Gisder et al. 2010) and in royal jelly (Cox-Foster et al. 2007).

Botías et al. (2012) using histopathological techniques looked at queens in naturally infected colonies to evaluate *Nosema* infection of the

"Infection by N.ceranae did not affect a queen's fat body content (an indicator of energy stores) but did alter the vitellogenin titer (an indicator of fertility and longevity), the total antioxidant capacity and the queen mandibular pheromones, which surprisingly were all significantly increased in Nosema-infected queens."

queens and to study the long-term effects of colony infection on the queen's ovaries. The ovaries and midguts of queens in infected colonies revealed no signs of *Nosema* infection and there were no lesions in ovarioles or midgut epithelial cells.

Traver and Fell (2012) also investigated whether queens from colonies with a known *N. ceranae* infection can become naturally infected and, if so, whether immature queens are also infected. They were also interested in determining whether *N. ceranae* could infect other tissues which might be involved in vertical transmission, such as the ovaries and/or spermatheca. Queens were analyzed using real-time PCR and included larval queens, newly emerged and older mated queens. Overall, they found that all tissues examined were infected with *N. ceranae* at low levels but no samples were infected with *Nosema apis*.

Larval queens and newly emerged queens were analyzed to determine whether *N. ceranae* can be transmitted to developing queens, i.e. through brood food. Larval queens were infected at low levels and *N. ceranae* DNA was detected in royal jelly; however they could not rule out the possibility that this was due to contamination since royal jelly samples were not decontaminated with bleach. A subsample of royal jelly was used for spore counting, but spores were not observed in any sample. Because *N. ceranae* was detected in royal jelly samples, brood food could provide a mechanism for the horizontal transmission of *N. ceranae* to all developing bees; however, infectivity studies for royal jelly are still needed (Traver and Fell 2012).

In newly emerged queens, Traver and Fell (2012) found abdomens, thoraces, heads, and ovaries to be infected with low levels of *N. ceranae*. Overall trends indicated that abdomens (minus the reproductive organs from the same queens) tend to have higher levels of infections compared to other tissues; though in some cases, ovaries were found to have a higher level of infection than the other tissues examined. The analysis of mated, laying queens also indicated the presence of *N. ceranae* and these infections had spread to other tissues such as the ovaries. Low levels of *N. ceranae* in the ovaries and spermatheca suggest that vertical transmission could be involved in transmitting *N. ceranae*.

Alaux et al. (2011) experimentally infected queens with *N. ceranae* to determine the impact of the microsporidia on queen physiology and health. After eight days, the level of *Nosema* infection was analyzed in experimentally infected and control queens. In infected queens, the mean number of *Nosema* spores per queen was 18.2 million. No spores were detected in control queens, except in two queens that were infected with 40,000 and 20,000 spores, which is five and 10 times lower than the dose used to infect the experimental queens. The minor infection observed in the two control queens probably came from spores ingested by chewing the wax capping at emergence (Malone and Gatehouse 1998). Based on the lethal effects of *N. ceranae* in workers and finding similar lesions in queens (Antúnez et al. 2009), a weakening of queen physiology was expected. However, Alaux et al. (2011) demonstrated that *N. ceranae* infection actually boosted the main physiological functions of queens.

Infection by *N. ceranae* did not affect a queen's fat body content (an indicator of energy stores) but did alter the vitellogenin titer (an indicator of fertility and longevity), the total antioxidant capacity and the queen mandibular pheromones, which surprisingly were all significantly increased in *Nosema*-infected queens (Alaux et al. 2011).

Workers and queens develop from the same genome, but opposing responses to *N. ceranae* were observed regarding vitellogenin (Vg) production. Contrary to the Vg decrease observed in infected workers (Antúnez et al. 2009), *N. ceranae* triggers the increase of Vg synthesis in queens. The lower amount of Vg in parasitized workers might explain their shorter life span, taking into account the positive effect of Vg activity on bee longevity (Seehuus et al. 2006). Alternatively, sincc Vg is present at lower levels in old foragers compared to young nurses (Page and Amdam 2007), and because *Nosema* causes a precocious onset of foraging (transition from nurse to forager tasks) (Wang and Moeller 1970), the decrease in Vg might simply reflect the precocious forager profile of infected bees compared to

control bees.

N. ceranae is strickly dependant on host energy for its development and germination (Cornman et al. 2009), which would lead to an increase in host metabolism and oxidative stress. In that case, the increase in Vg production observed in infected queens might be a response to the energetic stress caused by the spore population, since Vg is able to reduce oxidative stress by scavenging free radicals and therefore prolong the lifespan of bees (Seehuus et al. 2006). The elevated Vg titer would suggest a higher capacity to resist oxidative stress, which was demonstrated by higher total antioxidant enzyme activity in infected queens. Despite this protective response, *Nosema*-infected queens seem to have a shorter lifespan compared to healthy queens (Higes et al. 2009), suggesting that they are not able to cope with the physiological stress of *Nosema* over the long-term.

Analysis of queen heads revealed that the queen mandibular pheromone (QMP) components 9-ODA ((E)-9-keto-2-deconic acid), HOB (methyl p-hydroxybenzoate), and 9-HDA ((S,E)-(+)-9-hydroxy-2-decenoic acid) were present in both control and parasitized queens, but HVA) (4-hydroxy-3-methoxyphenylethanol was not detected since queens were virgin (Ledoux et al. 2001). However, all QMP components, except HOB, were significantly higher in *N. ceranae* infected queens compared to controls. Their chemical analysis demonstrated that *Nosema* can significantly modify pheromone production in queens; similar results were found in workers in which *Nosema* parasitism altered the production of the pheromone ethyl oleate (Dussaubat et al. 2010). Richard et al. (2007) found that the QMP profile changes according to insemination quantity, with virgin or single-drone inseminated queens producing higher amounts of 9-ODA and 9-HDA compared to mated or multi-drone inseminated queens, respectively. QMP compounds, 9-ODA and 9-HDA were also higher in *Nosema* infected queens, suggesting that elevated levels of QMP are a hallmark of poorly fertile or sick queens. The QMP modification induced by *N. ceranae*, coupled with the ability of workers to detect and respond differently to the pheromone changes (Richard et al. 2007) might explain the reports of *Nosema*-induced supersedures.

Since the prevalence of drone infection by *N. ceranae* is unknown, Traver and Fell (2011) set out to determine whether drones are naturally infected with *N. ceranae* and at what levels. Drones were analyzed for *N. ceranae* infections using quantitative real-time PCR with species specific primers and probes. Drone pupae were collected from capped cells at the purple eye stage (with body pigmentation) and were approximately 17-23 days old. In-hive and flying drones were also sampled. They found that both immature and mature drones are infected with *N. ceranae* at low levels. No *N. apis* infections were detected in drones of any age. Average spore counts were 9,436 and 13,839 spores per bee for in-hive and flying drones, respectively. Only 19.6% of in-hive drones had sufficient spore numbers to count. Drone pupae were infected at low levels and most frequently in May and June and this is the first report that has detected *N. ceranae* in immature bees. If pupae are infected before emergence, they may be infected through brood food or contamination in their cells. The low level infections found in pupae could be due to developmental changes associated with pupation and reorganization of the alimentary canal. In-hive drones had the highest infections in June. For both drone pupae and in-hive drones, the highest levels of infection coincided with high levels of infection in the sampled hives. Mature, flying drones were also infected, but generally at lower levels and may be due to flying drones not returning to the hive or because heavily infected drones do not survive as long. Because drones are known to drift from their parent hives to other hives, they could provide a means for disease spread within and between apiaries. BC

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Managed Pollinator CAP

Coordinated Agricultural Project

Neonicotinoid Seed Treatments And Honey Bee Health

Greg **Hunt** and Christian **Krupke**

Classes of Pesticides

In the last 10-15 years, the EPA has gradually eliminated many uses of several "older" classes of pesticides. These include the widely used organophosphates, a staple of many agricultural systems. This left farmers and chemical companies looking for alternatives. A new class of pesticides called neonicotinoids, or neonics for short, were initially developed in the 1970s. The chemical structure of these is derived from nicotine (also an insecticide, keeps tobacco plants safe from caterpillars) and they are relatively non-toxic to most vertebrates. Most are water-soluble and break down slowly in the environment, so they can be taken up by the plant and provide protection from insects as the plant grows and develops. During the late 1990's this class of pesticides became widely used (primarily as imidacloprid, trade names include Gaucho, Provado, Merit). Beginning in the early 2000's, two other neonics began to see wide use to treat corn and other field crop seeds. These compounds are clothianidin (trade name Poncho) and thiamethoxam (trade name Cruiser), the latter rapidly breaks down into clothianidin in living organisms. Currently, virtually every corn seed that is planted in the Midwest is treated with one of these two compounds, along with a cocktail of fungicides. In addition, most soybean seeds are also treated with neonics (usually thiamethoxam). Clothianidin is one of the most toxic substances we know of for honey bees . The lethal oral dose to give a 50% chance of death (the LD50) among an exposed group of adult honey bees is about three nanograms per bee. That's three billionths of a gram, a tiny fraction of the weight of the bee (1/10 of a gram). Of course, toxicity by itself is not informative without exposure data. How often do honey bees encounter these pesticides? Where does this issue rank among the challenges facing honey bee health? These are some of the questions that the beekeeping and agricultural communities are trying to answer. Here we describe the current situation as we see it, and the status of our own investigations into health threats from neonicotinoids. These studies were funded by the North American Pollinator Protection Campaign and the Bee Health Coordinated Agricultural Project (CAP).

Some beekeepers saw this issue coming before we did. In the Spring of 2010 we became aware of it when we saw dead bees in front of most of the Purdue bee hives during the week that corn was being planted nearby. Conditions were hot (85°F), dry and windy and clouds of dust were kicked up by the planters – a common sight throughout the Midwest in early Spring. We tested bees that were dying in front of hives near agricultural fields and also healthy hives. The dead bees had clothianidin and several other seed treatment chemicals in or on their bodies. Most of the bees that were dying were actually the nurse bees that may have consumed pollen that was being collected from dandelions and other flowering plants in the area. We saw the characteristic color of dandelion pollen on most of the foragers. Pollen collected by returning foragers and pollen sampled from the cells of those hives had about 10 times the level of clothianidin and thiamethoxam as compared to that detected in the dead bees. In 2011, we conducted further studies and found that the talc that is put into seed hoppers to keep seeds flowing properly during planting contained an extremely high concentration of clothianidin and thiamethoxam (about 1 to 1.5%). A gram of talc containing 1.0% clothianidin could theoretically kill a million bees if they ingested it and could threaten about half as many bees if the dust contacted them (Laurino et al. 2011; Tremolada et al. 2010). Later in the season, pollen collected by bees when corn was shedding pollen in the area had up to 88 parts per billion (ppb) of clothianidin in it. These results suggest that there are many potential routes for exposure, but does not identify the key factor. We hypothesize that corn being planted nearby acts as a source of talc which may have contaminated flowers that bees were foraging on. Corn pollen

Bees can be exposed to neonicotinoids at low concentrations from corn pollen and windblown soil that lands on other flowers. They are exposed to much higher concentrations from contaminated talc that escapes from seed hoppers for a short period around planting time. (photo courtesy of Purdue Entomology Extension)

from plants grown from treated seed had much less clothianidin, about four parts per billion. This is not enough to kill bees outright, but about 45% of the pollen our bees were collecting at that time was corn pollen. We do not know what effect this level of pesticide has on nurse bees that consume the pollen, or on the larvae they are feeding it to. Clothianidin is fairly stable in the soil with a documented half-life (the amount of time until half of the material is broken down in soil) of up to three years (EPA - 2003) . After testing soil from various fields, we found that levels were just as high (about 9 ppb) in a field that had not had treated seed of any kind planted in it for the previous two growing seasons. Our overall conclusion was that the greatest danger occurs at planting time (due to the waste talc from planters), but that bees are exposed to sublethal levels of pesticide throughout the growing season. Our research paper is published online and is freely available (http://www.plosone.org/article/info:doi%2F10.1371%2Fjournal.pone.0029268).

We have also communicated with beekeepers on how they can report bee kills to state agencies and the EPA (beekill@epa.gov). This report has generated some discussion and of course, and more questions. It is not a "smoking gun" that points to neonicotinoids as the cause of CCD. What the work does show is that there is significant room for improvement in how we plant field crops in North America. Although problems with bee kills and clothianidin had been seen in Germany in 2008, there are many differences in planting practices, land use, and equipment that mean the European experience does not readily translate to questions here. For example, the virtually ubiquitous pneumatic planters that use forced air to plant seeds (and exhaust used talc in the process), are not widely used in the E.U., nor is talc widely used as a seed lubricant. It is also important to note that the acreages (both in total and individual fields) here in North America dwarf European production. At some 95 million acres planted this year, corn alone accounts for almost a quarter of the harvested acres in the United States. It is the largest use of U.S. agricultural land and virtually every seed is coated with neonicotinoid insecticides. The United States accounts for over 40% of worldwide production, over 20 times more than the highest ranking country in the E.U. (France, ranking 7th worldwide).

What does all this mean? Is this a tempest in a teapot, or will our agricultural practices spell the end of honey bees in North America? It is tempting in the era of "thumbs up/thumbs down" and instant judgements to label every scientific finding as one or the other – but of course the truth lies in the middle. Only more data will reveal the extent of the problem and possible solutions. For example, this spring we have observed more dead and twitching bees in front of colonies during the corn planting here in Indiana. The Indiana Office of the State Chemist worked on a handful of incident reports and all of the dead bee samples tested positive for clothianidin and other seed treatment chemicals. Similar reports have been coming from Ohio, Minnesota and the provinces of Ontario and Quebec. In Ontario, more than 100 samples from this year's spring bee kills are being analyzed and regulation of neonicotinoids is being re-evaluated because of threats to pollinators (http://www.hc-sc.gc.ca/cps-spc/pubs/pest/_decisions/rev2012-02/index-eng.php) . It is certainly true as Randy Oliver recently pointed out that many people are still successfully keeping bees in the corn belt (Oliver 2012). If growing treated seed led directly to drastic reductions in honey bee health, we would not need research (or researchers!) at all. The results would be apparent to beekeepers and field crop producers alike. This story is like the layers of an onion, that unfortunately require time to peel. There is no question that other potential causes of these bee kills should be considered as well. However, when we see kills that are synchronized with each other and with corn planting over a wide area, and the pesticide is found in dead bees near agricultural fields, the weight of the evidence points in just one direction.

Some of the problems associated with planting can likely be solved with some effort to change planting practices. The neonics are effective pesticides that are relatively non-toxic for many life forms (most notably humans), but (of course) are highly toxic to insects. Like all pesticides, they should be used judiciously – where there is a demonstrated need. This is a principle of pest management that has largely gone by the wayside in some large acreage cropping systems. The bee story is one indication that perhaps it is time to re-evaluate whether it is necessary to use up to 1.25 milligrams of neonicotinoids on virtually every single corn kernel that is planted in the country. Planting corn is the largest use of arable land in the U.S., and each corn seed theoretically has enough pesticide to kill well over 100,000 bees.

The EPA is currently in the process of re-evaluating the registration of clothianidin. This includes convening a scientific advisory panel to weigh the published information, data packages from the registrants of these chemicals, and input from stakeholders. This is the time to make your voice heard. The public docket can be found online under the docket number **EPA–HQ–OPP–2011–0865.** Remember that in these cases, the most useful input is factual, science-based, and presents an argument that is **not** based on emotion, feelings or perceptions but data.

Let's try to put the seed treatment

issue into perspective with what is going on with our bees. We are all still hearing the words "colony collapse disorder" and it is synonymous in the media with **the** major bee health problem. Yet it is not clear how common these symptoms (rapid dwindling of colony population, leaving untended brood and food stores, but no dead bees) occurred in the past or are happening now. Symptoms of CCD were noticed during 2006 and 2007, perhaps less often since then. Since that time, there has been a comprehensive tallying of the nation's Winter bee kills, and there is a general belief that losses have increased – we are averaging about 30% winter die-offs each year. But prior to that time, losses were recorded from regional surveys that exceeded 30% after the spread of parasitic mites (occurring about 1990). For example, a survey of beekeepers in Indiana during the Winter of 1995-1996 showed that about 57% of the state's bee colonies died, and that not treating for *Varroa* resulted in much higher losses (Hunt 1998). In Pennsylvania, 53% of all bee colonies died that year, and losses were much higher for colonies not treated for *Varroa* [Finley et al. 1996]. Recent surveys and studies around the world still put *Varroa* at the top of the list among factors causing Winter losses (Guzman-Novoa et al. 2010; Le Conte et al. 2010; Peterson et al. 2010; Ratnieks and Carrick 2010). What is clear is that bees in many areas of the world (including areas far from neonicotinoid treated seed use) are in trouble. However, since we perform agriculture on a massive scale in this country, it makes sense to consider the factors that are stressing our bees in and near the modern agricultural setting. Neonicotinoids are a key player and a good place to start. Their effects are beginning to be better characterized, but they don't occur in a vacuum - we need to also consider interactions with other stressors of honey bees (mites, other pesticides, viruses and poor nutrition).

Where do these compounds and other pesticides rank as players in the CCD debate? Again, there is no definitive answer – but for a bee, it probably depends on where you live! Another CAP-funded study that surveyed levels of pesticides in colony wax, pollen and bees found that levels of neonicotinoids, when present, were usually low in wax and pollen and they were absent in bees. The study did not report any detections for clothianidin but it is important to note that the survey also did not include many samples from the corn belt (Mullin et al. 2010). Another study showed that bees reared in comb from commercial beekeeping operations that had relatively high levels of pesticides (including neonics) took longer to develop into adults and had their adult life span reduced by four days (Wu et al. 2011). These two studies highlight the complexity of teasing out how hive contamination with pesticides may have sublethal effects on bees. The real conundrum is that to design informative experiments we usually have to work with one compound at a time to uncover mechanisms – whereas the bees in the field are exposed to many compounds (and other stressors) simultaneously!

What we can say at this point, is that the use of neonicotinoid seed treatments over hundreds of millions of acres annually, coupled with their extremely high toxicity to honey bees, and their persistence in plants (including nectar and pollen

that bees eat) combine to create an environment where it is very difficult for bees to avoid exposure to these highly toxic chemicals. That in itself makes this topic worthy of further investigation. Another thought that gives us pause is that if we are seeing bee kills in honey bees that have a colony to rely on, what is happening to the many species of native bees in North America that have to go it alone? BC

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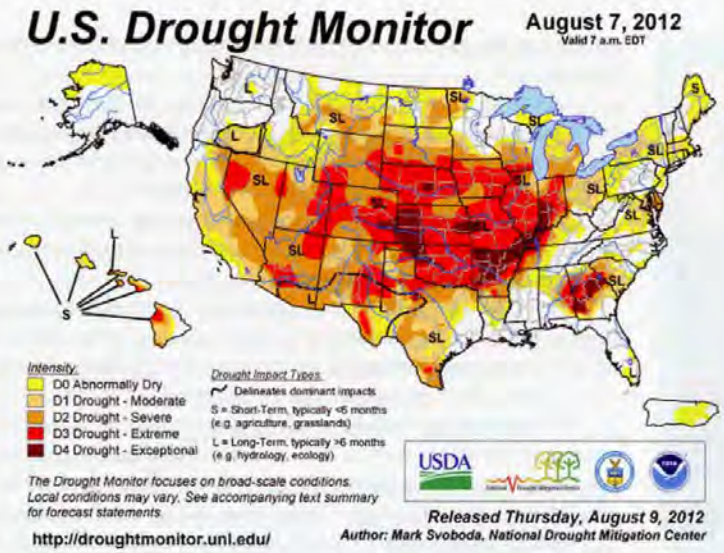


HOW DRY

Alan **Harman**

Climate change and global warming is increasingly being blamed as the planet experiences massive rain storms, intense heat, and paradoxically, spreading drought.

Analysts say global warming is making all major weather events much more intense.

While parts of Europe recently experienced their worst floods on record, 56% of mainland U.S. is experiencing drought conditions, marking the largest percentage of the country experiencing drought conditions on record.

Agriculture Secretary Tom Vilsack continued to add to the list of primary natural disaster areas due to damage and losses caused by the drought and excessive heat, with a early August count of 1,496 counties across 29 states due to drought.

The climate crisis is not only hurting agricultural producers – it hitting every American in the pocketbook hard.

Food prices are already rising in the face of crop losses and the culling of cattle by farmers without grass or water for their animals as the worst drought in 70 years shows no signs of easing.

In some areas, livestock markets are scheduling extra sale days to cope with the flow of animals from parched fields.

This will lead to higher prices for meat and dairy products.

Arkansas Beekeepers Association past president James Rhein says the drought is driving up the price of honey with new Arkansas honey selling for $15 a quart, up from $10 three years ago.

"Everything came on about a month early," Rhein told the *Baxter Bulletin* newspaper in Mountain Home, AR.

"Now the bees are eating what they gathered. "If (the drought) keeps on it's going to hurt."

Rhein says the drought has diminished blooming of wild plants that honey bees depend on, particularly white clover blossoms.

Fabens, Texas-based Ceballos Honey Farm tells KTSM-TV in El Paso the drought has seen production plunge.

"This spring we didn't have a production," Norma Calderon says. "This is the first Spring in about 40 years we haven't produced anything."

The farm has seen its number of hives cut in half to 3,000.

"Without rainwater, without sufficient irrigation water, the plants are not blooming," she says. "It's very hard. They're also dying of thirst."

Elsewhere, failing corn crops are being harvested for silage and this is seeing corn prices soar.

The U.S. Department of Agriculture says just 26% of the corn crop is in good to excellent shape, down from 62% at the same time last year. The U.S. accounts for more than half of all world exports of corn. It is used in dozens of products.

The U.S. soybean crop rated good or excellent is at just 31%, down from 40% in a week.

In Indiana, where all 92 counties now are in drought, Purdue Extension dairy specialist Mike Schutz says the situation is creating significant challenges for dairy farmers and their herds.

"Under extreme situations, selling the herd may ultimately be the best option to avoid substantial loss of equity in the farm," Schutz says.

Tel Aviv University researcher Colin Price predicts climate change will mean fewer thunderstorms around the world, but when they happen they will be much more violent.

Price says for every one degree of warming there will be about a 10% increase in lightning activity. The number of flash floods and forest fires will increase and there will be more damage to power lines and other infrastructure.

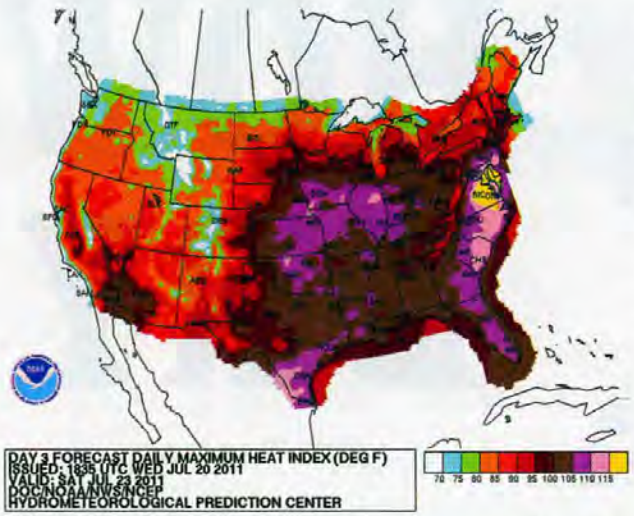
The National Oceanic and Atmospheric Administration (NOAA) says the average temperature in the U.S. during June was 71.2°F, some 2.0°F above the 20th century average.

This contributed to a record-warm first half of the year and the warmest 12-month period the nation has experienced since recordkeeping began in 1895.

Scorching temperatures during the second half of the month led many cities to set all-time temperature records.

The nation, as a whole, experienced its 10th driest June on record, with a nationally-averaged precipitation total of 2.27 inches, 0.62 inch below average. Record and near-record dry conditions were present across the Intermountain West, while Tropical Storm Debby dropped record precipitation across Florida.

Drier-than-average conditions were present from the West, through the Plains, into the Ohio Valley and Mid-



Atlantic. Wyoming had its driest June on record, with a precipitation total of 0.45 inch, some 1.27 inches below average. Eleven other states from Nevada to Kentucky had June precipitation totals ranking among their 10 driest.

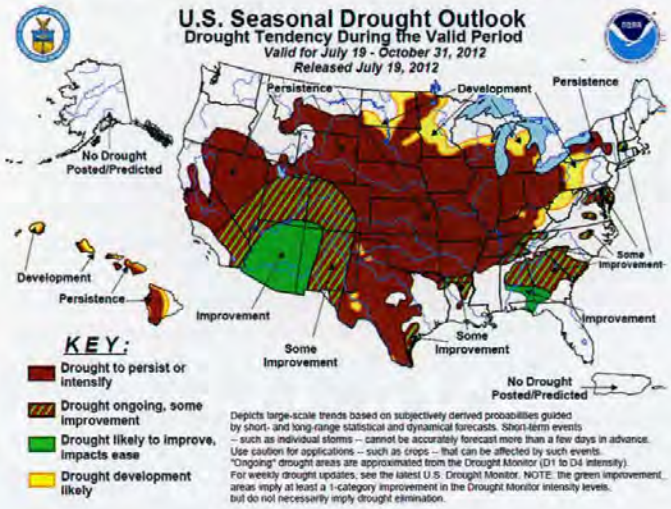
Warmer-than-average temperatures were anchored across the Intermountain West and much of the Great Plains during June. Colorado had its warmest June on record, with a statewide temperature 6.4°F above average. Seven additional states in the region had a top 10 warm June.

Cooler-than-average temperatures were present for the Pacific Northwest, where Washington had its seventh coolest June on record. Cooler-than-average conditions were also present for the Southeast, despite record warm temperatures towards the end of the month.

Record-breaking temperatures occurred across a large portion of the country during the second half of June. More than 170 all-time warm temperature records were broken or tied during the month.

The July 2011-June 2012 period was the warmest 12-month period of any 12-months on record for the contiguous U.S., narrowly surpassing the record broken last month for the June 2011-May 2012 period by 0.05°F.

The nationally-averaged temperature of 56.0°F was 3.2°F above the long term average. Every state across the contiguous U.S. had warmer than average tempera-



tures for the period, except Washington, which was near normal.

What rain that fell in some regions of the U.S. was no where near enough to save the crops and NOAA says hotter-than-normal temperatures are expected through at least October in most of the continental U.S.

American grain prices continue to set record highs as, while most of the wheat crop has been harvested, the corn and soybeans fields are being fried.

The U.S. Department of Agriculture says the drought now is seriously affecting U.S. agriculture, with impacts on the crop and livestock sectors and with the potential to increase food prices at the retail level.

Moderate to extreme drought conditions extend across more than half of the country, including much of the Midwest from western Nebraska to Ohio, and southern Minnesota through Arkansas. Corn and soybeans are widely produced throughout this region, along with significant acres of alfalfa, wheat, pasture and other crops.

Half-way through the 2012 crop year almost 40% of agricultural land is experiencing severe or greater drought, which makes the 2012 drought more extensive than any drought since the 1950s.

USDA says the drought has rapidly increased in severity over the past month and 62% of farms are located in areas experiencing drought.

About 65% of all crops and livestock are produced in areas experiencing at least moderate drought with 44% of cattle production and almost 40% of corn and soybean production in areas of severe drought.

More than 80% of the major field crops planted in the U.S. are covered by federal crop insurance, but livestock producers generally are not covered.

"With the ongoing drought expected to destroy or damage a portion of the field corn crop in Iowa and other states, an increase in the farm price of corn has already occurred and additional increases will depend on the extent of the drought," USDA says.

This will in turn, affect the price of other crops, such as soybeans, and other inputs in the food supply such as animal feed. Any effect on retail prices would depend on the severity of the drought and would begin to appear on supermarket shelves in the fall.

"We do not yet have specific estimates of how the drought will affect food prices," a USDA report says. "This will be estimated once we know the severity of the drought and, in turn, how much of the corn crop is destroyed.

"We will likely see impacts within two months for beef, pork, poultry and dairy – especially fluid milk. The full effects of the increase in corn prices for packaged and processed foods will likely take 10-12 months to move through to retail food prices."

The drought has the potential to increase retail prices for beef, pork, poultry, and dairy products first and foremost – later this year and into 2013.

In the short term, the USDA says drought conditions may lead to herd culling in response to higher feed costs, and short term increases in meat supply. This could decrease prices for some meat products in the short-term. That trend would reverse after time after product supplies shrink.

Historically, if the farm price of corn increases 50%, retail food prices as measured by the Consumer Price

Index (CPI) increases by 0.5% to 1%. More generally, as an overall commodity price index increases, about 14% to 15% of that increase is passed on to retail prices for products that use that commodity as an ingredient.

Farms

"A striking aspect of the 2012 drought is how the drought rapidly increased in severity in early July, during a critical time of crop development for corn and other commodities," the USDA says.

"Total cropland under severe or greater drought increased from 17% to 39%, while total value of crops exposed increased from 16% to 31%.

But the drought and global warming crisis is not confined to the U.S.

NOAA says the average combined global land and ocean surface temperature for June was 1.13°F above the 20th century average of 59.9°F and it was the fourth warmest June since records began in 1880.

USDA

Agriculture Secretary Tom Vilsack announced new flexibility and assistance in the U.S. Department of Agriculture's major conservation programs to help to livestock producers survive the drought.

"USDA will open opportunities for haying and grazing on lands enrolled in conservation programs while providing additional financial and technical assistance to help landowners through this drought. And we will deliver greater peace of mind to farmers dealing with this worsening drought by encouraging crop insurance companies to work with farmers through this challenging period."

The assistance involves four USDA programs – the Conservation Reserve Program (CRP), the Environmental Quality Incentives Program (EQIP), the Wetlands Reserve Program (WRP), and the Federal Crop Insurance Program.

Vilsack is using his discretionary authority to allow CRP land not yet classified as "under severe drought" but that are "abnormally dry" to be used for haying and grazing. CRP is a voluntary program that provides producers annual rental payments on their land in exchange for planting resource conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment.

Environmental Quality Incentives Program (EQIP)

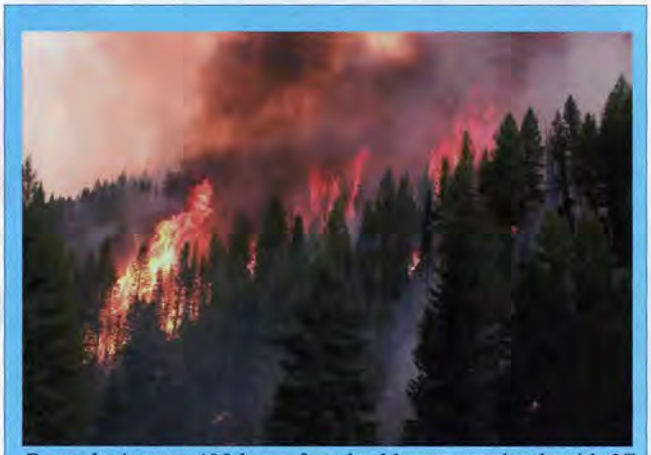
Farmers and ranchers will be allowed to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions.

Much of this land is planted to honey bee forage crops such as sweet clover. Millions of acres of CRP land were plowed this Spring to plant corn, which had become much more valuable as its use for biofuels picks up.

Vilsack is authorizing haying and grazing of WRP easement areas in drought-affected areas where such haying and grazing is consistent with conservation of wildlife habitat and wetlands. Bees fall under this program, too.

USDA will encourage crop insurance companies to voluntarily forego charging interest of 1.25% a month on unpaid crop insurance premiums for an extra 30 days, to November 1, for Spring crops.

To assist the crop insurance companies, USDA will not require crop insurance companies to pay uncollected producer premiums until one month later.



By early August 482 large fires had been contained, with 27 large fires still active. All told in 2012 to date, 37,076 fires had been reported, destroying 4,191,342 acres of forested land. This is actually down from year to date 2011,when 45,397 fires destroyed 6,065,671 acres...the worst year in the last 10.

The Northern Hemisphere land and ocean average surface temperature for June was the all-time warmest June on record, at 2.34°F above average.

The globally-averaged land surface temperature for June was also the all-time warmest June on record, at 1.93°F above average.

In Europe, German Chancellor Angela Merkel warns worse is to come and global warming will accelerate at a dramatic rate unless greenhouse gas emissions are reduced as quickly as possible.

This was backed up by new data showing global emissions of carbon dioxide (CO_2) – the main cause of global warming – increased by 3% last year to a record 34 billion tonnes.

The European Commission's Joint Research Center and the Netherlands Environmental Assessment Agency shows average emissions of CO_2 in China increased by 9% to 7.2 tonnes per capita. In the European Union, CO_2 emissions fell 3% to 7.5 tonnes per capita.

The U.S. remained one of the largest emitters of CO_2, with 17.3 tonnes per capita.

The increase in global emissions in 2011 is above the past decade's average annual increase of 2.7%, with a decrease in 2008 and a surge of 5% in 2010.

The top emitters contributing to the 34 billion tonnes of CO_2 last year were China (29%), the U.S. (16%), the EU (11%), India (6%), Russia (5%) and Japan (4%).

An estimated cumulative global total of 420 billion tonnes of CO_2 were emitted between 2000 and 2011 due to human activities, including deforestation.

Scientific literature suggests limiting the rise in average global temperature to two degrees above pre-industrial levels – the target adopted in UN climate negotiations – is possible only if cumulative CO_2 emissions from 2000-2050 do not exceed 1,000 to 1,500 billion tonnes.

"If the current global trend of increasing CO_2 emissions continues, cumulative emissions will surpass this limit within the next two decades," the report says.

It's not only the survival of the bees we have to worry about; it's the survival of the planet. BC

Alan Harman is a freelance writer who lives in Michigan and when he's not writing, he loves fishing.

ONE-ON-ONE

The Success Of Mentoring

Larry **Connor**

Last night my beekeeping buddy Sheldon and I were getting caught up after many weeks of my travel schedule and his travel schedule keeping us from talking bees--in person that is, since we are always on the phone checking in. We got onto the topic of Mentoring, and Sheldon said "I don't think you know how much I learned that day (several years ago) when you worked with me in my bees. I had read about all of the things we did, but by seeing how you did things really made a huge difference for me." We discussed quite a bit about this, and he wants to develop the entire mentoring theme for some future presentations. His day job deals with training people who work with individuals with special needs and concerns, and having the skills to train or mentor another person is one of his specialties.

It may be a bit risky, but I am going out on a limb with the following statement: **Bee clubs with growing numbers, more young people, women and minorities, are the ones who have a good mentoring program. Clubs without such programs can be described as either old-boy's networks, dying, or just plain dead.**

I know how critical mentoring was for me, first as a graduate student and again when I had to learn queen rearing and instrumental insemination for a business venture. My major professor spent time with me as we worked the Michigan State Apiary. Dr. E.C. "Bert" Martin was a story teller and an instinctive one-on-one teacher. He may not have been the most exciting lecturer in a classroom, but at the personal level he was extremely effective as a teacher. Dr. G.H. "Bud" Cale, Jr was the same way. He was not the writer that his father was (former editor of *The American Bee Journal*), but Bud was a great story teller. He would hold his cigarette in a way to minimize smoke getting into your face, and took great pleasure at showing and telling stories to one or two people.

Certain beekeeping skills, like grafting, require one-to-one attention.

For many people, learning about bees and how to manage colonies is a lot like riding on a roller coaster. There are periods where everything is going great, and exciting, but then there are periods when nothing goes right, and it is often frustrating. Mentors are there to cheer you on when the ride is going well, and more importantly there to help you during the tough climb to the top to sort through the problems you are having and get you back up to speed.

In the latest issue of *The Bee Line*, Maine State Beekeepers Association newsletter, Anne Frye writes: "The key ingredient needed for learning about bees? Work with bees. That makes sense, right? But if you only have a few hives and have been instructed to only open a hive once every three weeks (and then only keep it open for 15 minutes max), how can you learn what you need to? The benefit of having a willing mentor is incalculable."

Beekeepers who were mentored when they started with beekeeping are more willing to become mentors, and often do an excellent job. They greatly appreciate the benefits of helping new beekeepers learn the basics, and take a huge degree of pride when they see these new beekeepers succeed. Because they were mentored themselves, they have a well-developed sense of the importance of a private teacher or trainer in their own development as a beekeeper,

Individual mentor programs

Nobody set up the mentoring I received a long time ago, but were part of the life-situation I was in, first as a student, and later as a new employee. Not all of us are able to 'fall' into such a situation, or we may not be fortunate as I certainly was to be linked with top-quality mentors. Some new employees find themselves at a desk or work station with a study guide or computer learning guide. Uck. I am sure that someone has spent a great deal of time and money to determine the best way to train folks for adequate proficiency, but I doubt too many people return home to share what they learned

that day. And, when it comes to beekeeping, we need 'way above average' for a new person to master the task of keeping bees.

If you are a new beekeeper, or thinking about starting bees, check around to find your mentor. Start out and talk to the beekeeper selling honey at the town farmer's market and ask who might be able to take on a trainee in exchange for sweat equity. That is a time-tested process, where a new beekeeper works with a medium-sized operator to experience the wide range of chores that face the average beekeeping operation.

Group supported mentor programs

Or see if there is a beekeeper club nearby that has a reference list of potential mentors, like the ubiquitous swarm list, and start with that. That is a simple way for bee clubs and other organizations (nature centers, for example) to support mentoring without having a formal program. A potential mentor may list the conditions under which they take on a new student: having a meeting, the days of the week and months of availability, rules about phone calls and emails.

Easing into mentoring

The mentor list is a simple, somewhat effortless method of developing a mentoring program within a bee club. Someone will need to contact the mentor list for any changes, perhaps on an annual basis. This could be done by an annual email or mailing.

Steps in building a mentoring program

My first formal introduction to an informal mentoring program was at the Backyard Beekeepers group in Fairfield, County, Connecticut. Prior to each meeting, new beekeepers meet with a mentor (more experienced beekeeper) to review the prior month, project colony needs for the next month, and to discuss issues within the group. While not an one-on-one environment, this is a small group program that many other organizations are using because it does not involve a cost. Just the good support of a local beekeeper willing to give up 45 to 60 minutes before the main meeting and tolerate the same questions year after year.

Scholarships for new youth mentees

Another direction many club are using is to sponsor youth scholarships that require monthly meeting participation in pre-meeting report and Q & A sessions. Usually focused on teens, the programs may provide a colony of bees, a beekeeping course, bee suit (etc.), and a mentor. The club underwrite's the large cost of such a program by various fund-raising events. Groups like the Collin County Hobby Bee Club north of Dallas require a parent or guardian attend each meeting, which has the benefit of involving both child and adult in the bee club. After one year the scholarship student owns the bees and is expected to provide a new colony to another student in the future. At least that is the plan in theory.

Mentor-Mentee relationships

The person being mentored is called the mentee (a relatively new word) or protégé (a word around for hundreds of years), referring to the person being 'protected' during the learning process by a learned person, perhaps of some degree of success or fame. Since beekeeping is described as being both an art and a science, the use of the work protégé seems appropriate, at least is describing the relationship the two people.

The author and Stibon in Hawaii last year following WAS meeting. Small group meetings are not the same as mentoring, but offer some people a good learning environment.

Time, Days and months, email

Ideal programs have limits for the time of and duration of contact. The invitation to provide service should not be a 24-7 expectation.

Who goes to who's bees

In general, the student should go to the apiary of the teacher. That way there are support hives needed to replace missing equipment or bees. I like the model where the mentee keeps a few hives on the property of the mentor for the first season.

Fees

Rather than a direct charge for service, mentors often offer the sale of the first two hives, a classroom session, maybe a textbook, and related access to equipment for a certain time period. Two hives at $200 each, bee veil, smoker, hive tool, textbook and other items will go well over $500 per mentee, allowing the instructor some financial return on the time spent with the student. Should the mentor be required to drive to the student's apiary location, at least the cost of travel should be reimbursed.

Sweat Equity

If a person signs on to work for 20 to 50 hours over the course of the first year, without being compensated, the mentor has a trade for time spent teaching in exchange for inexperienced help. There will be times when the mentee will need to fail, and the mentor needs to be able to stand back and let this happen. Otherwise the mentee will not really learn, or may learn to expect the mentor to stop everything and help when all goes wrong.

When I met Sheldon he had two colonies. With the confidence he claims (or blames) he got from me, he will hit the 40 or 50 colony mark this season, since he still plans to make mid to late Fall splits (he does not always do what I recommend, but thinks for himself). During this four or five year period I have seen him blossom into a confident beekeeper. While our relationship is based on friendship and beer, it is nice to see someone develop into a person who is now very happy to share his knowledge with newer beekeepers.

Earlier I stated that the bee clubs that are growing are the ones with mentoring programs. The concept of the apprentice is ancient. It is one based on a gradual learning process between the experienced craftsman and the inexperienced but enthusiastic novice. These is much to be valued in these relationships, as this is the way in which the gentle art and science of bee husbandry is passed on to those will someday become teachers themselves.

Club mentoring programs draw a bit of criticism. Too expensive. Nobody signs up as a mentor. The mentees are too fussy, too demanding. Maybe a few of these folks need to take a chill pill. Others need to relax and enjoy the process. It may not be one hundred percent effective, but it has the success of prior generations behind it. BC

For the latest in bee books, see www.wicwas.com, or write Dr. Connor at Wicwas Pres, 1620 Miller Road, Kalamazoo MI 49001.

Make plans to attend the Texas Beekeepers Association Master Class taught by Dr. Connor at the annual convention in November, and make your reservations for the Super Sideliner Symposium to be held in January as part of the American Beekeeping Federation in Hersey, PA.

Honey Bees & Parasitic Mites, Part 2

James E. **Tew**

Setting in for a long, long battle.

Last month...

In last month's piece I spent my allocated space bemoaning all that Varroasis had put both bees and beekeepers through during the last quarter century. It was – and continues to be – a contorted and confusing situation. At an American Beekeeping Federation meeting about a decade ago, I took the time to review the program for that year. Approximately 45% of all the presentations were on some aspect of *Varroa* biology and its control. The program was nearly at the point where one could have asked, *"Is this a bee meeting or a mite meeting?"* Beekeepers and scientists were frantic to find some way suppress the rampant destruction that *Varroa* predation was causing.

The public was not with us

During my whining last month I indicated that the Africanized honey bee had thoroughly frightened the public. Movies, media coverage, talks at meetings all came together to present a fearful situation with rogue bees invading the U.S. In actuality, it was a fearful situation. These bees really are nasty.

Unlike now, beekeeping was not revered at that time. We had always had plenty of bees for honey and pollination. Swarms were common in the Spring season and low-cost honey was increasingly available from sources around the world. Related to bees and beekeeping, there was plenty of everything. Why should the public worry for bees? Yet, behind the Africanized bee facade, bees were dying by the apiary load. It was serious and the public was distracted. During this time, bees and beekeepers were on their own.

Finally, the public attitude (slowly) changed

It seems to me that the public's shift was due to the acceptance and establishment of Africanized honey bees (AHB) and ever declining numbers of common honey bees. Over the course of a few years the AHB took the territory it wanted and life went on for all of us – both bees and humans. We had no other choice. While the concern about the AHB did not die, it did evolve to be the issue for a more localized, specific audience.

Then, the recovery started slowly. It started with questions like, *"Where are all the honey bees? I never see them on the clover in my yard anymore."* It took several years, but the public perception of the bees' situation steadily improved. Then Colony Collapse Disorder (CCD) was all the news and the Green Movement embraced bees and, all-the-while, this information was passed far and wide by electronic media systems. So, here we are. Bees are still somewhat beleaguered but our industry is presently welcoming a significant number of new beekeepers and the public is probably better informed about bees than it has been since the agricultural age many generations ago.

What is it about these parasites?

What is it about these mites? I can't answer that question with authority. Others have said that *Varroa* is not a parasite that is well-adapted to honey bees, a reasonably new host for this mite. Our U.S. honey bees, indeed most honey bees around the world do not a have a natural defense mechanism to fend against these pests. Finally, the mite life cycle occurs primarily beneath the protective capping of bees in the pupal stage. Being protected like this makes it difficult to develop a pesticide delivery system to combat the mites. No doubt about it, after all these years, *Varroa* mites continue to be admiral foes.

An overview of the *Varroa* mite life cycle

Most beekeepers do not require great detail concerning these mites' life cycle, but some may. I offer two sources below for those who are interested in the details of *Varroa's* hidden developmental world[1]. A typical diagrammatically description of the cycle is presented below.

The fertile female mite is attracted to brood pheromones and enters the larval cell before it is capped. Apparently, due to a longer development time, drone larvae are much preferred – maybe by as much as ten times. The quiet female mite lives in and around the developing larvae often within the brood food. At about 12 days of development when the larvae has been capped and is in the pre-pupae form, the female mite feeds on larval blood and begins to lay up to five eggs. All this feeding and developing is causing physical damage to the developing larvae, but more importantly, viruses of different strains *(Presently, virologists can show that about 18 virus strains are involved in this infective stage.)* are transmitted by the mites. Once inside the developing bee, viruses cause problems like sac brood, deformed wings, and dark, shiny hairless black bees. Maybe something will turn up, but presently, I cannot list a single bee virus that is actually good for the bee.

Viruses may lurk in a seemingly healthy population of bees without exhibiting obvious symptoms. If the colony's defensive system is hampered by events like *Varroa* feeding, tracheal mite feeding, or Nosema infections, virus populations can increase dramatically. Other events can cause virus infections to be expressed. Confining the bees to the hive due to weather or relocation, inadequate stores of nectar and pollen, or pesticides – both in the hive and in the environment – can cause virus outbreaks. I ask that you take the following few comments as conversation and not as science, but I recall some early preliminary work that was done many years ago showing that nectar within a blossom could be contaminated with virus particles from infected bees. It was surmised that subsequent feed-

[1]Morse, Roger A., and Kim Flottum. 1997. *Honey Bee Pests, Predators, & Diseases.* A.I. Root, Medina, OH 44256. Chapter 14.
Sammataro, Diana, and Jay A. Yoder. 2012. *Honey Bee Colony Health – Challenges and Sustainable Solutions.* CRC Press, Boca Raton, FL 33487-2742. Chapter 5

Life cycle of Varroa *mites on honey bees.*[2]

ing could infect clean foragers. While nectar and pollen are not implicated in my quick review of virus spread, it would be very surprising if some of the bees' food commodities were not – in some way – occasionally involved in spreading this pathogen. While *Varroa* is documented as a culprit in spreading viruses, this parasite is not the *only* method of viral dissemination. It is highly probable that some of the pathogenic activities of viruses are fundamental causes of Colony Collapse Disorder (CCD).

Estimating *Varroa* Activity within the Hive

Quite a few years ago, *Varroa* infestations across the US became axiomatic. If you have bee hives, you also have *Varroa* – at some level. How do beekeepers tell *"what level?"*

At the colony entrance

Who does not look at the dump site in front of the colony to get an idea of what is happening inside? You can't tell everything, but you can tell a lot.

Varroa Symptoms at the Colony Entrance

- Twisted & deformed wings on dead and dying bees
- Crawling weak bees
- Pupae at hive front
- Reduced flight activity when compared to other colonies
- Mites on workers or drones (occasionally)

As usual, other than actually seeing mites on bees, the problem is that many other pathological events could cause many if not all of these symptoms. Pesticide effects, Nosema infections, and starvation could present in similar ways. For a more conclusive opinion, the hive will have to be opened and various sampling techniques will be needed.

Sampling Techniques for Estimating Varroa Populations

- Ether roll
- Sugar shake
- Colony/brood examination
- Sticky board
- Debris examination
- Screen bottom usage

Since sampled bees are not actually killed, the sugar shake procedure is popular with beekeepers. The ether roll procedure requires that about 300 bees be killed with ether inside a glass jar in order to count dead *Varroa* mites that stick to the glass wall. The technique for using the powdered sugar (icing sugar) is similar, but the bees survive the experience.

Sugar Shake Procedure[2] is as follows:

- Collect a lightly packed cup of bees (about 300 bees) from a frame of uncapped brood.

  A cup of bees ia bout half of a quart jar. To get these, pull a frame from the brood nest center – MAKING SURE THE QUEEN ISN'T ON IT – and thump it on the bottom of a plastic was pan. You may need two frames for a small colony. tip the bees into the corner of the pan and pour into the jar until half full.
- Quickly place bees into a wide-mouth jar fitted with a 1/8th inch wire mesh screen lid.
- Place two heaping tablespoons of powdered sugar through the screen.
- Shake jar thoroughly, tip it and shake five times like a salt shaker.
- Dump the sugar containing the mites on a white flat surface.
- Repeat the above two steps until virtually no more sugar shakes out.
- Count the mites.

It is a routine procedure for the curious beekeeper to always be looking for any colony malady – not just *Varroa* infestations. Check the brood and adult bees and always look to see what can be found in the bottom board debris.

Sticky board use seems to be relegated to scientists and a few dedicated beekeepers. Both of these groups readily present their findings to groups and through informational avenues. This technique is a good one but requires commitment on the part of the beekeeper.

Treatment Thresholds

This is not – and never has been – a clear, easy topic. Where is the hive located, what is the season, are supers on, and what is the colony's populations are all questions that affect the treatment threshold. But we must put something out there for you – a ballpark figure if nothing else. If you get 15 mites from a sugar shake procedure, then treat. At the time of year your colony is, by your estimation, small, average or BIG. If supers are on and your colonies are in the northern tier of states or Canada, consider the following recommendations[3].

[2]Illustration by Signe Nordin from Honey Bee Colony Health-Challenges and Sustainable Solutions. Sammataro and Yoder. CRC press. 2012.

[3]From: Varroa Mite Detection Methods. Apiculture Factsheet #222, British Columbia Ministry of Agriculture http://www.agf.gov.bc.ca/apiculture/factsheets/222_vardetect.htm

Some Chemical Controls

Product Trade Name	Active Ingredient	Chemical Class
Apiguard	Thymol	Essential oil
Apilife VAR	Thymol, eucalyptol, menthol, camphor	Essential oil
Apistan**	Fluvalinate	Synthetic pyrethroid
itras, Miticur, varol (tablets)	Formamidine	Formetanate, methanimidamide
tol	Cymiazole	Iminophenyl thiazolidine derivative
Apivar**	Amitraz	Amadine
Bayvarol**	Flumethrin	Synthetic pyrethroid
Check-Mite+**	Perizin, coumaphos	Organophosphate
Folbex	Bromopropylate	Chlorinated hydrocarbon
Sucrocide	Sucrose octanoate	Sugar esters
Hivestan	Fenpyroximate	Pyrazole (alkaloid)
Generic (e.g., MiteAway™)	Formic acid	Organic acid
Generic (Lactic acid)	Lactic acid	Organic acid
Generic (Oxalic acid)	Oxalic acid	Organic acid
Thymovar	Thymol	Essential oil
**No longer effective in some areas.		

#Mites/Colony Recommendations:

Less than 10 for small and medium, less than five for BIG

- not an immediate problem
- treat in September and October, after honey removal
- continue to monitor bimonthly

More than 10 for small or medium, more than five for BIG

- mite infestation will have an economic impact
- treat as soon as possible after removing honey; start in August, even if some crop potential is lost (Winter bee population must be protected)
- continue to monitor bimonthly

1000 mites +

- colony collapse imminent
- remove supers and treat immediately
- treat again in October

Much of the time

Even if you perform an evaluation, much of the time, the decision to treat/not treat is clearly an educated guess. In any given instance, some of you will choose to treat while others will not. They're your colonies, and it's your decision. Keep in mind that the control program need only kill about 50% of the mites to be effective.

Before you treat with anything

Read and follow label instructions as best you can. I suppose if an error is to be made, it should be that you *"under treat"* rather than put too much of anything on the colony. Use only registered and tested materials and dispose of the spent control product in a proper way. In all ways, respect the pesticide whether it is a synthetic or organic compound.

Chemical Control Products

In earlier years, when there were only a few control products, recommendations were reasonably easy to make, but not today. Your schedule, your personality, and what your beekeeper friends are using can influence your decision on what products to use. Today, you have multiple options.

I am not a role model in this instance, but if pushed to recommend a general program, I would suggest using the least amount of the least invasive products. Only when and if this does not work does one move to the "harder" chemical compounds. It's okay if you feel insecure. This is not an exact process and success is not guaranteed. The chart offers some of the common acarcide listings[4]. Not all products are approved in all states. Check with your state apiarist for conclusive information.

Non-Chemical Paradigms

Do nothing

A significant number of you (I estimate to be more than 1/3 of US beekeepers) choose to do absolutely nothing to control *Varroa* in your hives. Sometimes success is great while at other times, colonies die due to lack of treatment. However, wax and honey contamination are eliminated and treatment and labor costs are nil. Of course, one must make splits or buy package bees to make up the difference. Strangely, doing nothing is a viable option.

Trap crop using drones

Since drones are so much more attractive to questing female *Varroa* mites, there are drone comb devices that lure mites to drone pupae. The capped drones on the frames are subsequently killed along with (ideally) the majority of the mites[5]. Descriptions are on the web and a commercial device[6] that is available that makes this drone sacrifice possible without opening the colony.

Uncertain Feelings about this *Varroa* thing

It is common – even normal – to feel uncertain about *Varroa* thresholds and subsequent control programs. This is not an arena that lends itself to exact and permanent controls. Determine what others around you are doing. Find two products that work for you and rotate them. Be prepared to select new products as resistance develops. Know that at times, your program will likely fail. But alternatively, know that at other times, your program will work and then you will have swarming problems, equipment shortages and tons of honey to process. It's just beekeeping. One way or the other, try to enjoy it. BC

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[4]Pesticide source list.
[5]Drone Brood Removal for the Management of Varroa destructor http://www.masterbeekeeper.org/pdf/dronecomb_exchange.pdf
[6]MiteZapper Frame from http://www.mitezapper.com/

Scottish Beekeepers' Association

100 Years And Counting

Una **Robertson**

'The Scottish Beekeepers' Association was founded on 25th May, 1912, to unite the beekeepers of Scotland, for their mutual benefit, in a national confederation, and to promote, by the concerted action of its members, the extension and general advancement of beekeeping throughout the land.' So read the Minutes of this auspicious event.

This year, 2012, sees the Scottish Beekeepers' Association [S.B.A.] celebrating its Centenary. Much has happened during the intervening years; there have been good times and others best described as challenging; momentous occasions and periods when little was newsworthy; seasons recorded as being 'the worst in living memory' and, just occasionally, the rarely experienced 'wonderful season.' Whatever else has been occurring across the years the national beekeeping association has faithfully served the interests of the beekeepers of Scotland.

G.W. Avery

Once the decision had been taken to establish a national association, the meeting drew up a list of 12 principle objectives: these included readily-available lectures and expert advice for everyone, a display to promote beekeeping at the Highland & Agricultural Society's annual show [a major event in the Scottish calendar still], extirpation of disease, setting up of a library and holding examinations – many of which continue to occupy the Executive to this day. Also drafted were the rules and regulations.

However, the new Association looked distinctly fragile during its first two years and it might well have seemed that this attempt would be following two previous efforts, neither of which had survived.

First in the field had been The Caledonian Apiarian & Entomological Society [C.A.E.S.] of 1874. The immediate spark for this initiative, although other longer term reasons lay in the background, was due to C.N. Abbott, the appliance dealer. He launched the British Beekeepers' Journal, the first such magazine in Britain, on 1st May 1873, and called for a great exhibition to promote beekeeping. In September the following year, 300 exhibits in 40 different classes were massed in London's Crystal Palace. The quality of the Scottish honey on display, produced in Stewarton hives*, proved a revelation and won several major prizes. The next month saw the founding of the C.A.E.S. Despite being active for some 15 years, it never managed to attract a nationwide membership and by 1889 had ceased to exist.

Two years later another attempt at establishing a national association was made by Mr [later Sir] Thomas Gibson Carmichael of Chiefswood, near Melrose in the Borders who promoted and funded it under the title of the Scottish Beekeepers' Association. Many of its objectives would be familiar today. At its peak its membership counted seven branch associations and 320 individuals. Sir Thomas resigned as the Secretary in 1895 on being elected as Member of Parliament for Midlothian and without his support the Association failed. At that point, a fortnightly magazine called The Scottish Beekeeper appeared on the scene, offering its readership a series of wide-ranging articles. The magazine ran for a little over two years and then, just as suddenly as it had appeared, it stopped publication.

The early years of the twentieth century witnessed the devastation to beekeeping caused by 'Isle of Wight Disease' [IoW] so-called because it was there that the effects first appeared, although it then spread rapidly across the whole country. Apiaries were wiped out and, when re-stocked, were wiped out again; the cause was unknown and beekeepers were becoming demoralized.

Meantime, a farmer and lifelong beekeeper, G.W. Avery, was in the Lake District and he became a well-known and respected figure, advising the local beekeepers in the fight against the ravages of Foul Brood and Isle of Wight Disease. It was a sad day for them in 1911 when he was appointed the very first Lecturer in Beekeeping at the Edinburgh & East of Scotland College of Agriculture.

Once in post Avery called for a preliminary meeting to discuss the possibility of establishing a national beekeeping organization. This was well attended and letters of support were received 'from Shetland to Dumfries-shire', it was said. A committee was appointed to make the necessary arrangements for the inaugural meeting to be held on 25th May in the hope that many beekeepers and others would be present. The meeting took place as planned, the S.B.A. was set up and its constitution drafted.

Despite the initial favorable response to the concept, only a handful of individuals actually joined and only one county association – that of Midlothian. Several meetings to address the situation took place and in February 1914 it was agreed to reconstitute the S.B.A. on the basis of federation, thereby replacing the original 'affiliation.' This proved to be successful and membership soared thereafter. The first six months saw a significant increase of 280 in the membership and, including 'isolated' members [ie. individuals], numbered almost 800. The following year, membership was close to 1,000, which meant that within 18 months numbers had quadrupled and three new

John W. Moir

County Associations had been formed. Further substantial increases continued to be recorded.

Our forebears ensured that the S.B.A. was built on firm foundations. Standing Committees to oversee specific facets important to beekeeping were quickly established. The basic framework survives to this day although some modifications and updating of their remits has occurred. The earliest Committees to be set up were those relating to the Library, to Markets, to Shows, Propaganda, and Legislation & Diseases, with those for Finance and Education not far behind. By 1918 a scheme for examinations was ready to be launched.

Some years later a Committee entitled 'Beekeeping for Women' was formed to give advice on beekeeping to various women's organizations being set up after the First World War. However, this one was short lived and was dispensed with in 1927, the reason given being that 'the ladies were equally eligible on the other committees.' Coincidence or not, that same year the S.B.A. elected its first Lady President, Mrs. J.E.P. Robertson of Edinburgh. In 1929 she gave the opening lecture at the 7th London Honey Show, speaking on 'The Value of Honey', a lecture that, the report declared, 'showed much preparation and experience – moreover, those who were present were delighted with her charming brogue.'

One cannot have beekeepers without books it seems. Both the earlier national associations had collected together a supply of suitable material and in 1912, the S.B.A. aimed to assist its educational activities 'by maintaining a library of the most advanced works on apiculture.' John Moir started almost immediately, as he himself recalled, by buying a few old books on bees and a couple of newer works. Then, on 10th January 1913 he began on the formation of the library by buying eight books; by the end of the year he had bought 34 books altogether. The library grew apace. Moir corresponded with beekeepers elsewhere, such as the Dadant's, and sent them some early bee books, unwanted duplicates and so on, receiving in exchange a number of their books or journals.

The S.B.A. had always intended to publish its own monthly magazine but it was not until 1924 that The Scottish Beekeeper, the second of the name, became a reality. In the first issue the Editor wrote: 'The aim is that the paper be instructive, educative, and interesting, and this can best be accomplished by a united effort, by constructive, not destructive criticism, and by loyal support.'

From that date on, evidence is plentiful regarding beekeeping activities, management methods and equipment, and every other imaginable subject relating

Mrs. J.E.P. Robertson

to the honey bee. Many the controversy fought out between beekeepers; many a topic thought 'contemporary' nowadays was debated in the early issues; and many the Personality with a capital P to be found in its pages.

What of beekeeping itself in Scotland itself over these last one hundred years? Although the moveable frame hive in all its many varieties was commonplace by 1912, skep beekeeping was still in evidence. There were those who thought the modern hive was too expensive for the working man to buy and that management methods in general had become too complicated; others saw skeps as a source of disease. Many were the arguments expounded in the pages of the beekeeping press on their relative advantages or disadvantages! Items of equipment were recognisably the same as today's but they have, of course, been developed or improved.

Clover and heather provided the main sources of forage, but others were raspberry, strawberry, wild mustard, fruits such as apple, currant and gooseberry, field beans [reckoned as 'poor'] and trees such as lime and sycamore. Interestingly, in the very first issue of the magazine G.W. Avery wrote: 'We have noticed that there is an increasing number of folks who keep bees in places such as city or suburban gardens, where there must seldom be any chance of a paying honey harvest. . .' but he conceded that such beekeepers might be 'lessening the distance between the point of view of the city and the country dweller.' Nowadays he might have to revise his opinion as beekeepers are just as likely to be found in the towns and cities of Scotland as they are in the countryside. Suburban gardens, parks, golf courses and other open areas provide sustenance for the bees for much of the year – although inclement weather is always a limiting factor.

The Scottish Beekeepers' Association was founded at a time of stress, when beekeeping was in decline. The first report by Council to the members included the words: *'UNION IS STRENGTH: and Scotland needs a strong national beekeeping Association to unite her beekeepers to secure the greatest possible advance . . . by training and working together . . . to our mutual advantage, and to present a united front to the ravages of bee diseases. Never was a strong, central association so necessary as now, to coordinate the many efforts that are so essential, and the new advances being made by the Agricultural Colleges and others to benefit beekeeping.'*

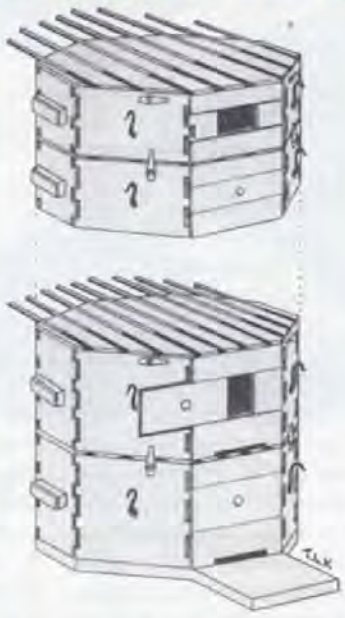
For 100 years the S.B.A. has carried out its fundamental objectives. It continues to be the national association, looking after the interests of some forty Local Associations as well as its many individual members. The administrative framework established a century ago continues to function well. We still have Presidents and an Executive Committee; Conveners still head their Standing Committees; honey shows are held and expertise is rewarded. We have two further reasons to count our blessings; the Moir Library is in good order, with well-filled shelves and additional material coming in regularly. Secondly, the Scottish Beekeeper continues to be 'instructive, educative and interesting' and the series of bound volumes are an integral part of our history.

This month we will gather together in the Stirling Management Centre, located in the extensive grounds of the University of Stirling, for a weekend of lectures, workshops, demonstrations and a Centenary Dinner and Ceilidh. There is also an optional Post-Conference outing to a local apiary and a honey packing plant.

The S.B.A. Centenary Celebration Conference, being held in conjunction with the Bee Improvement and Bee Breeders' Association [B.I.B.B.A.], will be an occasion to give thanks for all those who, across the years, have worked voluntarily and given freely of their skills to maintain the Association, to the promotion of its objectives in the widest possible sense and to ensure the progress of beekeeping in Scotland. However, we will not only be looking back to our origins, we will be gathering together to consider the present but, above all, we will be looking to give our national association a spectacular launch into its second century. **BC**

Una Robertson is the Conveyor of the John W. Moir Library.

Stewarton Hives



Robert Kerr was a cabinet maker by trade and a beekeeper. In 1819 he produced a hive which he named after his home town – Stewarton, in Ayrshire. He made improvements to the original designs for a hive formed of octagonal wooden boxes, originally patented by John Gedde of Falkland in the 1660s. Gedde's aim was to reduce the incidence of swarming as well as to obviate the autumn culling of the bees. He claimed to have devised the hive himself but the design can be traced back another 20 years or so to the Revd. William Mew of Eastington, Gloucestershire.

Lessons Gleaned

From The Wisdom Of The Honey Bee

Ross **Conrad**

A common belief among many indigenous cultures is that everything in nature has something to teach us if we are open to it in our hearts and our minds. As beekeepers, one of our most intimate connections with the natural world is through the honey bee: a creature that looks very different from us, and yet is much more like us than it would seem at first glance. This connectedness we have to the honey bee naturally leads to contemplation and reflection on what we observe in the hive and in the colony's actions.

As I embarked upon my beekeeping career, one of the first lessons a hive taught me was about myself and my reaction to the bees . . . or more specifically, my reaction to the fear and pain of being stung. Will the bees all come after me at once? How badly will the sting hurt? Will I have an allergic reaction to the bee sting?

What makes this first lesson of learning to overcome the fear of pain and stings all the more potent is the fact that we tend to put off facing this fear for as long as possible. We cover up with a veil, bee suit, and gloves. We use smoke in an attempt to keep the bees calm. We only open our hives on sunny warm days when many of the bees have vacated the hive and are out foraging for nectar and pollen. All our efforts to avoid this painful lesson only serve to amplify any expectations that we may be carrying, but despite our best efforts, if we keep bees long enough we eventually get stung. All the fearful questions we have had building up inside of us tend to be answered when we experience that first sting in the beeyard.

One way to remove some of the fear and trepidation of that initial sting is to sting yourself first. This can be done by giving yourself a test sting, like the test sting an apitherapist will provide someone who is to receive bee venom therapy. Allow a bee to sting you and a fraction of a second later, scratch the stinger out of the skin. This results in a very small dose of bee venom being injected into the body. In this way, you will get an idea of what a full sting may feel like. Then wait for 15-20 minutes as see how you feel. If you do not begin to have a full body reaction such as breaking out all over in a rash (known as hives), or experiencing a drop in blood pressure, then chances are good that you are not hypersensitive to bee venom and will not suffer anaphylactic shock. When performing this test it is wise to have a good friend, and an EpiPen® (epinephrine) on hand . . . just in case.

Once you have confirmed that you are not hypersensitive to honey bee venom, you can give yourself a full bee sting (leaving the stinger in for 10-15 minutes) if you want to know how it feels to receive a full dose of a sting's venom. Just be sure to sting an area of your body that you won't be using a lot in the next few days since the localized swelling may make walking (if stung in the leg or foot) or using your hands (if stung in the hand or forearm) difficult. Note: be sure to remove all rings from your fingers if you are going to sting your hand or forearm.

By giving yourself those first stings, you remove the unexpected "surprise" factor and will have greater control over the timing and environment within which the stinging occurs. When you have a good idea of what to expect and know that you are not likely to suffer from anaphylaxis, the worst psychological aspects of a bee sting are removed and the physical symptoms of an unexpected sting are easier to handle. This can be important since for some, the psychological response to being stung can be worse than the actual physical response.

The other early lesson about ourselves we gain from working with honey bees is the lesson of responsibility. When we take on the responsibility of caring for a hive, it becomes incumbent upon us to be sure the colony is provided with a adequate place to live, enough food and water, and help in defending themselves from disease and pests. Sure, the lesson of responsibility can be learned by taking care of most any animal, though bees tend to be easier since unlike most other animals that are kept as pets or livestock, they don't require daily attention. Yet stepping up to the responsibility of beekeeping can also be more challenging, since despite feelings of strong affection that some of us have for the bee, we are not able to pet bees or play with them like we can with a dog or cat...even though some beekeepers do try.

The workers, queens, and drones must all work together in a cooperative manner in order for the hive to survive.

Once we have started to grow in our relationship with the bees, we stop focusing so much on ourselves and start to focus more on the bees. Through their actions the honey bee has many lessons we can learn and one of the first that comes to mind is the importance of community and working together in cooperation.

A colony of bees is a superorganism, where all the individuals within the hive act as one. The bees know that they can not survive long on their own, but that they need

each other and they can only survive by working together cooperatively. It is this cooperative approach to life that increases the ability for many organisms to survive and one of the reasons that the honey bee survived the great extinction that occurred during the time of the dinosaur, about 65 million years ago. Other animals that make use of the wisdom of cooperation including herds of bison, flocks of birds, schools of fish, and packs of wolves.

This is an important lesson that seems to have gotten lost somewhere long the way in our culture. Rather than promote and support strong and close communities, American society glorifies the rugged individual who carves out a place for themselves without the help of others. We all have our own homes, our own cars, our own appliances, and our own credit cards so we don't need our neighbors or anyone else's help in securing our daily needs. The ATM, Internet, and home delivery allow us to obtain the requirements for living without having to even interact with another human being. This erosion of community and direct reliance upon others in our lives tends to isolate us and makes us less resilient in the face of hardship that can deprive us of the resources we may need to overcoming challenges.

The unmated virgin queen along with the workers and drones that remain behind after a queen swarms, rely on the large store of food left behind to help guarantee their future survival.

Anther great lesson that the honey bee can provide is about the gift of generosity and confidence in oneself. When a colony decides to reproduce, the queen bee in the act of swarming will leave behind her home, the nest of combs, most of the food the colony has gathered and a large percentage of her family, her community . . . all in order to help guarantee the survival of the new colony that is created when a virgin queen successfully mates and takes over the reproductive duties of the hive. The old queen has already proven herself successful at being able to create a prosperous home and she trusts in her ability to do so again.

The incredible act of generosity expressed by the honey bee is relevant because the honey bee is more like us than almost any other animal. Like us humans (and all mammals), the bee in a manner of speaking gives birth to its young alive (as the fully developed bee chews its way out of its birthing cell), the bee like all mammals, feeds its young a milky substance, and like mammals the bee keeps its core body temperature, in the brood nest, elevated (usually around 94°F.) But beyond this, the honey bee is like us in that it builds its own home, has a very complex social structure, and like humans, the honey bee gathers and stores the food it needs to get through times of dearth, and since they don't hibernate like most bees, wasps and ants, it provisions itself with the energy it needs to keep warm during Winter in cold climates.

Next month we will continue this exploration of the lessons we can learn from the bees' response to the world around them by looking at what the honey bee can teach us about our personal actions, contributions to society and our communities, and our choice of livelihood. BC

Ross Conrad is author of Natural Beekeeping: Organic Approaches to Modern Apiculture.

Planning A Beekeeping Business III

Managing Growth & Increasing Revenue

Managing Growth and Increasing Revenue

Warm Colors Apiary has been a full-time business for 12 years. I consider our operation a success and a maturing business. The most important work Bonita and I did to move our apiary from an incurring debt to an income producer was writing a business plan with achievable goals. We became profitable after three years, grew our sales as honey production increased, and learned to maintain hundreds of colonies. We have also hit our growth ceiling. Another way to see this is that we decided not to continue to expand our apiary as a way to increase honey production. Continued growth would require considerable new investment in bees, equipment and labor. It would also raise our operating costs requiring the need to meet higher monthly and annual expenses. After re-working the business plan, we decided additional investment would not significantly increase personal income, or our free time.

Growth is not the only way to increase revenue. Reducing the cost of operating the business, and increasing the price of your honey will also leave more money in your pocket.

We live in a country where name recognition has value. Advertisers have made "Branding" a science by creating images that are memorable, that fit our lifestyles, and promote our sense of identity with the product. Large Businesses spend a lot of money putting a positive face on their brand, and even more to protect their good name. They understand how important product recognition and a positive image are to a customer's decision to buy. The same holds true for a small beekeeping business.

Your reputation has value beyond the product you sell. My thought on this is that a small business earns brand loyalty by having quality products, and by building lasting relationships with customers. It is a waste of time for a local business to spend money trying to create a positive image with advertising, unless you have a quality product. Creating a brand takes time and is more resilient when you earn it, than when you try to convince customers. Your job is to get your name in front of potential customers and have them try your honey. Remember that the job of marketing is to identify your customers and introduce them to your products. Word of mouth from one satisfied customer to the next is your best advertisement.

A few low cost ways to promote honey and get your apiary name in front of new customers is to team up with other businesses willing to promote your products to their customers. Make it easy for them by doing the work.

- Sell honey to businesses that use it as an ingredient in their products. Ask them to add your name to their labels. Provide stickers with your name and logo.
- Ask restaurants to include your apiary name on the menu. Offer honey bears for the tables with your label.
- Offer honey fact sheets as a part of your honey display in stores. The National Honey Board has some excellent promotional brochures, recipes, and materials for members.

Speak to organizations, the media, and provide honey tastings at the stores buying your honey.

- Join Organizations with shared goals. The Farm Bureau, National, State and County Beekeeping Associations, the local Chamber of Commerce, and other business organizations can introduce you to a wide network of people that can help you with your business.
- Send local newspapers information about your business, contact local television stations and offer to talk about honey bees and volunteer to participate in future promotional events. Media exposure that is not paid advertising is valuable and has greater credibility with readers and viewers.
- Outreach – talk to school children, garden clubs, and other interested groups. You do not need to be an expert to provide informative talks to non-beekeepers. It can be a positive experience for participants and for you. Bring an observation hive and props to hold their attention.

Delivering your honey costs time, gasoline, and is one of the more challenging tasks for the small business. Distribution is an add on cost and you can reduce this expense with better planning and improving efficiency with taking and dropping off orders.

- Plan delivery routes to include all customers along the route. Call those not on the order list to encourage them to take the next order when you are delivering.
- Optimize the deliveries by setting regular days and weeks for a delivery route.
- Anticipate large orders and pack

The most important work we did was write a business plan with achievable goals.

ahead of time. Schedule bottling around large orders. Include smaller deliveries when filling the larger orders to spread out delivery costs.

Competition and Free market spirit is far easier to practice when you are clear about what objectives you will follow to reach your business goals. I never compete by running my competitors down or selling honey to beat another labels price. Both are dead-end strategies and short term sales arguments. Have a good product, know your costs, and sell based on quality and a fair (profitable) price.

- Rules for Negotiating price.

1. Know your product – match quality with price range, articulate the reasons your honey is a good product.
2. Know yourself – have confidence in your products and be firm on what you need to get for a price. Never sell for less then it costs, or to under price the competition. Losing money is not going to keep you in business.
3. Know the Sellers – their situation, supply & demand, develop a relationship with the buyer.
4. Know how to fit into the situation – Local, unprocessed honey sells well in some stores, but not in all of them. Scout potential markets and identify why customers buy. Do they look for quality, or are they shopping for low prices? Remember objective #1 is to find markets that will value the quality of your honey, and be willing to pay the value added price.

Keeping Profits is often a matter of not spending in the first place. The following suggestions are areas we have been able to cut costs quickly and with big paybacks in increased income.

Avoid Debt – interest adds to the product costs, becomes part of the monthy overhead, and should be viewed as an increase in the cost of producing your products. As Rockfeller once said "There are those who pay interest on debt, and those who collect the interest. I prefer to collect the interest". A business credit card, and credit lines are necessary but you should be paying the balance off each month, and not charging more than can be repaid quickly.

- Personal debt is the same for a small business person. Never borrow for living expenses. This is a clear warning sign of financial disaster.

Efficiency is always a smart place to look for savings. Much of my focus has been to improve the tasks of operating the apiary. I am really looking for ways to save time by simplifying or eliminating duplication of effort, allowing more time for those activities that pay the bills. Sometimes buying a piece of equipment, keeping track of inventory, having an extra person to help with labor intensive tasks, or finding a better price on jars and labels can make a significant change to the unit cost of a jar of honey. Improving efficiency is ongoing and should be at the top of the business plan as a task to review often.

Making it happen by influencing your markets is something not promoted by most Bee Associations. Most of our local and state Associations are non-profit and we shy away from trying to influence political decisions, and creation of new markets. Many business associations do exist that take active roles in promoting political and marketing ideas that can improve sales, protect business interests, and lobby for agriculture and beekeeping support by state and federal government. When you become a small business you join the ranks of tens of thousands of business people, and you will quickly find participation in political, community, and professional organizations is part self-education and part self-defense.

Warm Colors Apiary has benefited by supporting and participating in the following organizations.

CISA Community Involved in Sustaining Agriculture – This organization started with local farmers wanting to promote local buying and direct sales. It has been successful in raising the farm incomes in our region by promoting the value of locally grown products, the value of keeping farms profitable, and enhancing quality of life by protecting open space.

MDAR Massachusetts Department of Agricultural Resources – Politics is a commodity and agriculture is a tax producer for state revenues. MDAR offers low cost and free training in how to start and operate a farm business. Most state agriculture departments exist to promote and assist farmers. Remember beekeepers are an important part of agriculture. The state apiary inspector works for MDAR.

Extension Service is part of the University of Massachusetts. Apiculture is no longer represented in our extension service, but we have been working with University faculty and staff to revise research and lab support for our state beekeepers.

The Eastern Apicultural Society, State and Local bee associations are a must for any beekeeper today. Going it alone is a fool's errand with so many threats to beekeeping. I consider participation in bee organizations a neccessity as a self-employed beekeeper. I receive training, network with other professional beekeepers, and am regularly introduced to valuable insights into research and management. The strength of these groups is directly proportionate to the number of active volunteers and quality of the leadership.

Talking to other groups and acting the ambassador for beekeeping is another way to promote honey bees and products. We are living in a time where the media has been regularly telling the public that honey bees are in trouble. People want to understand the situation, and many want to know how they can help. Beekeepers need to educate the public.

Expand your horizons and stay informed. Although I would never claim to be a producer of organic honey, Warm Colors is active with the Massachusetts Organic Farmers Association (past Board of Directors and Treasurer). I regularly offer beekeeping workshops at the winter conference, and promote organic lawncare (no pesticides) to homeowners. NOFA and its state associations are a source of ideas that help reduce toxins in the environment and that helps beekeeping. Membership has also provided introductions to organic farmers with land to setup new beeyards.

Budgets save money before you

spend it. On paper you can lower input costs and plan ways to increase profits. Planning is probably the best way to improve your financial situation as it takes away so much risk that wastes resources. All the suggestions I have been making boil down to lowering the costs of producing and delivering, while increasing the value of your honey.

Rules for Budgets:

- Match financial needs with budgeted income. In other words write down everything you spend, and then project the production required to pay the expenses. Postpone spending that can wait, prioritize those items absolutely neccessary to produce honey.
- Always cover the cost of the business before taking a salary. This is difficult when you are building up your apiary, but loans, having cash to pay bills, and acquiring credit lines with vendors are all about records that support a positive financial picture. Keep the business financially healthy by making weekly reviews of cash coming in, and what you have sold. Base your salary or wages on what income is received after business expenses.
- Balance spending with savings. Having a financial safety net of several months savings should be part of your plan for future security. Self-employment requires greater financial discipline than having a job with a guaranteed amount in your paycheck. At Warm Colors we have very good sales months and some lean months requiring us to average income. We keep a balance in the bank that we do not touch unless absolutely necessary. An example of this is two years ago when I broke the heal of my foot and could not work the bees for a month. That impacted most aspects of our production and we lost income. We had the money to pay the bills and that removed a great deal of stress as I mended. Buffering with savings for those rainy days is not optional for the self-employed – it is required.
- Adopt a long view of your business: identify seasonal, annual, and monthly cycles. Keep records and review them quarterly. We have been tracking our business for twelve years and it surprises me how predictable much of our business has become. Information is useful when planning. We can predict when to order equipment and increase inventory, when to increase bulk purchases to save some money, anticipate estimated tax payments, or which year to make major purchases and help our tax situation. I have been operating on a five year plan that is reviewed each year.
- Expanding the size of your business, increasing the area you market honey & adjusting pricing will be based more on your personal situation and life goals. Bonita and I are content with the size of our apiary and at our age see no advantage to expanding the production capacity or marketing area. Pricing will likely increase and that will stay ahead of costs and inflation for the short run.

There are few rewards as satisfying as operating a profitable business and making a living with honey bees.

This does not mean we will stagnate or stop reinventing our business. I am now a member of the Russian Queen Breeders Association and have begun the transition to becoming a Russian bee operation. This will take at least two years, but I hope to eventually produce certified Russian Queens for sale to other beekeepers. I see the Russian bee as having many desirable qualities needed by backyard and commercial beekeepers. At this time these Queens are difficult to find and only a handful of certified breeders are producing them. More then the idea of selling Queens is the renewed passion it brings to my beekeeping. I have much to learn about the Russian bee and from the core members of the RQBA.

Conclusion

Starting a beekeeping business at this time in history can work. Staying small is an advantage, selling local is preferred, and having some diversity adds stability to your business. Local honey is in demand, prices have never been higher, and selling local honey in local markets is a competitive advantage for the small apiary.

By starting small you learn the business as it grows. Selling, negotiating prices, and developing distribution routes take time and experience. The costs of expanding the business are absorbed over several years, and if debt can be avoided, you can pay as you go. This reduces the financial risk while lowering the overall cost of production. All of these circumstances greatly increase your competitive advantage in local markets. There are few rewards as satifying as operating a profitable business, and making a living by working with honey bees. BC

Planning Pollination

The more you know before you begin, the better you'll be able to negotiate contracts, know your costs, and what to expect.

Dewey **Caron**

I have been surveying east coast beekeepers who rent colonies for pollination for the last four years and this year with Ramish Sagili, continued a 25 continuous year survey of Dr. Mike Burgett of Pacific Northwest (PNW) beekeepers. The magnitude of differences is almost 10 to 1 west to east coast comparison but there are also some striking similarities. USDA, NASS statistics do not report pollination income so these two surveys provide a compelling snapshot of our bee industry.

In 2011, 47 eastern beekeepers (20 commercial, 19 semi-commercial and eight hobbyists) provided pollination rental information returning a one page mail survey. Sixty three PNW beekeepers did likewise (50 commercial and 13 semi-commercial beekeepers). The 47 eastern beekeepers managed 25,450 colonies total (Commercials averaged 1177 col/individual, semi-commercials = 153 average col/individual and hobbyists 22.5 col/individual). The western commercial beekeepers managed 155,424 colonies, four times as many as the eastern beekeepers and averaged more colonies (simple avg 3108 colonies for western commercials, 228 colony average for semi-commercials). Eastern beekeepers reported 3.7 rentals/individual and western beekeepers averaged 4.1 rentals/individual.

Rental fee was reported for 234 crop rental opportunities of 16 crops for a total of 254,000 colony rentals by western beekeepers. Eastern rentals included 149 colony rentals of 17 crops for a total of 32,054 colony rentals (12% of their western counterparts). Eastern beekeepers 'weighted rental fee for 2011 was $74.80, a decrease of $3.70 (9.5%) from the 2010 survey. The western pollinator weighted fee was $90.62, an increase of 72 cents over the 2009 weighted average and $20.23 over the drastic drop of the previous year. Total reported income for western beekeepers was just under $23 million while for the eastern beekeepers the total pollination income was almost $2.4 million.

Figure 1 presents the weighted pollination fee for the 12 most recent survey years of western beekeepers. The middle bolded line w/circles is the average weighted pollination fee for all rentals. Almond rentals are shown as top bold line w/diamonds (it consistently is the top fee generator for beekeepers and beginning in 2004 significantly increased in pollination fee generation.) Tree fruit rentals are illustrated with lower bold line w/squares. Tree fruits, pears, sweet cherries and apples, are the 2nd major fee for rental income for western beekeepers. Also shown, all running more or less together, are blueberry, vegetable seed crops (principally carrot, radish & onion), and squash & pumpkin crop average rental fees.

Figure 2 presents the weighted pollination fee for the four survey years of eastern beekeepers. The top line with diamonds (no data collected in 2008) represents the almond weighted pollination fee, the bolded middle line with squares shows the weighted average pollination fee for all crops reported (note that the average fee reported for the 2010 survey

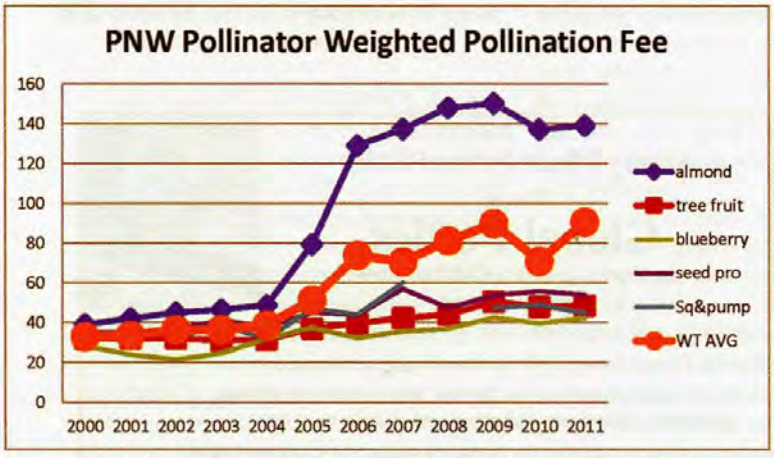


Figure 1. *Average weighted pollination fee (bolded line with circles) and major crops, pacific Northwest pollinator surveys 2000-2011.*

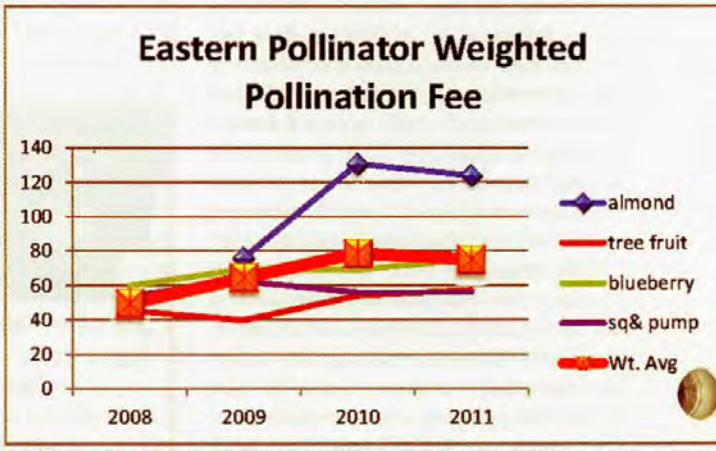


Figure 2. *Average weighted pollination fee (bolded line with squares and major crops, eastern U.S. pollinator surveys 2008-2011*

year($78.50) was higher for eastern beekeepers than for those of the PNW =$70.85) and the three remaining plot lines show the weighted average fee for tree fruit, blueberries and squash and pumpkin (combined).

For western beekeepers, almonds and tree fruit rentals represent 79% of rental opportunities and generated 89% of the pollination income of survey respondents. For eastern beekeepers, cucurbits and blueberry each represent about a third of rentals and 58.5% of their reported gross income. Tree fruits generate about half that number of rentals (15.5%) but under 12% of rental income. For eastern beekeepers, a total of five survey respondent individuals, almond rental was 13% of total colony rentals and the rental fee provided more than 21% of total fee gross income. For eastern and western beekeepers, almond rentals are critical gross fee generators while fruit, the most common rental in the west and a third in importance in the east, lags behind rental opportunity (i.e number of colony rentals) in gross income opportunity.

These reported amounts and percentages are shown in Table 1. Columns are from left: crops, the location (PNW or east with total numbers of rentals in 2011 in ()), the number of colony rentals, percent of colony rentals, gross rental income (# colonies X the individual beekeeper reported fee) and percent rental income. Western beekeepers, after almond and tree fruit, rent their bees to seed producers (both vegetable seed and clover seed growers), blueberry, other berry growers, oil seed (principally meadowfoam and canola) and cucurbit growers, in that order. The average rental was 4.1 different crops (range 1-15) for the 63 respondents in 2011. Eastern beekeepers, after blueberry and cucurbits, rent their bees for tree fruit pollination, almonds and other fruit plus some organic and truck crop farmers. The 47 individuals reported an average 3.7 rentals/individual (range1-7 different crops). Total rentals (32,054 vs just under 254,000) and total gross fee income reported (just under $2.4 million vs almost $23 million) was all heavily PNW.

While not valid to directly compare one year with another, I believe, with the large participation of individual pollinating beekeepers, that this data is robust and representative of the larger scale beekeeping pollination activities. For example I estimate that our PNW survey reached about 70% of the USDA, NASS estimated beekeepers in the three-state PNW region. Caution is advised as information is only as accurate as provided by individual respondents. The Individuals that contribute, in fact any individual renting bee colonies, should use the information to compare to their own individual operation.

Table 1. 2011 Pollination rentals and income by crop type - 63 PNW beekeepers, 47 eastern beekeepers 2011.

Crop	loc/#	# col rentals	% rentals	rental income	% rental income
Almonds	PNW/56	118,850	47%	$16,542,802	72%
	East/5	4,158	13%	$515,090	21.5%
Tree fruit	PNW/59	80,746	32%	$3,919,276	17%
	East/31	4,980	15.5%	$280,281	11.7%
Blueberry	PNW/49	14,279	5.6%	$605,054	2.6%
	East/18	10,538	33%	$789,079	33%
Seed prod	PNW/47	16,357	6%	$884,511	3.9%
Cucurbits	PNW/17	3447	1.4%	$177,618	0.8%
	East/50	9779	30.5%	$616,400	25.5%
Oil crop[1]	PNW/10	7684	3%	$410,788	1.8%
Other[2]	PNW/24	7600	3%	$238,865	1%
	East/16	2599	7.5%	$201,370	8%
Total	PNW/234	253,899		$22,945,813	
	EAST/149	32,054		$2,398,220	

1. Canola & meadowfoam
2. west includes Includes Black-,rasp-, marionberry, & cranberry berries and east includes black & raspberry, strawberry, cranberry, + organic & truck crops

What do these surveys mean? Both small scale and larger scale (commercial/semi-commercial) beekeeping operations evolve and are continuously in a state of flux. Pollination rentals now drive large scale beekeeping colony management and represent the larger amount of their annual income. Honey production and colony numbers have steadily declined since the mid 1940s.

Dr. Mike Burgett, retired bee specialist at OSU wrote in his 25th annual report of PNW pollination economics surveys (Feb 2011 Honey MarketNews), "The vast and diverse agriculture of the PNW relies on a healthy and strong beekeeping industry to maintain optimum production. An enlightened knowledge of pollination economics is crucial to every beekeeper that enters the world of commercial crop production." For the pollinator, mites (for the last two decades) and large, still mostly unexplained colony losses of the past decade, are major challenges. With rentals and movement being what they are, your bees might end up next to the world's worst beekeeper, exposing your colonies to increased risks. For the majority of larger beekeepers, commercial crop pollination continues to be a major management decision as agricultural commodities require large numbers of pollination rental colonies.

Better Bee Keeping

Bee Culture editor Kim Flottum has written a unique and thought-provoking book BETTER BEE KEEPING. Not your average bee book, nor a standard beekeeping text, it is designed to help the serious beekeeper improve his or her colony care. His first chapter "Growing your Business" sets the tone of the text. The second chapter begins by discussing the realities of beekeeping today ("What it once was and why it changed" and "How beekeeping has changed.)" He describes the current beekeepers dilemma – to move and move again, following a succession of blooming plants from warm weather wintering area to succession of monocultural situations needing bees for pollination in between to get to summer honey producing areas.

Kim points out that managing a bee colony for pollination Is different than managing bees for a honey crop. He laments that the amount of movement activity necessary for pollination or movement to southern overwintering areas and/or to

Commercial pollinators spend somewhere near $150/colony/year to keep them healthy and strong. Know Your Costs Before Your Begin.

secure a honey crop asks too much of a colony of bees. He is suggesting beekeepers work smarter, not just harder, to make the bees pay.

Pollination doesn't pay full value

These two surveys, outlining the beekeeper pollination business on both coasts, point out that pollination still doesn't pay its value for beekeepers. There are real risks and dangers to both bee and beekeeper keeping bees constantly on the move from one agricultural monoculture to another. Thirteen Oegon commercial and nine Washington commercial beekeepers estimated their approximate income source as 28% honey sales, 68% pollination and 4% other. Twenty eight Idaho beekeepers listed honey production as averaging 29% and pollination as 69% of that income. For the 13 semi-commercial beekeepers, it was more nearly a 50-50 split, slightly in favor of honey sales (52%) to pollination rental (47.5%). For the nine eastern commercial beekeepers, honey production was estimated as 42% of annual income.

USDA NASS estimates for 2010 there were 228,000 total colonies for the three PNW states and the value of honey for the three states was $11,690,000. If we extrapolate from this that the pollination income of $23 million is 70% of total income as the respondents indicated, then the ***total estimated pollination value of the region exceeds $30 million dollars***. Comparing this hypothetical PNW rental income value with the farm gate value of crops needing supplemental pollination in PNW (one estimate puts it at $2.75 billion) demonstrates that pollination "costs" are barely 1% of total crop value. This varies with individual crop market value (and almonds are not included in the PNW figure.)

Kim Flottum points out in BETTER BEE KEEPING, "assured income from sequential pollination contracts pay the way and incidental honey crops become a bonus. . . . pollination income [is] stable, honey production [isn't]." Beekeepers recognize there are real risks and dangers to both bee and beekeeper with bees constantly on the move from one agricultural monoculture to another. With this movement comes a price, in many cases necessitating virtually 100% colony replacement each year. Beekeeping is not "one size fits all." For most larger beekeepers, pollination is part of the pay check, in fact the larger part. BC

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HONEY BEE CANDY

Donald **Studinski**

Keeping bees in the Denver metropolitan area calls for 70 to 90 pounds of honey and pollen per colony to get through Winter, which is from the beginning of October to the beginning of April. I make sure that my harvest, if any, leaves adequate stores of natural food for my girls. However, I have had the unfortunate experience, as many of you have also, of opening a colony in Spring to find all the girls head down, butts in the air, dead. This despite the fact that there were adequate stores of honey next frame over. This experience has sensitized me to want an insurance policy. I call this insurance "bee candy."

I've tried the syrup feeding in the Fall, but found that to be too labor intensive: standing by the stove nearly every night to ensure all the feeder jars are topped off early the next day. I found that this ritual had to be repeated for several weeks to get adequate stores prepared. I also didn't like this solution because I was always vulnerable to a mason jar full of syrup freezing and breaking, giving me a mess and leaving the bees high and dry.

Making "bee candy" is a nice dry solution that I can use in the coldest part of Winter, and although my intent is that it is unnecessary, it feels good introducing that bit of insurance that helps me sleep better. I originally got the idea of hard candy for bees from Mel Disselkoen's[1] web site. Then, not knowing what I was doing, I got my first candy cooking lesson from my friend and local beekeeper, Denise O'Connor. Since that time, I've become bold and modified the recipe to the point that I'm very pleased with it. I'm hoping you will find it beneficial too.

Note: one pound of sugar is about equal to two cups of sugar. So, for this recipe, I found it convenient to use four-pound bags of sugar. First batch you must scoop out the four cups (two pounds), next batch you can just dump in the remainder of the bag.

Here's the recipe and advice:

4 cups Pure Cane Sugar (I don't use GMO from beets and such)

1 cup water

1/4 teaspoon vinegar

1/4 cup glucose (this keeps the candy a little soft) I find my Glucose at Hobby Lobby in the cake decoration section; a one-cup container (look for purple label) makes four batches.

Hint: **Do not** use high fructose corn syrup, HFCS, as a Glucose substitute. When heated, HFCS creates the compound hydroxymethylfurfural (HMF). HMF is toxic to bees[2]. It does not take much heat, as a dramatic increase in HMF occurs at 120°F[3].

1/2 cup MegaBee for protein

Options: as a water substitute, you can make Camomile tea (two tea bags) with one teaspoon Honey B Healthy and 1/2 teaspoon of natural sea salt with minerals (typically not pure white in color) per quart[4]. Using this water substitute will cause the candy to bubble up a bit more

than otherwise. Just turn the heat down a bit until the bubble-up stops (this happens as the liquid starts to look clear) and then turn the heat back up.

Tools you need:
4-quart pan
Whisk
butter knife
spoon
Spatula
measuring spoons
measuring cups
hot pads
wax paper
candy thermometer

Boil sugar, water, vinegar & glucose to 234°F (soft ball) stirring with a whisk.

Remove from heat and QUICKLY whisk in 1/2 cup MegaBee (powder) . . . turns candy brown. At this point, your candy is starting to harden and if you dilly dally, it will be too hard to spread before you know it. You have less than one minute. Try to get the MegaBee mixed in 15 seconds if you can.

Spread on wax paper using a form if you wish. See the pictures.

We had a great time making bee candy together around Thanksgiving day. A bunch of beekeeping friends got together to exchange tips and help make the candy. This ensured we could find a day above 50°F to put the candy on the girls before Christmas day.

Thanks to Eileen Callaway for providing the pictures of the bee candy making event and thanks to Mel Disselkoen for providing the picture of the bee candy residue left in Spring after the girls have been enjoying it.

In the case of a Langstroth hive, I put the candy brick directly onto the queen excluder which is directly above the brood area. I have a special little "super" that will essentially fit the candy brick with some bee space around the candy. The inner cover goes directly on top of this little super, and the telescoping cover goes over that as usual. See picture. This works out really nice because the heat and moisture from the cluster rises and hits the hard candy making it just a little bit softer and just right for a bee to take a bite.

In the case of a top-bar hive, I put the candy brick in the hive opposite the brood nest end. I have to break the candy brick in half to get it to fit. In my TBH, the brood nest is at one end, near the front door. Then there's all the honey expanding toward the other end. I've saved some

room at the far other end using a divider board in the TBH. When Winter candy time comes around, I move the divider board closer to the opposite end giving me some space for the candy brick. Break it in half and put it in there. They will find it if they need it. Special thanks to Marci Heiser for providing the photo of the top-bar hive. BC

Don Studinski is keeping bees in the Denver Metropolitan area, currently in Broomfield and Golden, but expanding all the time. His focus is on expanding the bee population more-so than producing honey.

Footnotes

[1]Http://Www.mdasplitter.com

[2]Http://en.wikipedia.org/wiki/Hydroxymethylfurfural

[3]Http://www.sciencedaily.com/releases/2009/08/090826110118.htmHYPERLINK "http://www.sciencedaily.com/releases/2009/08/090826110118.htm"

[4]Dancing Bee Gardens Bee Tea, Bee Culture, August 2010, pg 49.

Overwintering In Severe Climates

Robert **Helmacy**

I live at 1400 feet in the mountains of northeast Pennsylvania. I have a very open northwest exposure, severe winds, and temperatures as low as -10°F with long periods at an average of 10-15°F. And Winters are from November 1 through April. Our last frost date is June 7.

I have kept bees since 2003 and like most in my area have experienced 30% to 50% losses almost every winter. In fact, much of Pennsylvania experiences similar losses, and Mike Thomas of Bjorn Apiaries, a former Pennsylvania state bee inspector, has publicly written, "If you want six hives in the Spring go into the Winter with 10."

But three years ago I was given a section of a bee tree six feet high which has changed my beekeeping life. Here's why.

In the Fall of 2008 a man called me and said he had found a dead shag bark hickory tree felled by a storm. The tree was approx. 30" diameter. 20' up was a bee hole approx. 6" in diameter. We cut out a six-foot section about 2.5' above the hole and 3.5' below, and set it upright on my farm. Now, three years later, that log hive has survived three Winters and is still thriving. I have not fed it syrup or pollen at all, only a little dry sugar each February on a warm day.

My question then was, "How can bees survive in a log through three terrible Winters, when beekeepers have 40% losses?"

Part of the answer has to be the amount of insulation the tree provides. The walls of this tree are 9" thick all around, and 1" of wood is equal to about 12" of earth for insulation purposes. But I have had heavily insulated hives for several years and the 40% loss remained. There had to be something else. So I started studying the log through the top hole which I had covered with an easily removed piece of plywood and insulation. I had also examined the bottom before setting it upright. Here are some observations I made, and some conclusions and experimental procedures I have arrived at.

Observations

- The bottom had wet debris, shredded wood etc., but I could only see from the lower end, not all the way down from the top. I wonder what happens to the dead bees?
- Comb on walls all around in vertical manner, each a few inches from the next one. Average size 8" tall, 5" out from inner wall.
- About an 11" open shaft down the middle. Bees move down in Summer, up in Winter.
- They eat sideways, no overhead food observed; I don't know if the cells slant upward. Bees can cluster in Winter surrounded by food.
- The colony is always strong when it emerges in the Spring, and is consistently strong all Summer and Fall.
- The bees are large, yellow, and probably Italian or a natural hybrid.

My conclusion became: If bees can overwinter so successfully with no help in what apparently is an ideal situation, why can't I (we) duplicate that in my (our) hives?

In our hives, we talk about clusters in overwintering, but what do you see when you open a dead hive in the Spring? Not a cluster, but seven or eight lines of dead bees separated by wood and/or plastic. All food is gone where the bees are, but there often is a good supply a short distance away. But the bees are separated from the food and must traverse around the ends or over the top to reach it. That means leaving the cluster one at a time to eat, and exposing themselves to cold frames and/or walls to get to the food.

A.I. Root describes this problem in *ABC of Bee Culture* in the 1880 edition, and concluded that the bees do not like traveling next to or on cold surfaces, even to get to food. He made thin pillows made from oat chaff lining the inside the hives and over the top inside the telescoping cover, and had such success that he unhesi-

Setting the log on end with colony about 2/3 up from bottom.

Chained to adjacent tree to bear-proof it. Aluminum siding was used for the cover over the insulation.

tatingly recommended all hives be packed in chaff blankets to overwinter (pp. 274-5). He did make some other suggestions people had given him, like Winter passages through the frames to encourage sideways movement without the bees having to go around or over the frames and getting chilled, but never says he actually tried it.

TWO EXPERIMENTS IN OVER-WINTERING

Before the bee tree was found, I had made a first experiment in changing overwintering procedures by putting triangle-shaped holes through all 10 frames in a deep hive body with 4" wide by 3" tall holes in the center frames and getting ½" progressively smaller toward the outside edges. I put this on top of another deep, and allowed the bees to fill it in the Fall honey flow. The bees wintered successfully in a windy northwest exposure. The second year, I added a medium honey super above, which I harvested in July, allowed the bees to refill in the fall flow, and again left the deep with triangle cutouts in for the Winter. Again the bees overwintered in good shape. Unfortunately, during the following Summer, a mouse chewed its way through a wooden entrance restrictor and killed the hive. With a better mouse guard, I think this method is feasible. Incidentally, the bees did not fill in the triangle holes, although a little comb was evident in the corners of one or two of them.

After acquiring and studying the bee tree, my second experiment was to try to provide an open space similar to that in the tree, in which the bees could cluster free of the frames running through them. Procedure: To do this, on or about November 1, I refigured my eight hives as follows: I started as usual with a hive stand with a slanting landing board, and a screened bottom board with a closed but removable plastic sheet underneath. On these I started with the standard deep with 10 deep frames with honey and brood. Next I removed the four least-filled frames from the second deep so I could leave a four-frame hole in the center of deep no. two. That left three frames on each side in no. two with honey, brood and pollen left in. Above that I put a *medium* super with six *shallow* frames of honey in the center and two medium frames with honey on each side. This created a T-shaped opening in the upper two boxes so the bees could move up and down in a real cluster and move outward to access the honey above and below without touching the outside walls.

Above this, instead of a standard inner cover, I put a triangle escape board with the triangle down to keep the bees *IN* the hive, not allowing them up against the telescoping cover, even though it was insulated.

On top of the triangle escape board, I put a telescoping cover lined with a piece of 3/8 bubble house wrap of aluminized plastic. The cover was left closed all Winter, allowing ventilation through the front entrance only, which was covered with a ½" hardware cloth guard shaped to fit over it.

The outsides of the hives were wrapped on three sides with 3/8" aluminized plastic bubble house wrap, painted green on the outside to absorb the sun's heat as much as possible. The front was not completely wrapped due to its southern

exposure and the front entrance was only covered about an inch or two on each side from the wrap extending around. All was duct-taped together to seal out moisture under the telescoping cover and in one or two cases where the wind was fierce, I put an extra piece of the same wrap over the top to better seal it.

I closed up the screened bottom board in November and left it closed until after the danger of late March snows was past, as they can blow snow up from underneath and freeze a strong hive that still has ample food. I left the outer wrap on until the danger of hard freezes was past (mid to late May where I live).

The removable board under the screened bottom board was left closed all Winter from November 15 to April 15, when it was opened about 6". On May 5, I removed it entirely when the warmer weather hit. I removed the outer wraps on May 10-11, although they could have been left on longer. (A.I. Root recommended that hives be kept warm right into mid-June.)

On most hives, I left the mouse guard on for the Summer, but in one or two I removed it because the bees seemed to be having trouble negotiating it and some pollen was being stripped off their legs as they entered through it. (Eventually they learned to get through it without losing pollen, however.)

As of April 14, all eight hives were alive, although hive no. seven was dwindling. When I opened it I found a dead mouse which had either chewed its way in through the one-inch upper hole in the super, or somehow been missed when I closed up the hives for the Winter. The hive had a bad ammonia smell – I suspect from mouse urine – and it succumbed by April 25. So eight out of eight survived the Winter, and one died from a mouse habitation after that.

I replaced it with a split from no. eight on May 6, and no. four swarmed and the swarm became hive no. nine as of May 12. So I started the honey flow with nine hives rather than the usual four or five out of eight. On May 15 another hive swarmed, and I hived it and had 10 viable colonies by June 1.

While this was a welcome, if unprecedented success for me, some problem areas are still to be solved.

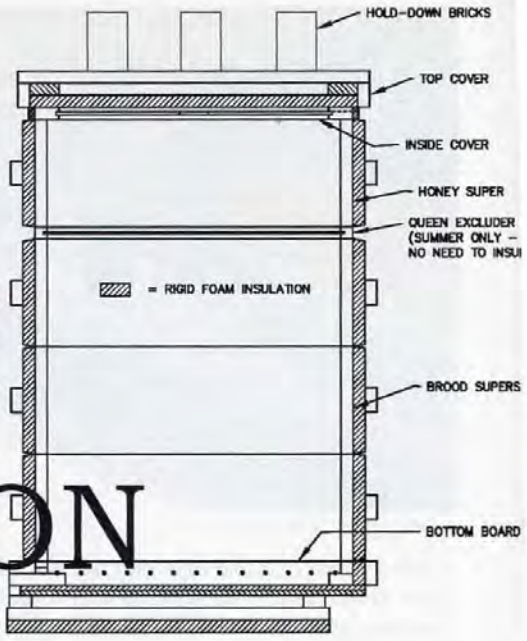
1. Exactly when is the best time to open the hives to put in full length frames? In some hives, because I waited for warmer weather, the bees had built burr comb down from the shorter frames and had begun raising brood in it. I left this to solve in the Fall. In others there was a mish-mash of comb in part of the open space.
2. I suggest removing the triangle escapes early in the Spring, when you first check your hives. However, that opens the question as to whether you replace it with a regular inner cover or not.
3. Regarding triangle escapes, they can substitute for an inner cover with the triangle up for normal use, allowing bees to get out, but no robbers in. Homecoming bees will enter through the bottom entrance or extra holes in the supers. You can also put the triangle down when hiving swarms or packages so bees can get in but not out. Spiders tend to want to nest under the screen of the triangle escapes and impede the passage of the bees.
4. In our climate there are more cold days in the year than warm ones. Since bees are able to cool warm hives if they have adequate ventilation, I opt for painting my hives dark colors to reflect less sunlight and absorb more heat. I prefer green because it blends in well most of the year and so does not call unwanted attention to the hives. Proof this works: Hives painted darker colors, when placed side by side with lighter ones will have more bees flying earlier on sunny mornings.

I present a few thoughts from A.I. Root in his original *ABC of Bee Culture* on overwintering, published in Medina, Ohio in 1880:

- No drafts or cracks which might admit cold air can be allowed.
- All hives must be built up by feeding sugar syrup after the September honey flow is done. If some are still too weak, combine them into strong ones. (N.B. My warning: feeding sugar syrup too close to clustering time can result in uncapped liquid which may evaporate and soak the hive, killing the bees.)
- He strongly recommended oat chaff sewn into thin cushions made of muslin to pack around and over the frames and separated from the bees with a very thin board (for cleanliness) to keep the bees warm.
- He wanted the hives to be very warm *even into June.*
- He favored large wind breaks for hives (suggest 8' high) on the north and west sides. (My note: could also be on east side to protect against nor'easters, as long as it does not block sunshine.)
- He says bees will not travel around the ends of frames in colder weather because they do not want to get against the cold wood of the outside surfaces. Root mentions "Winter passages" on page 275 (bottom right hand column) which I take to mean holes cut through frames to provide lateral movement without touching outside walls. (This idea is similar to my triangle hole – see above – and one company makes a hole in their frames, although it is small and low and in a corner. I have not tried them.)

In summing all this up, bees need a lot of food and warmth to survive long severe Winters. The traditional frame-filled hives do not offer a real clustering opportunity for adequate warmth or the chance for bees to get to food stores without separating from the cluster and getting chilled and possibly dying. If beekeepers in severe climates can better insulate the outsides of their hives and leave a large space inside for a tight cluster that still allows easy access to all the stored food without the bees getting chilled, they would have many more hives survive the long Winters. BC

YEAR ROUND INSULATION



Robert **Williams**

As a beekeeper and architect living and working in Michigan's northern climate, the lack of insulation in a standard Langstroth bee hive has bothered me for years. Every winter I lost colonies due to, I believe, the weather conditions. The ¾" solid wood walls, floor and top provide no insulation from the Winter's cold and the Summer's heat. I know many beekeepers will disagree with my concerns over the lack of insulation. The system I am going to describe is not for those who are firm believers that bee hives do not need insulation and that hives must have lots of ventilation. This is for those beekeepers who want to insulate their hives and are looking for a better way than wrapping them temporarily with roofing paper. For those of you who have used or are using the BeeMax Styrofoam hives and have not been fully satisfied, this may be the alternative you are looking for. It is a system of insulating a standard Langstroth bee hive with permanent insulation without affecting the design of the internal components or the normal routine for managing the hive. It remains in place year round, so once it's installed it stays there. The system increases the insulation of the hive components from approximately R-1 to R-5 and reduces the transfer of energy to about one fifth that of a standard hive. All materials needed are readily available at home improvement stores; the tools needed are very basic, and all of the work can be done by one person working alone. It can be installed on hive components in the shop or to existing hives in the field. All of the parts of the system can be easily removed or replaced as needed. Nothing needs to be, or should be removed for the Summer.

Tools needed to fabricate and install the system are as follows:
tape measure
pencil
powered screw driver or a standard screw driver and drill with bits
utility knife or hand saw
optional - propane torch

Supplies needed to insulate three hives, each with four medium supers are as follows:
Two sheets of 4' x 8' x ¾" foam board insulation (normally sold as wall sheathing) - $28
Eight 1 x 2's by 8 foot long - $16
120 - 2" long exterior screws (about one pound) – $8
Two rolls of 3/8" thick x 3/4" wide x 10' foam weather stripping tape - $16
Optional – 18 – 1.25" exterior screws and 18 large washers or ceiling buttons

The system is very simple. Cut panels for the sides of the supers from ¾" foam board and hold them in place with 12" long sections of 1 by 2s screwed to the wood hive components through the insulation. Put a sheet of ¾" foam board under the bottom board and one under the top cover. Insulate the edge of the inner cover with ¾" side foam weather stripping tape. That is basically it, but, with a few little details added which I will explain. Once you have the materials and tools ready, it should only take about an hour and a half to cut and install all the components needed for a single hive. The total cost to insulate hives is about $20 each. The weight that this system adds to a typical medium super is only about a pound.

Installation details

While installing the foam panels it is important to have each panel held tight to the hive at the perimeter of the panel. This is one reason that I prefer ¾" foam board instead of ½" or ¼". The foam board is easily cut with a

Side panel and inner cover insulation.

Inner cover detail.

Frame hanger extender.

utility knife or hand saw and is held tight to the super by the wood cleat. I like to run a propane torch over all the panels after installation; it melts the foam slightly and seems to create a harder surface that I think might hold up better to the weather and to impacts over the long run. Avoid breathing the fumes when you heat the foam, because many foam boards can be toxic.

Supers

For panel cutting patterns I use a side and end from an unassembled super. It doesn't really matter that the edges aren't perfectly straight and square, in fact, all of my edges have a little bevel on them because of the way I hold the knife and use the pattern.

Inner Cover

The inner cover is insulated at the perimeter with foam insulation weather stripping self-stick tape. Don't cover the ventilation slot/upper entrance. Though the amount of exposed wood on the inner cover is very small, this is a very important step. Cold temperatures on the edge of the inner cover are easily transferred to the remainder of the inner cover and could result in condensation on its underside, the build-up of ice, and water dripping on the bees.

Outer Top Cover

The dimensions of your top cover may vary a little from mine. It's important to have the bottom of the foam board a little lower than the perimeter board of the cover. If the perimeter board is lower than the rigid foam board, the perimeter board will rest on and possibly damage the insulation around the edge of the inside cover. Unfortunately this insulation modification to the outer cover defeats its telescoping feature. If you don't want to lose the telescoping feature, you will need to make a custom outer cover 1½" wider in each dimension and ¾" deeper than the standard cover. I am getting along fine without telescoping.

Bottom Board

The design of bottom boards seems to vary a bit and yours probably doesn't match mine. You'll have to figure out what works on your style bottom board. Options include a piece of foam board mounted to the bottom of your current board, placing a piece of foam board between your bottom board and hive stand or replacing your current slide out panel with a foam board. I happen to have screened bottoms with slide-out boards below. I replaced the boards with foam boards. I like these foam board bottoms, because they are so inexpensive that I consider them disposable. After I flip them over for a second use, I replace them with clean boards at a cost of about 50 cents. One concern I had about replacing the wood bottom board with foam board is that critters could scratch through the foam board and allow air to enter and defeat the insulation. To avoid this I put a solid wood board between the bottom and the hive stand to prevent animals from getting to the foam board. Though I don't really feel it is needed for insulation purposes, you may want to insulate the sides of your bottom board. So far I have had no insulation at all on the sides of the bottom boards, and I haven't lost a colony yet. I almost think it might be better to allow the sides of the bottom board to be colder so if there is any moisture in the hive it will condense at the bottom where it won't drip on the bees.

Queen Excluder

I don't feel that queen excluders need to be insulated, but could be done like the inner cover if you wish.

One piece of equipment that needed to be modified was my frame holder rack. To allow it to hook on the super side with the extra ¾" layer of insulation I used two stiff pieces of wire, wound them around the rack hooks and fashioned new wider hooks from the wires.

That's all there is to it. Though this system is patent pending, I welcome and encourage beekeepers to try this system on their own hives, for non-commercial purposes. A more detailed explanation of the system along with complete drawings, videos, comparisons to other insulation systems and possible concerns is available online at **http://bees.StewartFarm.org.** If you try this insulation system for yourself I would love to hear your experiences and the effects you observe on your colonies, the Winter survival rate and your honey harvest. In addition, if you have any questions or comments on the installation of the components of the system or on the instructions, please send them along. I have a free email newsletter called "Hive Insulation Update" to provide updates about the system and to share the results which others are having when using this system. If you would like to be on the newsletter email list, please drop me a line. Send your name and email address to **xharpspah@aol.com** and just put "subscribe hive insulation update" as the subject. BC

THE WALT

Walt **Dahlgren**

A Bee Vac for removals or swarms. Liteweight, easy to make.

When you have to collect a swarm of honeybees, you want to work safely and enjoy the bees as you vacuum them up. To do this, use my bee vacuum unit "THE WALT" to Work And Love Them.

This unit contains its own vacuum motor, is simple to make, holds a medium size swarm, provides ventilation to the bees while returning to your apiary and is easily opened to pour the bees into your hive. I also like the window to view the collected swarm.

My previous motorized bee vac, shown in the May 2011 issue of Bee Culture, required some woodworking skills for construction. This unit is quite simple to make. Just cut four rings from a plastic five-gallon pail and cut a circular piece of insect screen. Then assemble to another five-gallon pail by drilling a few holes and fastening together with screws and nuts.

The vacuum motor is attached to the removable pail lid. Alternately one could use the bucket lid vac sold in various lumber stores. A screen divider separates the lower portion of the pail as bee storage area from the upper vacuum chamber.

After making this vac, you will have elevated the beekeepers' common plastic pail to an honored place with his beekeeping equipment.

Making The Screen Divider

1. Cut 4 ½" section off the top of a five gallon plastic pail.
2. Next, cut four 1" rings from the pail and mark them #1 for the first ring, 2, 3 and 4.
3. Measure the diameter of the lower side of ring #4.
4. Make a screen template by drawing a circle of this diameter on a piece of paper. Then draw a circle 1 1/2 inches larger in diameter around the first circle.
5. Staple screen template to a piece of insect window screen with your paper stapler.
6. Cut screen and template to larger diameter circle.
7. Make ¾" cuts in screen and template approximately 1" apart from the outer circle to the inner circle to facilitate bending the screen lip.
8. Place ring #4 on workbench with smaller side up. Place screen with template still attached, on the ring and adjust screen to be centered on ring.
9. Bend the 3/4" screen tabs down around ring #4 perimeter being careful to not distort the circular shape of the ring.
10. Remove paper template, push ring #1 over the screen and ring #4. Drill and install screws and nuts to hold assembly together.
11. Cut ring #3 to make handle as shown and attach with screws and nuts.

Modifying Five Gallon Plastic Pail

1. Attach ring #2 to your second pail approximately 2" down from the top of the pail using four screws and nuts. This ring easily positions the screen divider inside the pail.
2. Place the completed screen divider into the pail and drill two holes above it for containment screws spaced at approximately 1/3 circumference points. Install screws and nuts with screw heads to interior. The screw heads will hold the screen divider in place when the cover with vacuum motor is removed.
3. Drill a suitable hole for your bee vacuum hose. Make a plastic hole cover from the bottom part of the pail used to make the rings. Inside the pail place a 3/4" wood strip drilled to suit your bee vac hose to secure the hose to the vac. Attach the cover and wood strip with screws.

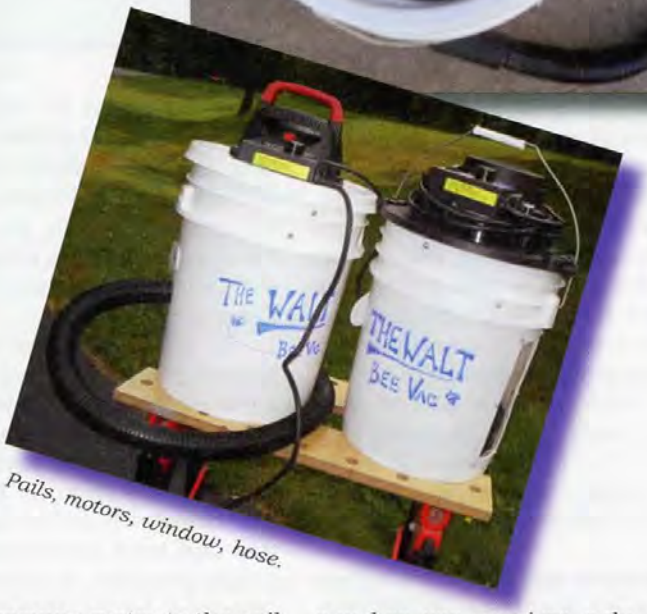
First, cut the pail.

Screen Divider – Ring #four on the inside, ring #one on the outside. Screen in between four and one. Ring #three as handle.

Screen cover on outside. Ring #two positioned inside pail. Hole for vacuum hose with hole cover in place.

Inside the lid, with modified tabs and motor and switch held in place.

The top of the lid, showing the unit and switch.



Pails, motors, window, hose.

Making Window Optional

1. Cut a window opening 3" wide 1/2" below ring #2 to within 1/2" of the bottom of the pail.
2. Cut a piece of plastic glazing to suit window opening. I heated the plastic in the kitchen oven, with my wife's permission, to bend to the shape of the pail.
3. Fit, caulk and fasten plastic glazing to pail with screws and nuts.

Make Pail Cover For Vacuum Unit

1. Cut hole in plastic pail cover to suit your motor vacuum unit and drill holes to match the attaching screw.
2. Cut off all but three tabs, which hold the cover to the pail. Cut off about one-half of the length of each tab to make the cover removal easier.
3. From the vacuum unit, cut off the plastic portion which holds the filter and the flotation cup and cut off any plastic projections which are not required to make the vacuum motor function properly.
4. Attach vacuum motor to the pail cover.

One more thing! Vacuum units were designed to pick up dust, dirt, sand or whatever and require much vacuum force to do this. However, any bee vac requires only a small amount of vacuum to move the bees off the clusters or comb when being collected. When using too much vacuum, they will be tumbled to death in the vacuum hose. I recommend purchasing a router speed control unit or an even heavier unit to reduce the speed of your electric vacuum motor, thus reducing the amount of vacuum created.

Wow, that wasn't so hard to do. Now you have your own WALT to go forth to collect those bees. You can Work And Love Them. BC

Master Beekeeper Programs, Part II

Who's In Charge, And What Do You Have To Know?

Ann **Harman**

Last month we began our quest for information on Master Beekeeper programs. This month we continue that quest beginning with the organization of the programs and requirements for entering them. Remember, the information is taken from the websites of the state beekeeping associations plus universities and questionnaire answers. Here are the known states with a Master Beekeeper program: NY, VA (new), WV, NC, SC, GA, FL, AL (new), OH (new), NE, MT (new), OR (new), WA, and one regional program (EAS).

Organization and Administration

In some states the Master Beekeeper program is designed and run by a university: NY (Cornell), GA (University of Georgia), FL (University of Florida), NE (University of Nebraska), and MT (University of Montana),

In some states the program is run jointly by the state beekeeping association and a university. VA: tests developed by Virginia Tech with the State Apiarist as Testing Official with testing announcements and sites by the Virginia State Beekeepers Association. SC: The South Carolina Beekeepers Association and the Clemson University Cooperative Extension Program.

In other states the Master Beekeeper program is organized and administered by the state beekeepers association. WV: has assistance from the state apiary inspector. NC: the program has recently been turned over completely to the state association and local associations. AL: the entire program is currently being organized by the state association. OH: the program is operated completely by the Ohio State Beekeepers Association. OR: the new Oregon program, run by the state beekeepers association, has three scientists on their committee. WA: This Master Beekeeper program is under the direct supervision of the executive board of directors of the state beekeepers association.

The one regional association, EAS, has an Academic Advisor responsible for generating and grading exams, plus a Board level Master Beekeeper Committee composed of Directors (who may be Master Beekeepers) and Master Beekeepers. The committee is appointed by the Chairman of the Board and works with the Advisor and the Board on all aspects of the program. Together, the Advisor and the Committee have oversight of the Master Beekeeper program and make recommendations for the Board to consider. Previously-certified Master Beekeepers assist with the exams, grading and evaluating the program.

Can a Non-Resident Apply?

For NY no information is given but for the EAS exam there are no restrictions on residence, but you need to be a member to take the

State	First Level	Second Level	Third Level	Fourth Level
NY	unknown	unknown	See EAS	
VA	1 yr + "Basic Beekeeping Knowledge"	3 yrs & 3 hives	being developed	
WV	2 yrs	3 yrs	5 yrs	
NC	none given	2 yrs	3 yrs	2 additional
SC	1 "season" for Practical Exam	2 yrs	3 additional	2 yrs additional
GA	"basic skills"	2 yrs	3 yrs	2 yrs additional
FL	1 yr	1 yr additional	1 yr additional	2 yrs additional
AL	1 yr	1 additional	1 additional	being developed
OH	3 yrs	being developed	being developed	being developed
NE	only one level	---	unknown	
MT	not specified	being developed	being developed	
OR	none	being developed	being developed	
WA	not specified	3 yrs	6 yrs total	
EAS	only one level	---	5 yrs minimum	

State	Level 1	Level 2	Level 3	Level 4	Pass Grade
VA	W, F	W, F	in progress		75%
WV	W, L, F	W, L, O	W, L, presentation		80%
NC	W, F	W, L	W, (1)	O, (2)	
SC	W, F	W, L + 6 specialties	W, L + 6 specialties	O + 7 topics	
GA	W, F	W, L (3)	W, L (4)	O + 7 specialties	
FL	See (5)				
AL	All levels W, L, F				70%
W= written L= lab F=field O=oral					

(1) Demonstrate excellence in selected beekeeping specialties.
(2) Demonstrate excellence in minimum of seven specialties.
(3) To pass lab exam **must** achieve 100% for diseases and insects portion. No exceptions.
(4) Demonstrate excellence in five specialties with IPM topic required.
(5) For Level 1: W, F, pass at 70%;, Level 2: pass training modules with 80%, W and L at 70%; Level 3 W at 70%, Level 4 Oral

OH: For Level 3 must demonstrate expertise in a number of beekeeping areas.
NE: has two take-home exams and must demonstrate beekeeping skills
MT: all levels will have tests during and after courses, W, F, O
OR: Level 1 is open book written test; must achieve 90%, plus 4 field checklists with mentor; for Level 2, W, F
WA: for Level 1, 10 "tests" following official apprentice manual; for Level 2, 10 more advanced "tests" plus field exam; for Level 3 a written research paper
For NC Master Craftsman beekeeper must recertify after five years with 15 required units of Public Service and must have kept current in beekeeping topics.
For SC Master Craftsman must recertify after five years with 15 Public Service credits and "competence in new requirements added."

exam. Interestingly, you do not need to remain a member once you pass. Virginia states that a non-resident cannot apply. The information for Ohio is a bit vague but indicates that a non-resident may not apply. In Oregon an applicant would be assigned a mentor in Oregon. Therefore it would seem that a non-resident could not apply.

Several states either suggest or require membership in a local or the state association. The following states require membership: WV, NC, AL, OH. In addition, if a resident of a state with hive registration, the hives must be registered.

Entering the Program

Each state has determined where a beekeeper can enter the program. Obviously experienced beekeepers may, at some point, decide to become a Master Beekeeper and hope they can enter at an advanced level. The following states require **all** applicants, in spite of experience, to enter at the first level: VA, WV, NC, SC, FL, AL, OR.

No information has been received from NY. Both NE and EAS just have one level. In GA beekeepers can enter at the second level with proof of first-level certification from a sister program ("sister" not specified). The OH program is still under development. In MT a beekeeper can enter an advanced level but must "test" into that level. WA does certify a very few, long-time experienced beekeepers with the title of Honorary Master Beekeeper.

Entrance Requirements, All Levels

The limited information from the New York website does not give any requirements for entrance to Apprentice or Journey levels. Since the Master level is achieved with the EAS program, information would have to be obtained from that organization.

The programs do list the minimum number of years the applicant has bees. Many states specify the number of years beyond achieving a particular level to move up to the higher level.

Courses and Workshops

New York gives a very brief description of the Apprentice Level Workshop (then described as a Course) but no indication is given whether this is required. The Journey Level page briefly mentions some workshops and includes the IPM workshops that do not seem to be connected to the Journey level. The Master Level only has a very brief description of a workshop series to prepare for the EAS Master Beekeeper Certification (not described on the New York website) but no indication that it is required by New York. That workshop series is not required for EAS.

For Level 2 in VA, "... at least 12 hours classroom instruction in advanced beekeeping training" is required. However, no other information on the instruction is given. In OH, for Level Two, applicants must attend workshops or seminars for a total of 40 hours of instruction with 24 hours of that taken from a list of 11 topics. A three-day workshop is required for the program in NE. The Beekeeping Certificate Program in MT has a detailed, required course for each of its three levels.

In WV, NC, SC, GA, FL AL, OR, and WA classes/courses are voluntary but recommended. A Georgia Master Beekeepers Lecture Series is offered. Twenty-three lectures are offered. A detailed outline of these lectures covers 63 pages.

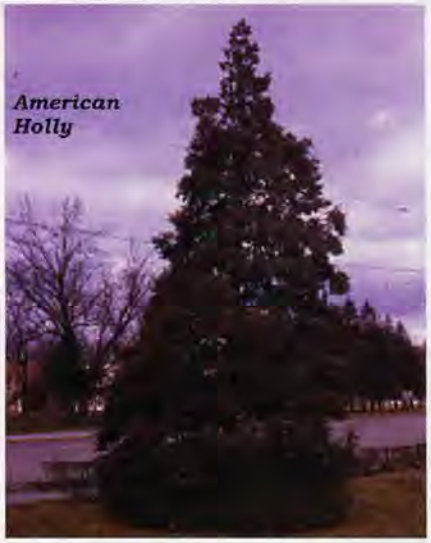
Types of Exams and Passing Grades

No information on exams is given for NY. For EAS there are four exams: written, lab, field and oral. To pass these exams a score of 80% is required for each one. Once an applicant has passed one of the exams a repeat of that exam is not required. However the applicant can repeat a failed exam for a fee.

One difficulty has been to determine whether "practical" means in a lab or in the field with an actual hive. Wherever possible instead of "practical" I have designated the exams as "lab" or "field." Sometimes it was impossible to determine from the descriptions given.

In Part 3 of this Master Beekeeper series we will see what unusual requirements some of the states specify in order to achieve a given level. We will also find out who composes and grades the exams. States that are developing their program will have to make some compromises until their program has been in place for a few years. And, of course, we will see if any states have some problems with any aspects of their program. We will also find out what sort of program Great Britain has. An inquiry was made to Canada but no reply was received. BC

Ann Harman lives and keeps bees in Flint Hill, Virginia.


American Holly

Hollies As Bee Plants

Connie **Krochmal**

Hollies are among the most reliable bee plants for the garden, providing bees with pollen and nectar. Both the wild and cultivated forms are recommended. Over a dozen species of hollies are native to the U.S. They're especially plentiful in the Southeast. These include deciduous and evergreen trees and shrubs. The alternate, leathery foliage is very thick and shiny. The leaf margins are often spiny.

The hollies bloom from April to June depending on the species and location. With four to five petals, the small, inconspicuous, greenish to white scented blossoms arise from the leaf axils. The male and female blossoms are on separate plants. For berry production, many hollies require cross-pollination. Typically red, the fruits also come in other colors.

Growing Hollies

The deciduous hollies are very easy to grow. They prefer a reasonably fertile, well drained soil. At times the evergreen hollies and the native species can be somewhat more finicky. Native ones prefer a neutral to acid pH.

The hollies are suitable for partial shade and full sun. The variegated types need full sun for best growth. Water hollies for the first year after they're planted as they initially tend to grow rather slowly.

Hardiness varies from one species to another. Some can be grown in zone three. Propagate the evergreens by seeds and hard wood cuttings. Use softwood cuttings for the deciduous ones.

The holly leaf miner can be a problem. The most common diseases are twig canker and anthracnose. Tar spot usually isn't terribly serious. Sometimes, severe winter weather damages some of the branches.

Holly species that are especially good for bees include the following.

American Holly, Common Holly (*Ilex opaca*)

This is a very popular landscape plant. Among the best known hollies, American holly is hardy to zone five. This grows in zone four if given Winter protection. It is hardier than the English holly. Hardiness of the cultivars varies slightly with some being hardier than the species. Over 60 cultivars are available.

Native to the Central states, its range extends from Texas to Arkansas and Missouri eastward to Florida and northward to the Northeast and New England. This erect, upright, evergreen shrub or tree has a pyramidal, spreading growth habit. It can be 20 to 50 feet tall. Many cultivars are much shorter. The deep green foliage is oblong to lance shaped. With a leathery texture, the spiny, alternate leaves are three to four inches long.

This species thrives in acid, moist, well drained, reasonably fertile soils. A pH of four to five is considered ideal. American holly is intolerant of soggy soils. This can get winter burn in the North when grown in full sun. Although it tolerates air pollution, this dislikes windy or dry spots. It is unsuitable for coastal areas.

American holly has few serious problems. However, it can occasionally suffer from scale and holly leaf miner. Sun scald can occur in exposed sites.

The scented blooms open in April or so in the South, while in Massachusetts it can be in June. The best nectar flow is during warm, humid weather. The only factor that appears to affect the nectar flow is rain.

Tending to be a reliable honey plant this can produce good honey surpluses in some locations. The honey is nearly white to very light amber. With a wonderful flavor that is milder than that of the gallberry, this usually doesn't granulate if it is pure.

Chinese Holly (*Ilex cornuta*)

Also called horned holly, this is hardy to zone six if it has some Winter protection. Chinese holly can reach six to 12 feet in height with almost a matching spread. This densely branched, rounded shrub is upright. It is distinctive due to the horned leaves, which are notable for the down-turned spines located on the tips. The alternate spiny foliage is deep green and oblong, three to four inches long. This species needs no pollination to produce berries, which are red. Various cultivars of the Chinese holly are available.

This adapts to a range of pH levels. Tolerant of drought, it does well in most soil types. Chinese holly has a moderate to fast growth rate. This plant typically benefits from an occasional pruning, depending on its location.

Dahoon (*Ilex cassine*)

Hardy to zone seven, dahoon is native to the Southeast. This densely branched evergreen shrub or tree is rounded to pyramidal. It reaches 35 to 40 feet in height. The light green to deep green toothed leaves are glossy. Four inches long, these can be rounded, oblong, or pointed. Dahoon has whitish-yellow berries. Easy to grow, this species will tolerate wet spots and salt spray.

This is a good source of nectar in the region. The bees eagerly seek out the flowers.

Gallberry.

A related dahoon variety is also an excellent bee plant. The myrtle leaved holly or myrtle dahoon (*Ilex cassine var. myrtifolia*) is native to the Southeast from North Carolina to Florida westward to Louisiana. Hardy to zone seven, this evergreen can reach 40 feet in height. It has smaller leaves and smaller fruits than the species. The deep green to medium green foliage is shiny. With a leathery texture, this is 1½ to four inches long. It can be rounded to oblong. This variety blooms in May the same time as the species. It provides a lot of nectar for about 10 days or so.

English Holly (*Ilex aquifolium*)

Also known as Christmas holly, this is hardy to zone seven. Some cultivars are hardy enough for zone six if given some protection during the Winter. Native to Eurasia, this grows particularly well in the Northwest.

Usually when grown in the East it is six feet or so in height. However, this species has been known to reach 25 to 50 feet in its native homeland. Most cultivated forms tend to be small and compact.

A densely branched, erect tree or shrub, this often has a pyramidal shape. The evergreen foliage is spiny. Deep green and shiny, the wavy edged leaves are three to four inches long. They range from oval to oblong.

The flowers open on the current year's wood. In the North this blooms in May and June.

This plant is unsuitable for areas with extremely hot dry Summers. In the South it will need some shade during the afternoon. A pH of five is considered ideal for English holly.

The English holly is one of the subjects in a traditional Christmas carol, The Holly and the Ivy. Much folklore is associated with this plant. The berried stems have long been a favorite for Christmas decorations.

Gallberry (*Ilex glabra*)

Also called inkberry and winterberry, this is hardy to zone four. It can survive in zone three with Winter protection. Native to the East, gallberry is especially common in coastal areas. It is found from New England to Florida westward to Louisiana and the Gulf Coast.

This shallow rooted evergreen is usually two to six feet in height with a matching width. Spreading by suckers and seeds, it eventually can form thickets. This rounded, erect shrub has small evergreen foliage.

Free of spines, the alternate toothed leaves are deep green, shiny, and flat. The shape varies from oval to lance-like or wedge shaped. This is 2½ inches long.

Various cultivars are available, including dwarf and compact ones. Easy to grow, this has few problems other than attacks by spider mites if the weather becomes very dry. This species does well in sandy soils. Preferring an acid, moist spot, gallberry thrives in wet and swampy areas. It tolerates salt spray.

Very floriferous, it produces lots of flower clusters. The plant begins blooming at an early age. Flowering usually starts in May, and continues into June for about four weeks.

The bees collect the pollen early in the morning. Later in the day they begin bringing in the nectar. The nectar flow is higher during dry weather. Considered a major nectar source in the Southeast, this species has so much nectar that it is quite visible on the blossoms. Historically, this has provided a honey surplus of 150 pounds or more per colony.

The premium quality honey is quite aromatic. The flavor ranges from tangy and rich to somewhat mild. The color varies somewhat. It can be almost white, white, extra light amber, or light amber. With a heavy body, it seldom ever granulates. For best results, allow plenty of time for this honey to ripen before removing from the hives. A related species in Florida called tall gallberry (*Ilex lucida*) is also a very good honey plant.

Possum Haw (*Ilex decidua*)

Also known as bearberry, this grows in zone five if given some Winter protection. Native to the South Central and Southeastern states, this extends from Missouri and Texas eastward to Florida and northward to Virginia.

Mostly a deciduous shrub, this can also be a small tree. The species reaches about 20 feet in height under ideal conditions. However, it is usually six to 10 feet tall. Several cultivars are available. This upright plant produces foliage late in the Spring. The shiny green toothed leaves are wedge shaped, 1½ to four inches long. Easy to grow, this experi-

ences few serious problems. It needs minimal pruning.

A good source of nectar for bees, possumhaw blooms early in the season, usually in May. It yields lots of nectar in a very short time. It is one of the best deciduous hollies for bees. The honey is valuable for brood rearing.

Winterberry (*Ilex verticillata*)

This is known by various other names, including Michigan holly, black alder, feverbark, coral berry, and mountain holly. Hardy to zone three, it can be found from Wisconsin to Missouri eastward to Florida and northward to New England and Michigan.

Spreading by suckers, this deciduous shrub or tree can reach five to 15 feet in height with a matching width. Winterberry has a spreading, rounded, twiggy growth habit. The alternate, deep green to bright green foliage is toothed. About three to four inches long, this can be oblong to elliptic.

Winterberry has a slow to moderate growth rate. A number of cultivars are available. Preferring an acid, rich soil, this grows in a range of soil types. Although it is well suited to wet and boggy spots, excessive moisture is by no means essential.

This plant is very popular with bees. Winterberry gives a good honey surplus, especially in New England.

A related species, smooth winterberry (*Ilex laevigata*) looks very similar to winterberry. Hardy to zone four, this is native to the East.

Winterberry.

It occurs from Maine to Pennsylvania southward to Georgia. Suited to swampy areas, this deciduous plant can reach eight to 10 feet in height. Smooth winterberry is quite similar to winterberry except for minor differences between the foliage and the fruits. This plant is a very good nectar source.

Yaupon (*Ilex vomitoria*)

Hardy to zone seven, yaupon is native from Virginia southward to Florida and westward to Texas. This evergreen tree or shrub can reach 10 to 20 feet in height. It has an upright, irregular shape. The alternate shiny foliage, deep green to gray-green, is oval to egg shaped. With scalloped or toothed edges, these are 1½ inches long. The blooms open on the previous year's wood.

Yaupon has a moderate to fast growth rate. Adapted to salt spray, this does well in hot climates. Withstanding windy conditions, it thrives in a wide range of soil types, including dry and wet spots. Easy to grow, it has few problems.

Yaupon was used for the widely known 'black drink' ceremony of the Native Americans. The plant, which acts as an emetic, was prepared as a tea. The ceremony was depicted in sketches made in 1565 by early European explorers. The historical accuracy of these drawings is questionable. The ones I've seen depict Europeanized natives with a group of European soldiers (likely Spaniards) in the foreground.

This is considered a very good honey plant in many locations, particularly the Southeast and the Gulf region. BC

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

INNER ... Cont. From Page 13

The name differences have to do with the amount of the poison or other chemicals in the mix ...but all of them have Clothianidin as the active ingredient. How much active ingredient?

For a corn seed treatment, depending on which of the chemicals are used, there's between 0.25 and 1.25 milligrams active ingredient *per kernel*. If you are planting at a rate of about 35,000 seeds per acre, that comes to 0.02 to 0.1 pounds active ingredient per acre according to information on one of the many Bayer CropScience web pages. By the way, 96 million acres of corn were planted this Spring – you can check the math but my figures show 4,800 *tons* were used on trillions of corn seeds on millions of acres.

This particular poison works as a systemic insecticide. That is, when the corn seed germinates and produces both roots and a shoot, the roots absorb that poisonous seed coating that has dissolved into the surrounding soil water and, along with the nutrients and minerals in the soil brings it up into the plant... starting with the roots, then the stalk and eventually leaves, tassel, pollen, silk, and finally the corn kernels themselves. Every cell of that plant is a testimony to modern chemistry, biology, and insect killing technology. Someone should be proud.

Of course not all of it is moved from the soil water into the plant. From the Bayer CropScience web page – "The fate and disposition of clothianidin in the environment suggest a compound that is a systemic insecticide that is persistent and mobile, stable to hydrolysis, and has potential to leach to ground water, as well as runoff to surface waters." So it doesn't stay put, it seems, but like a plague it is spread around and shared with everybody nearby.

Moreover, again from Bayer's web page – "Clothianidin has the potential for toxic chronic exposure to honey bees, as well as other nontarget pollinators, through the translocation of clothianidin residues in nectar and pollen." Of course corn doesn't have nectar, but it does have pollen. And chronic exposure is not a good thing...there's a saying...what doesn't kill you makes you stronger...but not in this case. For this – a bee that eats this stuff just gets worse and worse and worse. And if that pollen gets stored...nurse bees end up feeding poison to their young later in the season. What a shame.

But this doesn't have anything to do with corn seeds last spring, does it. Nope. There's a whole different way to die. Here's how that works.

If you haven't seen one lately, corn planters...and the tractors that pull them... are more akin to the Star Ship Enterprise than that old Ford 9N you use to brushhog your beeyards. These planters cover 12, 14, 18 or more rows at once. The seeds are moved from the seed hopper into the soil slit by being literally sucked into the pipe that follows the blade that opens the soil at just the right depth and are shot into the soil at exactly the right spacing. What makes this work is that the seeds have to move fast and can't stick to each other or the tube gets clogged and suddenly you're missing a row and an alarm goes off in the cab and Captain Kirk, no, more likely Scotty – has to fix it. That's an incredibly inefficient use of his time, so, to stop that from happening the seeds need to be slippery...and talcum powder is added to the hopper to coat those seeds to make them slippery so they get perfectly placed in the cut in the soil every five inches in every row in every acre.

As the seeds are blown into the cut in the soil, they, and the pesticide that's coating them and the talc that's making them slippery get scraped and bounced and pounded and slid and some of it comes off and is loose...and because of all the vacuum pulling seeds out of the hopper and into the tube there's one heck of a breeze right there at the junction of seed and soil, and that talc and poison get blown all over the place. And if there's anything resembling a breeze that day that deadly cloud of talc and poison gets blown all over the place even further.

And then the fun begins.

Purdue researchers found that "the insecticides from the seed coatings were present at high concentrations in waste talc that was exhausted from farm machinery during planting. Talc was used in the vacuum system planters to keep pesticide treated seeds flowing freely and excess talc was released during routine planting and planter cleaning procedures. The insecticides were also consistently found at low levels in soil up to two years after treated seed was planted, and on nearby dandelion flowers and corn pollen gathered by the bees."

So, it's obvious this stuff isn't all sticking to the seeds and that some is staying in the soil to do again its dirty deed, and that some is washing away to taint the world in other places. And mostly, that some is blowing away to land on...anything downwind.

Isn't applying a pesticide to nontarget blooming plants illegal?

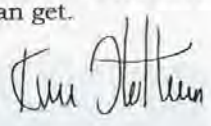
In fact, isn't applying a pesticide to anything other than the target crop illegal?

This Spring, beehives in apple orchards were downwind from corn fields, and some of those hives died because of this. And the chemical they found when they tested the dead bees was – not an apple-applied pesticide. No. It was a corn applied pesticide that killed those bees. So an apple grower didn't get his crop pollinated because a corn grower killed those pollinating bees.

I suspect the lawyers will have a field day with this.

What doesn't kill you, anymore, absolutely doesn't make you stronger. But it does make you smarter, if you're lucky enough to live.

It's harvest time, or even past harvest time. Hurry and check for *Varroa*, get started getting ready for Winter, and keep your veil tight and you hive tool handy...your bees need all the help they can get.



GLEANINGS

SEPTEMBER, 2012 • ALL THE NEWS THAT FITS

BEE BUSSES IN DENVER

Denver Bees and Marygael Meister created a bus campaign that will run for a couple of months. The bus line of Metro Denver is RTD and DB, has three different signs on 11 bus routes and one billboard.

The messages are fun, however they're also building a visual of Bees and Denver Bees . . . you can't get much more urban than a city bus with a message.

FARM SERVICE AGENCY ACCEPTS POLLINATOR HABITATS IN RESERVE PROGRAM

USDA Farm Service Agency Executive announced that pollinator habitats, which support a variety of pollinator species, will now be accepted as a Continuous Sign-up Conservation Reserve Program practice. It is a voluntary program that helps producers apply conservation practices to safeguard environmentally sensitive land.

Pollinator habitats are areas of permanent vegetation located in an agricultural landscape: field edges, field middles, odd corners, or any agricultural location that is suitable for establishing pollinator habitat.

Participants of newly enrolled pollinator habitat practices are eligible to receive a $150 CRP Signing Incentive Payment per acre.

The payment is a one-time payment issued to CRP participants after the contract is approved. The following practices qualify for the $150 SIP:

- Pollinator Habitats (for continuous sign-up only);
- Wetland Restoration & Wetland Restoration (non-floodplain) practice which restores the functions and values of wetland ecosystems that have been devoted to agricultural use and;
- Habitat Buffers for Upland Birds practice which provides food and cover for quail and upland birds in cropland areas.

The SIP for all other continuous sign-up practices remains unchanged at $100 per acre.

For more information about the Continuous Conservation Reserve Program, contact www.fsa.usda.gov.

Continuous CRP sign-up allows participants to submit offers for selected CCRP practices to enroll in CRP at anytime instead of waiting for a General CRP sign-up period. Participants and offered lands must meet certain eligibility requirements to be accepted into the program.

BEEKEEPER EXTRAORDINAIRE

Our VP Steve Hupfer recently went through Brown County Beekeepers Association's old boxes of secretary's minutes, which go back to 1953. The Club may even have started before that. So our Club is approximately 61 years old.

Many years ago this Club had only seven members. There was a vote taken whether to keep the club, or disband it. The vote was 4-3 to continue. We now have over 100 members and we are still growing.

Now for the highlight of our Club's history.

As best as we can tell the 1st meeting for Tom Cashman, our current Sec./Treas., was in 1971. He attended with his dad. Tom's dad was a dairy farmer and a beekeeper, with up to 150 hives. To this day, Tom is still a beekeeper.

In Toms' second year as a member, he became the Club Secretary at the age of 28, from 1972-1982. He was then elected Treasurer from 1982-1987. Since 1987 he has been the Sec./Treas. for 25 years!!! All total, he has been an officer for the club for 41 years!!! The records show he has missed only TWO meetings!! Fantastic dedication!!

Tom has seen the Club go through many ups and downs in membership, and in beekeeping methods. Years ago, the meetings were more of a social gathering with very few beekeepers sharing their secrets of success. He explained that years ago, the only malady they had to deal with was American foulbrood. Also, farm fields were loaded with alfalfa blossoms, which provided lots of good foraging for the bees. Of course, there were many, many more dairy farms that planted alfalfa back then. But, the blossoms are no longer available today, because of early harvesting.

Without Tom being a solid anchor for the Club over the years, we doubt the Club would have continued to exist this long. His minutes of the meetings always included enough detailed information to inform the reader. He is always there to help in anyway he can and participates in all of our functions. This is an example of the kind of commitment and dedication it takes to hold an organization together, for so many, many years. You will never, ever, find dedication like this today. But, if each member gave just a small portion of their time, say four hours a year, it would be a tremendous benefit to the Club.

Tom is an Army veteran, having served three years, including a tour in Vietnam.

Tom is an active member of the Neville Public Museum Astronomical Society in Green Bay. He owns a couple of big telescopes that reach beyond the universe (Not quite!).

We can't thank Tom enough for his years of service. He has truly led by example. Thank you for keeping this beekeeping family together in Brown County, Tom! The bees in this area are forever grateful!

Tom recently celebrated his 69th birthday.

Tom Cashman

CHRONIC DROUGHT

The chronic drought that hit western North America from 2000 to 2004 left dying forests and depleted river basins in its wake was the strongest in 800 years and scientists warn these conditions will be the "new normal" for most of the coming century.

Not only that, the 10 researchers from six universities who worked on the project, say as bad as conditions were during the 2000-04 drought, they may eventually be seen as the good old days.

The researchers report in the journal Nature Geoscience that climate models and precipitation projections indicate this period will actually be closer to the "wet end" of a drier hydroclimate during the last half of the 21st century.

"Climatic extremes such as this will cause more large-scale droughts and forest mortality, and the ability of vegetation to sequester carbon is going to decline," says study co-author Beverly Law, professor of global change biology and terrestrial systems science at Oregon State University.

"During this drought, carbon sequestration from this region was reduced by half," Law says. "That's a huge drop. And if global carbon emissions don't come down, the future will be even worse."

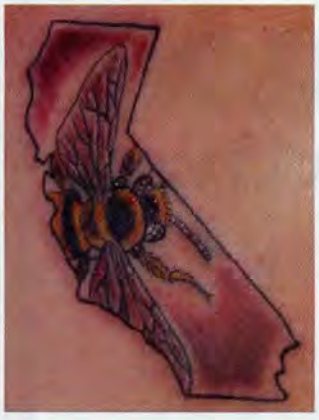
Drought-stressed pinyon pine forest near Los Alamos, N.M., in 2002 on the left and two years later largely grey and dead on the right. (Photo by Craig Allen, U.S. Geological Survey)

Law says it's not clear whether or not the current drought in the Midwest, being called one of the worst since the Dust Bowl, is related to these same forces, as the research did not address this.

But in the West, this multi-year drought was unlike anything seen in many centuries, based on tree ring data. The last two periods with drought events of similar severity were in the Middle Ages, from 977-981 and 1146-1151.

The 2000-04 drought affected precipitation, soil moisture, river levels, crops, forests and grasslands.

"Areas that are already dry in the West are expected to get drier," Law says. "We expect more extremes. And it's these extreme periods that can really cause ecosystem damage, lead to climate-induced mortality of forests, and may cause some areas to convert from forest into shrublands or grassland."



TATTOOS

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2013 Calendar Contest
See Page 77 For Details

Little Darlings
All Mine

Ed **Colby**

Aspen Mountain is a Summertime beehive of human activity. Last year when I first put 10 colonies up there, some naysayer friends thought it idiocy. "That is so wacky," they implied. "You'll be lucky if no one gets stung and sues you."

There were problems, like the local woman who regularly hikes on the mountain. I had placed my little darlings on the precise spot where her husband had proposed to her. His ashes are reportedly in the vicinity.

She is deathly allergic to bee stings, particularly the potent venom of vicious honey bee drones! That's her story! She's a confirmed complainer and troublemaker well-known to the company brass. Last year the mountain manager promised her that the bees were there to stay for the Summer, but that this year I'd find a new spot. Oh, boy! Easier said than done! This hill goes straight up and down, and where there's a flat spot, it's generally got a building or a ski lift terminal on it. That, or there's no road anywhere nearby. So it was with some trepidation that I considered my options this year. I wasn't sure I wanted any more headaches! Not for the paltry honey yield I got last year – 60 pounds. Nice honey – sublime, even – and I got a pretty penny for it. When the hotel purchasing agent got my invoice, he said, "Isn't that a little steep for honey?" "Maybe," I replied, ""but there are only five gallons of this stuff in the world." He works for a five-star hotel. What's he going to do – buy honey at Wal-Mart? But 60 pounds from 10 hives? A six pound average? It wouldn't matter how much I charge per pound. Not worth the trouble, right?

Last year was a scratch almost everywhere around here. Maybe my pathetic Aspen Mountain crop was just the fruits of a bad year. Maybe this year would be better. Maybe.

But the skiing company is wild about bees on the mountain. At the end of the ski season, I got a note from the vice-president in charge of operations – encouraging me to place hives on the mountain again this year.

I work for a company that loves honey bees! Could life get any better? I just had to figure out a way to make this pay. I try to be a team player, but my bee work is not charity work. But they wanted these bees pretty badly. We finally agreed that the company would pay me a set fee per hive for up to 10 hives. Plus they get the honey. It was sort of a futures contract. They get my yield, no matter how great or small. I get a guaranteed income for my efforts. Kind of like working for the government.

I initially dropped off five colonies, because that's how many I had left over after distributing bees to my other yards. At first they nearly starved. You could scarcely find a flower on those parched hillsides. Then in July it rained, finally. After the weather cleared, the bees got on a wicked honey flow. So I brought over another five hives. Now, in mid-July, I wish 'em well, but no promises.

Driving back from my Silt Mesa yard yesterday, I passed by Paul's 32-colony yard at the western end of Peach Valley, where I live. I drove past the local CSA farmer's place. He has bees in his gardens. I don't know how many. Another half-mile down the road, I saw seven new hives by the roadside. The woodenware looks brand new. Who owns them?

Another mile and you come to the Slaughter Gulch Road, where Paul has yet another 32-hive apiary. Right past there behind the old schoolhouse are three hives. A mile and a half farther you come to my place, where I currently have nine. Sometimes I have up to 40. Close by at the farm store a guy from Boulder has beehives. A dozen? Twenty? I don't know. I have another near neighbor who sometimes keeps bees. These are just the ones I know about.

All I'm saying is that this area seems saturated with honey bees. It's got some alfalfa, but it's got lots of houses, too. I wouldn't say it's super productive bee forage. But the bees keep moving in. Fifteen years ago, I was the newcomer, with a couple of hives. Paul was here already, as his dad had been before him. As far as I know, we were the only beekeepers in Peach Valley. In time my little operation grew to eight, then 12, then 30, now 70 or 80 or 90 colonies. Finding a good location for 20 or 30 hives is challenging, assuming you don't want to step on anybody's toes. Maybe that's why I have hopes for Aspen Mountain. It feels like the frontier. At least it's all mine.