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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

DECEMBER 2008 VOLUME 136 NUMBER 12

Pollen stores are critical for early Spring buildup. Make sure your bees have enough stored away, or be ready to help them out with a protein supplement. Nutrition management has come to the front of good beekeeping skills. (photo by Bill Mondjack)

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FEATURES

DEPARTMENTS & COLUMNS

Bee Laws In Denver

I am a hobbyist beekeeper – a hobby that has gotten out of control at times.

I have hives scattered in three counties here in northern Colorado including one in Denver.

I only have four producers this year – managed to get 262 pounds. I have six more that have built up from swarms with enough stores to Winter over. This is just replacing losses from last year.

I work for the City & County of Denver. The folks at Parks and Rec dept think that I am the City beekeeper as I get calls for swarms in the parks & I'm on someone's list as a swarm catcher in the Denver neighborhoods. Currently it is illegal to keep bees within the City and County. The ordinance lists bees as "dangerous animals." A gal named Marygael Meister (you can probably google the Denver Post article) was cited for keeping bees in her Denver backyard after taking a class thru the Denver Botanical Gardens at Chatfield Reservoir. With Marygael as the catalyst, City council along with the Zoning Dept, the Legal Dept, Parks, & Environmental Health asked me to be an "expert" in the discussions to revise the two ordinances that cover beekeeping. We've drafted a bill that mirrors the City of Aurora (right next door to us). This will allow two colonies & there must be a six foot fence to get the bees over people's heads before they head to forage. No "junk" in the bee yard – broken frames, etc. and there must be an available water supply (altho' as we both know, if there is a bucket in my yard & a swimming pool in the next yard, the bees will go to the pool).

This bill has passed the "Greenprint Denver" committee (Denver practicing sustainable living). Passed the "Blueprint Denver" committee just last week (how this fits into the Denver master plan for the next 75 yrs).

The first reading before City Council – along with public comment – is on Monday 20 Oct. The second reading is on 17 Nov. After that, it is law!!!

The outlook is excellent. In order to pass we have to get seven of 13 votes. I have been "politicking" members of Council, many of whom I know well from my work as an Inspector. I know I have five of the seven needed.

One Council member is adamantly against it as she got stung once while campaigning (don't know if it was a wasp or bee and she doesn't care). This person has gone so far as to address a neighborhood group, telling them the City is going to "infest your neighborhood" with bees!!! I'm amazed, I'm sure you've seen much more of this thinking than I have.

I'm about to "send out the word" to "underground" beekeepers that are keeping bees within the City limits, to throw in their three minutes worth at the public hearing on the 20th.

If you could include a "blurb" of what is happening here in Colorado that would be nice. Probably be a "done deal" by the time you can get this to press.

Phillip Bradbury
Denver, CO

Survival

I have gotten a little older and my activities are not any more as they were even five years ago.

However, I read all those doomsday reports and I shall not worry about the pollination issue.

As it already exists, honey can be replaced by "pseudo" Honey, already marketed. That is one reason to keep the price in check.

Since there is already a chemical marketed affecting the pollen, and whatever (I just read that within the *Apis* letter), I am totally sure that our learned chemists and biological gurus will be able to modify our plant population not to require any pollination by whatever insects at all since "Self pollination" will be the answer to all those bee diseases hereby eradicating also all related "pests." The beekeepers have to look for other income making endeavors.

Another thought came to my mind quite some time ago.

Of course here again I talk heresy.

All critters have this, what is called "Survival instinct." Now, if *Varroa* and equally pesky critters have any interest in survival, why should they be out to destroy the very creature giving them a livelihood???.

The other side of the coin is it equally true for the bees (in our instance) not to do the same by developing counter measures?. (*Apis Cerana* ???!!!)

Personally I got fed up fiddling according to time tables with "my" bees. A good three years back.

However, I use SBB's since 1999. Whether they have any significant influence about survival, beats me. As you probably gathered, I am not an academic, whomever they is.

I have used about all the suggested remedies including FGMO, which in the end proved also be worth a pinch of coon manure. Same applied to "essential oils." All that far too much diddling around with.

I do have survivors not doing a thing but leaving enough food or feeding.

Quality and abundance of pollen? I do not know. (There appears to be plenty.)

Losses: OF COURSE !!! By what? I looks like lousy genetic, random quality queen stock. Too dumb to find food close by? Nosema? What is now the telltale, formerly it was the excrement color. I find no evidence of that.

As I said I have losses up to 50%. Usually in March. Then they are because of it, a bunch of empty hives, which are then occupied with new tenants. My own swarms or strangers.

May be and hopefully they ARE survivors. And Not hopefully diseased one's!

Varroa? Less than 10 % last checked, 2005. Now: No idea.

Now: Am I a keeper or a "haver," that is the question?

H.E. Garz
Roscoe, WA

Varroa In Hawaii

The *Varroa* mite has arrived in Hawaii, and it is island hopping.

Here is how the State's Agriculture Department is coping with the situation: *"Agriculture quarantine teams plan to immediately destroy all feral bee hives within a five mile radius of Hilo Bay."*

This is nuts! Which one is going to kill more bees? Is it *Varroa* destructor, or is it the Department of Agriculture of Hawaii?

As I see it, and as past experience has shown, eradicating the feral bee population is not going to get rid of the parasite. But this mass killing of bees is surely going to eliminate any chance of letting a strain of bees emerge that is well-adapted to the local conditions and that is naturally resistant to the pest. Given a little time, this positive outcome would have undoubtedly occurred through the process of natural selection. But no, bees are going to be deliberately killed in huge numbers. The official excuse: This is to protect the interests of beekeepers. The real reason: This is meant only to give the impression that the Department of Agriculture is doing something about the situation.

Once again there are some people who are acting as if they know better than Nature with its millions of years of experience!

After the feral bee population has been eliminated, beekeepers will follow up with routine applications of all sorts of concoctions in vain attempts to protect the bees that will remain in their boxes.

We've already been there, and yet the same stupid mistake is repeated over and over again. There are always some who are so good at killing and destroying, aren't there?

Serge Labesque
Glen Ellen, CA

Tulip Poplar Problems

Tulip Poplar problems (*Bee Culture*, 9/2008) letter to editor by W. Bartlett, Leonardsburg, MD cites a problem that I have experienced in the failure of nectar secretion, at least in volume, in yellow star thistle in the upper Sacramento Valley here in California. I no longer find it worthwhile to keep bees in the area and consequently no longer sell the excellent thistle honey on the farmer's market.

Yes, global warming may be a factor in climate changes that affect plant physiology. However, geologists with a billion or more years of geological evidence may not be so quick to give credence to global warming as a sole result of human activity.

Since the evolution of the angiospermae (the tulip tree is one of these) following the domination of the gymnospermae during the Mesozoic Era there have been cycles of radical climatic changes during periods far, far longer than the relatively brief period of human existence. These periods of planetary upheaval seen centuries long droughts, comings and goings of intensive flooding of continents and the advances and retreats of pervasive ice ages. Yet, we are predicting doomsday based on evidence from our last 200 plus years, a minisecond compared to several billion years of geological time.

Perhaps what we should be gravely concerned about is our dwindling resources to supply the exponentially expanding human population on the planet. Our current problems, as Bartlett points out, are getting our attention whereas the more subtle, but potentially more destructive disturbances are receiving little or no attention.

Larry Goltz
Redding, CA

Great Issue - October

I just wanted to comment on the cover of the October '08 *Bee Culture*, "What's Causing CCD???" This is hilarious! I thoroughly enjoyed this cover as well as all the articles in this issue. I usually read each *Bee Culture* cover to cover as soon as received. Thanks for such an informative and sometimes entertaining magazine for hobbyist beekeepers.

Donna Boozer
Greenwood, SC

I am writing to thank you for the hilarious cartoon on the double front cover of the October issue, which I understand is the artwork of Lela Dowling.

I still chuckle when I think about it. Needless to say, I have sent for "Uncle Buzzy's Big Fat Book o' Bee Cartoons."

Lela's wit certainly appeals to my English sense of humor.

Please may we have more covers like this one. Very many thanks.

Monica Mullett
Cumming, GA

Old People

Hello, this is in response to an editorial that appeared possibly three months ago. With the coming of Fall, there is more time to write.

You asked, "Who are all these old guys?" in reference to the changing methods of beekeeping but using a music analogy. These "old guys" – possibly rockers now in their 60s and beyond – are some of the people from whom the young generation of musicians draw inspiration. The aging musicians of which you wrote most likely drew from even older "guys" like Muddy Waters, Ledbetter, Bessie Smith and Robert Johnson. They, in turn drew upon far older "guys" songs, and chants from their ancestors' cultures. Every new style of music has some echoes from the near and distant past. Just as many of the new styles of beekeeping draw upon past experiences.

Essential oils? There are centuries-old poems and sayings from what is now the U.K. that speak to the need for rosemary, mint, and thyme to be in flower for the bees to do well. Insulate a hive? Some people in northern Europe have been using insulation for years. It was often wool, but wool is a fine

insulator. Ventilation in a hive? In my first year of beekeeping I shifted the top box back one-eighth of an inch in the winter to increase ventilation. A technique I read of in *Bee Culture* which had been used by a venerable beekeeper in northern New York (I believe) for quite a number of decades. The list goes on and on.

To progress one cannot disregard the past, but must draw from it: to build upon the successes and to learn from the errors. The combination of knowledge, innovation, creativity, and daring can result in new techniques that will help all beekeepers advance in the face of new challenges.

As to the number of nails in a frame, I use staples, but I figure there are six important points to connect in a frame. If you miss the ones under the "arms" the frame just doesn't hold together. An older beekeeper taught me that.

Thanks for a great magazine.

Karen Edmundson Bean
Deming, WA

Dusting With Poison

I have to agree about the pesticides. I had a father-in-law who wanted me to supply him with bees to pollinate his cucumbers and squash, which I did for several years.

I knew after the first hive died, that this project meant a death sentence for the bees I supplied.

He was old school and used insecticides on his produce. It was how he got his money and bugs would eat up his profit.

Mostly, he used Sevin dust. This stuff is death to the bees. Every year I'd bring a nuc out to his place and every year the bees died.

Except one year, he modified the way he used the Sevin dust and the bees survived, that year. What he did was wait until the bee's quit flying in the evening.

I've been told bees collect Sevin dust like pollen and feed it to the larvae. I think Sevin dust should be banned or at least let people know what a danger to bees it is.

Mickey Knight
Winston-Salem, NC

Agrochemical Editorial

Your editorial references to The Agrochemical Agrocultural Complex in the September issue of *Bee Culture* showed great insight. We needed this.

Carl Webb
Clarkesville, GA

CORRECTION

In the October issue of *Bee Culture*, the story on page 66 should have been titled **www.savethehives.com**. We apologize for any confusion this may have caused our readers.

INNER COVER

One activity every beekeeper can do more of is to attend beekeeping meetings. Oh, I know you think you already attend more than you can afford in both dollars and time, and besides, it's always the same old thing, or the speaker doesn't really know what real beekeeping is about because it doesn't put food on their table like it does mine, or if I have to listen to one more lecture on marketing I'll just scream. Same for candles, nosema, CCD, the new *Varroa* drug and on and on and on. I've heard it all before, I get the magazines and I go to my county meeting most of the time. What more do you want?

Tell you what, I can hear you think, I'm gonna miss this one and get the news from someone else. I'll save $50 or more if I stay home, get some shut eye, some work done, and keep the wife, or husband happy...right?

Wrong. Wrong. Wrong. And again, Wrong.

First, how much does it cost to replace bees anymore? Next year packages will be about $60 or so retail, $40 if you get them wholesale. Queens are $20 or so for one that's untested and unknown and maybe unmated. $30 for a tested queen, one that you'd have paid $20 for 10 years ago. How far does that $50 go now?

My friends, the whole world of beekeeping is changing. Everything you know about bees is being challenged...everything. Feeding. Queen production. Treating everything from AFB to Wax moths. Everything. And if you aren't in the loop, if you stayed home and slept in last Saturday, if you went skiing or bowling or hunting instead...your bees are in trouble because they have changed and the things that kill bees have changed...and now, you haven't. Maybe skiing or bowling or hunting is what you should be doing instead.

If that sounds harsh, OK. It is. I'm watching bees die because beekeepers didn't change, or sadly, won't change.

I don't have time. I don't have the money. I didn't know that. Why didn't someone tell me? I can't do that and harvest honey. It's too much work....

My friends, I stand in front of groups all the time and this is what I hear. And if that sounds too harsh, OK. It's either the truth because beekeepers don't have time, money or energy; or it's the truth because beekeepers have changed as much as they want and don't want to change any more. If it is, if this is the way it is then your beekeeping days are numbered, and that number isn't very large. But if it's not the truth, if instead you could be changing and making those changes work for your bees, then get your carcass to another meeting. Get another book. Read that hard article in the magazine with the big words. Because if you don't, for sure you're in trouble. And even if you do, you're still going to have to change and do new things and different things and better-for-your-bees things.

I went to a meeting in early November in New York. Here's what I learned that I didn't know, that will help save my bees now and next season.

There's a new EFB out there apparently, at least in New York. It looks like AFB. It ropes out kind of like AFB, especially kind of old AFB, but the tests say it's EFB, and if you burn or treat with antibiotics then you've wasted money you didn't need to waste. But at the same time there's some AFB out there that looks more like EFB than AFB. The larvae die down before the cell is capped, the rope isn't as stringy as you'd expect with AFB and the dried down larva pricks out just fine, thank you. But it's AFB, and if you don't do something about it, guess what. Dead bees, contaminated equipment and a fine mess on your hands. Especially if you put new bees in that equipment. I learned that a meeting.

I learned a lot about packages, too. Stuff you'll want to know next Spring, when you spend big bucks for...what?

Drones? In the research I heard, one package supplier sent packages that were 25% drones. 25%! But lots more measures were taken from the eight packages from eight suppliers. *Varroa* mites/adult bee. Nosema present. T Mites. Queen supercedure. Colony mortality. Hygienic behavior and over all weight gain during the season. One supplier sent along six *Varroa* mites/hundred adult bees in that package. And didn't charge extra for them! (What's that come to at 10,000 bees in that package? 900 mites, that will be 2400 in three weeks, that will be 5000+ in three more weeks...) Three suppliers sent along nosema, five didn't. That's encouraging...kind of, I guess. You'd think they wouldn't want that in their operation, let alone sell it to you.

All suppliers sent along bees that exhibited somewhat high levels of hygienic behavior, and that is encouraging. Finally.

All in all there were significant differences *between* suppliers in drones sent. Nosema sent. Mites/bee sent, and number of packages with mites. The impact those mites had on honey production, along with nosema on honey production and weight gain was significant, too.

Steve Sheppard has more about this in his article. But the take home message is that you better be careful with your packages because you may be getting a lot more for your money than just bees and a queen. And you better be asking the right questions, and if you don't get the right answers, I'd find a different supplier. I learned that at a meeting.

The new Nosema? I learned a lot about that, too. Commercial beekeepers were examined. Colonies that don't take feed in the spring often have very high nosema spore counts...and instead of thinking they are just fine, they'll die. When to treat? First, get spore counts (send them in or get a scope), and figure 1 million spores per bee and you better treat. Spring and Fall treatments are making out better than just Fall, or just Spring, so far. Feeding in plastic bags works well. Use a gallon bag with a half gallon syrup in it and feed that twice. If they don't take it consider the drizzle method described here last time. With the new nosema it's feed, or die. I learned that at a meeting.

I learned more, but I hope you see my point. Get to a meeting. Save your bees. No one else will.

Finally, from all of us here at *Bee Culture*, we wish you and yours a safe and sane holiday season. Remember, keep you smoker lit and your hive tool sharp...next year *will* be better.

Notes From A Meeting

DECEMBER – REGIONAL HONEY PRICE REPORT

A year makes a little bit of difference overall …, but for some products in some regions, it's a real big change. Posted here are the December 2007, and the December 2008 prices for all products in all regions. Take a look at yours.

REPORTING REGIONS - 2007

	1	2	3	4	5	6	7	8	9	10	11	12	SUMMARY Range	SUMMARY Avg.	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.10	1.35	1.26	1.38	0.88	1.20	1.15	1.10	1.26	1.08	1.09	1.16	0.88-1.38	1.17	1.14	1.07
55 Gal. Drum, Ambr	1.00	1.21	0.92	1.13	0.79	1.02	1.13	1.00	1.00	1.00	0.99	0.97	0.79-1.21	1.01	0.99	0.99
60# Light (retail)	110.00	115.50	120.00	110.60	110.00	110.00	114.00	107.15	110.00	121.33	123.40	120.00	107.15-123.40	114.33	109.91	109.09
60# Amber (retail)	110.00	105.00	105.00	105.00	110.00	107.33	111.20	110.00	110.00	119.59	122.80	119.50	105.00-122.80	111.29	107.42	106.37
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	47.52	48.98	40.80	42.53	60.95	38.50	42.27	60.95	60.95	46.90	36.40	60.50	36.40-60.95	48.94	52.89	45.94
1# 24/case	65.33	71.28	67.20	60.53	60.00	66.93	71.11	68.80	55.00	77.76	67.45	80.00	55.00-80.00	67.62	70.24	65.71
2# 12/case	64.08	61.08	61.80	55.20	54.00	52.40	61.37	68.00	58.00	57.84	52.80	76.80	52.40-76.80	60.28	61.81	57.53
12.oz. Plas. 24/cs	58.56	61.68	49.80	49.45	48.00	56.00	58.98	56.80	48.50	47.28	50.80	55.00	47.28-61.68	53.40	53.88	53.55
5# 6/case	75.75	65.98	71.25	62.80	68.99	63.50	68.00	74.40	62.50	61.86	60.00	74.50	60.00-75.75	67.46	66.15	63.13
Quarts 12/case	110.59	135.75	112.20	83.29	79.25	78.19	84.72	83.40	102.00	120.12	80.65	130.00	78.19-135.75	100.01	91.80	91.57
Pints 12/case	68.75	69.98	66.00	46.50	58.00	56.00	67.51	49.50	66.00	64.68	59.13	67.00	46.50-69.98	61.59	57.77	52.52
RETAIL SHELF PRICES																
1/2#	3.00	2.68	2.40	2.74	2.19	2.50	2.72	2.35	2.54	2.54	2.79	3.75	2.19-3.75	2.68	2.66	2.52
12 oz. Plastic	3.88	3.57	3.25	3.18	3.25	3.40	3.39	3.77	3.43	3.15	3.39	3.95	3.15-3.95	3.47	3.38	3.17
1# Glass/Plastic	4.73	4.32	4.10	4.21	3.92	4.70	4.14	4.63	3.73	4.46	3.98	5.16	3.73-5.16	4.34	4.28	3.98
2# Glass/Plastic	7.50	7.44	7.05	6.88	6.62	6.39	6.66	8.16	7.31	6.38	6.12	9.25	6.12-9.25	7.15	7.02	6.82
Pint	7.68	7.92	6.50	5.35	4.75	5.53	6.33	5.85	5.58	8.00	5.36	8.15	4.75-8.15	6.42	6.12	6.12
Quart	12.00	11.98	8.73	9.37	7.70	9.41	8.27	10.00	10.00	11.00	9.03	13.50	7.70-13.50	10.08	10.95	9.48
5# Glass/Plastic	15.75	16.16	15.65	14.00	22.13	15.50	17.40	17.00	15.00	12.74	13.94	18.00	12.74-22.13	16.11	16.00	14.58
1# Cream	5.99	5.91	4.87	4.86	5.99	3.80	5.49	4.95	5.99	5.48	4.72	5.75	3.80-5.99	5.31	5.43	4.90
1# Cut Comb	5.00	6.72	5.19	5.06	7.42	4.77	7.31	5.00	7.42	8.00	9.00	7.50	4.77-9.00	6.53	6.09	5.67
Ross Round	6.75	3.97	4.97	5.75	6.75	3.50	6.75	5.00	6.75	6.75	5.75	6.25	3.50-6.75	5.75	5.56	5.34
Wholesale Wax (Lt)	2.00	3.12	1.80	2.03	2.15	3.00	3.30	2.63	2.93	3.00	2.59	3.31	1.80-3.31	2.65	2.37	2.33
Wholesale Wax (Dk)	2.00	2.73	1.70	1.87	1.90	2.00	2.85	2.75	2.00	2.68	2.25	2.00	1.70-2.85	2.23	2.19	2.07
Pollination Fee/Col.	60.00	82.33	52.50	30.00	90.00	47.00	46.67	60.00	94.03	94.03	75.00	108.75	30.00-108.75	70.03	63.57	51.49

REPORTING REGIONS - 2008

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EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.50	1.59	1.51	1.54	1.42	1.43	1.45	1.50	1.51	1.45	1.38	1.45	1.38-1.59	1.48	1.46	1.17
55 Gal. Drum, Ambr	1.41	1.35	1.41	1.33	1.28	1.23	1.43	1.40	1.18	1.41	1.37	1.40	1.18-1.43	1.35	1.33	1.01
60# Light (retail)	120.00	124.50	130.00	117.88	120.00	125.00	117.60	108.00	127.00	118.34	123.00	129.75	108.00-130.00	121.76	122.92	114.33
60# Amber (retail)	120.00	113.50	130.00	115.92	120.00	112.50	114.00	117.50	112.50	117.82	118.00	68.00	68.00-130.00	113.31	116.49	111.29
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	52.08	51.10	43.20	47.82	64.56	37.50	43.81	64.56	64.56	42.00	49.00	63.00	37.50-64.56	51.93	56.95	48.94
1# 24/case	65.52	68.21	72.00	67.36	86.00	64.60	70.02	73.12	70.00	94.44	92.94	95.00	64.60-95.00	76.60	79.91	67.62
2# 12/case	69.72	64.08	64.80	57.14	83.00	57.00	62.46	81.00	62.00	69.24	60.00	78.00	57.00-83.00	67.37	71.81	60.28
12.oz. Plas. 24/cs	64.32	62.63	52.20	62.09	78.00	54.00	56.52	56.64	54.00	53.28	51.00	68.67	51.00-78.00	59.45	63.34	53.40
5# 6/case	89.55	75.98	75.00	66.40	96.00	60.00	74.10	96.00	70.00	74.82	100.00	93.00	60.00-100.00	80.90	74.32	67.46
Quarts 12/case	137.00	100.35	68.00	94.33	78.00	83.70	90.00	88.80	102.12	120.00	95.94	120.00	68.00-137.00	98.19	102.31	100.01
Pints 12/case	71.30	51.95	85.70	64.54	58.00	60.25	59.00	54.90	66.00	69.00	70.50	69.50	51.95-85.70	65.05	62.01	61.59
RETAIL SHELF PRICES																
1/2#	2.88	3.06	2.57	3.03	2.39	2.76	2.69	3.00	2.78	3.00	2.53	4.60	2.39-4.60	2.94	2.99	2.68
12 oz. Plastic	3.75	3.84	3.62	3.62	4.66	3.65	3.53	3.77	3.89	3.75	3.92	4.50	3.53-4.66	3.88	3.74	3.47
1# Glass/Plastic	4.23	4.25	4.44	4.53	4.88	4.66	4.24	4.73	4.81	5.25	4.85	4.95	4.23-5.25	4.65	4.73	4.34
2# Glass/Plastic	8.25	7.50	7.73	6.80	7.37	7.00	6.85	8.25	7.14	7.20	7.44	9.75	6.80-9.75	7.61	7.46	7.15
Pint	7.62	7.38	6.50	6.31	5.26	6.58	6.31	5.98	9.00	7.50	6.36	8.19	5.26-9.00	6.92	6.45	6.42
Quart	12.00	9.48	9.75	10.03	8.75	9.88	9.76	9.75	11.29	13.00	9.16	12.50	8.75-13.00	10.45	10.90	10.08
5# Glass/Plastic	17.25	15.24	18.33	17.63	20.00	14.50	16.87	18.00	18.00	15.55	17.42	20.50	14.50-20.50	17.44	16.99	16.11
1# Cream	5.25	5.15	5.50	5.44	5.87	6.00	5.30	5.07	4.09	6.28	6.08	6.85	4.09-6.85	5.57	5.10	5.31
1# Cut Comb	5.50	4.99	6.50	5.75	7.48	6.87	6.90	6.00	7.48	10.00	10.00	8.25	4.99-10.00	7.14	6.84	6.53
Ross Round	6.67	5.05	5.88	5.25	6.67	6.67	5.60	4.85	6.67	6.67	8.00	8.45	4.85-8.45	6.37	6.11	5.75
Wholesale Wax (Lt)	3.67	4.00	2.50	2.62	2.15	3.00	2.70	3.00	3.92	4.06	3.57	3.70	2.15-4.06	3.24	2.93	2.65
Wholesale Wax (Dk)	3.00	3.48	2.43	2.47	1.90	2.00	2.77	2.75	3.00	3.36	2.80	2.00	1.90-3.48	2.66	2.65	2.23
Pollination Fee/Col.	80.00	94.00	57.50	42.50	155.00	42.50	50.00	60.00	87.65	87.65	23.00	125.00	23.00-155.00	75.40	73.77	70.03

RESEARCH REVIEWED

The Latest In Honey Bee Research

Steve Sheppard

"Good (and bad?) things come in small packages."

Buying and installing packages of honey bees is a common method for new beekeepers to populate or to replace Winter losses within an existing operation. The majority of queen and package producers are located in temperate regions of the country, including the southern United States and California. From these areas, they can take advantage of the relatively early Spring to prepare and ship bees to other parts of the country as early as possible in the bee season. The package bee industry makes it possible for beekeepers to recover relatively quickly from unexpected colony losses and, consequently, maintain a large force of pollinating bees for commercial agriculture. The limitations of a highly seasonal production schedule means that producers shake bees (fill the packages with workers) quite frequently from their colonies and, as such, the packages represent a cross-section of the current health status of their beekeeping operations. Collectively, widespread shipment of bees throughout the U.S. also provides a means to rapidly disseminate novel pests and pathogens to all parts of the country. The issue of package bee quality and the level of associated pests and pathogens shipped during a bee season were recently investigated in a paper published by Strange and colleagues (Strange et al., 2008).

In May 2006, the researchers received eight packages of bees (with a queen) from each of six different suppliers from the southern United States (48 three-lb packages total). They then sampled bees from the packages and analyzed them for the following: the population of *Varroa destructor* (mite to bee ratio), tracheal mite infestation rate, *Nosema* infection and the percentage of drones present in the packages. Within 48 hours after their arrival, packages were installed into single story colonies and inspected three and six weeks later to determine the presence or absence of the marked queen. The researchers reported no significant differences in queen survival rates between the different package suppliers (described as package "lines"). However, the mite to bee ratio (MPB) of *V. destructor* varied significantly among the six different package lines. The mean infestation rate for the line with the highest MPB was 5.4 mites/100 bees, while the lowest MPB ratio was 0.4 mites/100 bees. The overall mean MPB for the 48 packages was three mites/100 bees. No tracheal mites were detected in any of the samples. Significant differences in *Nosema* infestation of packages also were found among lines. Fifteen of the 48 packages (in four out of the six lines) contained *Nosema*-infected bees, whereas two lines tested *Nosema*-free. The proportion of drones present in the packages was also highly variable, with two of the lines containing packages with significantly more drones than in the other four. The highest proportion of drones found in a single package was over 20%.

The researchers concluded that "package quality (as measured by *mites/bee*, percentage of drones and *Nosema* prevalence) was highly variable both among and within the lines" studied. They noted that, although the four suppliers sampled may not have been "generally representative of the packages available to beekeepers," their findings revealed that some queen and package producers were shipping packages with significantly higher mite, disease and drone loads than others. The high mites/bee levels found in "at least 50%" of the packages from five of the six lines, exceeded the spring threshold for treatment in some regions of the country. Strange and colleagues considered that in these cases, mite control costs have "simply been shifted to the beekeeper." The researchers discussed a number of possible explanations for the variable quality of honey bee packages as measured by the presence of pests, pathogens and excess drones. These included variation in production practices (i.e. the use of excluders when shaking to reduce the inclusion of drones), mite control efforts and the possibility of acaricide-resistant mite populations. In their conclusion, the researchers cautioned: "Purchasing packaged bees is a buyer beware endeavor." By way of advice, they suggest that beekeepers check packages of honey bees they receive for the presence of pests and diseases and communicate with package producers to improve standards. BC

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News For You –

ABF & ABRC IN RENO – BEE THERE

The 2009 North American Beekeeping Conference in Reno, January 13-17, by the American Beekeeping Federation will see an event-filled week for beekeepers. From the opening free reception on Tuesday evening to the Annual ABF Banquet on Saturday evening, the beekeepers will have unique opportunities to learn of the latest developments, see the newest products, make new friends and renew old acquaintances.

The conference officially opens on Wednesday morning with a keynote address. At noon, the ABF Trade Show will open, to run through Saturday noon. In the afternoon, the Shared Interest Groups will give commercial honey producers and pollinators, queen breeders, honey producer-packers, and sideliner-hobbyists opportunities to take a closer look at their particular segments of the industry. Wednesday closes with the annual Honey Queen Reception.

Thursday is the day for the *Varroa* Seminar, when experts in every aspect of the parasite will look back at its past 20+ years in the United States; the present situation and the future as new avenues of treatment and control become available.

Friday's program will cover a variety of topics of interest – pesticides, pollination, nosema, nutrition, and honey marketing. The day will conclude with the American Honey Show auction.

Also, on Friday, the Serious Sideliner Symposium will operate on a simultaneous track, examining topics of special interest to those serious, but part-time, beekeepers. The Symposium will continue on Saturday afternoon after sharing the Saturday morning Interactive Workshops with the general conference attendees.

The Conference program includes Jeff Pettis, Beltsville Bee Lab; Marla Spivak, University of Minnesota; Marion Ellis, University of Nebraska; Jim Tew, Ohio State University; Jay Evans, Beltsville Bee Lab; Keith Delaplane, University of Georgia; Charles Wick, U.S. Army's Edgewood Chemical Biological Center; Eric Mussen, University of California, Davis; Frank Eischen, Weslaco Bee Lab; Peter Teal, USDA, Gainesville, Fla.; and Sue Cobey, University of California, Davis.

The North American Beekeeping Conference will be held at the spacious Nugget Casino Resort Hotel in Sparks/Reno. The Nugget is a self-contained adventure with nine restaurants plus casino and show entertainment all under one roof. The Conference rate is $95. Check it out at www.janugget.com.

Visit www.ABFnet.org for the full conference program. For additional information, contact the American Beekeeping Federation, P.O. Box 1337, Jesup, GA 31598, ph. 912-427-4233, fax 912-427-8447, e-mail: info@ABFnet.org. BC

BEES COUNT TO FOUR

Australian researchers have found honey bees can be trained to count up to four, learn colors and smells and be trained to fly through complicated mazes.

Prof. Mandyam Srinivasan of the University of Queensland's Brain Research Institute says in one experiment landmarks were placed at frequent intervals in flight tunnels and showed the bees could be trained to differentiate between up to four separate landmarks before becoming confused.

"If you train them to the first landmark and then test them they will go to the first landmark," Srinivasan is quoted as saying. "If you train them to the second one they will then search at the second one, and so on. But if you test them beyond four then they have trouble."

Srinivasan says previous analogous studies have shown bees can store details of three separate locations of pollen-laden flowers.

"However, we were looking purely at sequential counting whereas they were looking more at how many different items a bee could remember," he says.

The bee brain is only about the size of a sesame seed, but research has shown it has many of the characteristics of the human brain including complex behaviors such as advanced memory and learning.

Srinivasan – who won the 2007 Queensland Smart State Premier's Fellowship and the 2006 Prime Minister's prize for Science – is recognized nationally and internationally for his groundbreaking discoveries concerning bee vision, navigation, perception and cognition.

In a 2004 Nature paper, he demonstrated scent could trigger complex navigational memories in honey bees. He proved scent injected into a hive could stimulate experienced bees to fly to previously visited sites, through previously formed associations between scent and location.

Meantime, Srinivasan says the university's recently opened A$2.5-million All Weather Bee Flight Facility at the Queensland Brain Institute will play an important part in his research.

"Studying how bees control their flight speed, avoid collisions, and orchestrate smooth landings is providing valuable insights into the design of biologically inspired vision systems for unmanned aerial vehicles," he says.

With nearly 200m^2 of useable flight space, it is the world's largest indoor, climate-controlled insect flight-testing facility.

The facility is a high-tech rooftop structure with climate-control and abundant natural light, specially designed for studying bees and their behavior.

"Bees have an extensive behavioral repertoire, allowing scientists studying them to learn about vision, olfaction, memory and learning and even aggression – all human traits," Bartlett says. BC

– Alan Harman

Malcolm T. Sanford

The Florida Standard Of Identity For Honey

"A Groundbreaking National Iniative"

It was over two years ago that I wrote in this publication about the possibility of finally having a honey standard adopted, the **culmination of over two decades of work by scientists, attorneys and others**.[1] There is abundant evidence that one is needed as there appears to be a never-ending list of pretenders coming into existence that are either sold outright as honey or more commonly added purposefully as adulterants, providing a commercial advantage to the adulterer and defrauding and confusing the honey consumer. This continues a tradition that has been around ever since honey first became a viable economic product. The economic adulteration of honey among other substances was in fact one of the important reasons for the establishment of the U.S. Food and Drug Act, which culminated in formation of the Food and Drug Administration (FDA).[2]

Everything seemed to be in place. The FDA was on board to the extent that a Docket number had been declared and the basics of the standard had been agreed upon by most of the major players. I wrote at the time, "Thus, a variation of the Codex Alimentarius has been recommended. The Codex Alimentarius Commission was created in 1963 by Food and Agricultural Organization of the United Nations (FAO) and World Health Organization (WHO) to develop food standards, guidelines and related texts such as codes of practice under the Joint FAO/WHO Food Standards Programme. The main purposes of this Programme are protecting health of the consumers and ensuring fair trade practices in the food trade, and promoting coordination of all food standards work undertaken by international governmental and non-governmental organizations.'"[3]

In August, 2006, however, two months after my column was published, the FDA's Center for Food Safety and Applied Nutrition (CFSAN) sent a letter saying it would not address the petition for a standard because of other agency priorities and limited resource availability. The claim was that there were simply not enough funds to do an adequate job of enforcement. It turns out the FDA had in fact been burned in an earlier attempt to criminalize honey adulteration.[4] Investigators had assembled a considerable amount of evidence, but the trial resulted in an acquittal. This was reported by Troy Fore Jr., Executive Director of the American Beekeeping Federation, at the 1996 Convention in Portland, Oregon. He concluded that lack of an acceptable standard of identity for honey affected the outcome of the trial in several ways. In particular, it raised considerable doubt in the mind of the jury about what constituted purposeful adulteration.[5]

Enter a human dynamo named Nancy Gentry into the Florida beekeeping scene. She has spent countless hours and funds of her own in attempting to shepherd the promulgation of a honey standard in the state of Florida. Part of her strategy is to convince the FDA to continue with developing a standard by getting one passed in every state, forcing it to finally take action. As an example, Oregon's Death With Dignity Act of 1997 forced then Attorney General John Ashcroft to attempt to overturn the law, and this went all the way to the supreme court.[6]

Unfortunately for Ms. Gentry, the Florida Department of Agriculture and Consumer Services (FDACS) parroted the same response as the FDA, that the funds were not available to enforce a state honey standard. As it nears adoption, however, the FDACS appears more eager to proceed toward enforcement options. There are good reasons for this reticence. To prosecute honey economic adulteration, as the USDA found out to its chagrin, is fiendishly difficult and expensive. That's because the standard or "burden" of proof is extremely high to determine criminal intent.[7]

However, there is another way to approach the subject, according to Ms. Gentry, who attributes the idea to her retired trial lawyer husband. Rather than attempt to prove criminal intent, why not provide a way to bring civil suits to the bench where the burden of proof is less and the chances of getting economically recompensed greater. An example of this is the case of O.J. Simpson, who although acquitted of criminal murder, was successfully sued in civil court with a lower burden of proof.

As Ms. Gentry stated in her presentation[8] at the National Beekeeping Convention in Sacramento, CA in 2008 on the subject, "Citizens cannot sue someone in a criminal court; those actions are the responsibility of the state attorney. However, recall the Goldman family, whose son, Ronald Goldman was murdered in Los Angeles, along with Nicole Simpson, O.J. Simpson's former wife. O.J. was charged with first degree murder but found not guilty in the criminal courts, yet the Goldman family initiated a wrongful death suit against Simpson in civil courts. The Goldman family won. The evidence in the civil court did not have to prove beyond a reasonable doubt that O.J. committed the murder, only that it was more likely he committed the murder than not. Today, the Goldman family continues to haunt Simpson, seizing any asset they can as partial payment of the money damages awarded to them by the court." The results of that civil suit may have led to his further conviction of criminal robbery in October 2008.[9]

She concludes: "So what are the fruits of our labors if the Revised Codex Standard for Honey is adopted in Florida? Once the standard is adopted, the Department of Agriculture's enforcement is irrelevant; we, in the honey producing community, finally possess our constitutional right to access to the courts where we can inflict real pain: We sue anyone adulterating honey in the civil courts where actual

"Finally, it will be difficult for the FDA to ignore the standard once it becomes widespread, and so provoke it into some kind of action on the issue. In the meantime, producers and others will have a powerful tool at their disposal via civil actions."

and punitive damages are not held to a specific amount and where the burden of proof is not as onerous as in an administrative court. The adoption of the Revised Codex Standard for Honey, when used as a means to seek civil remedies, is the method by which we bypass government impediments to the industry and begin to save our industry through self-enforcement.

"Consider a buyer purchasing a barrel of honey. He tests the honey for adulterants and determines the barrel contents do not meet the state-adopted Codex Standard. In a contractual relationship, which may, in your state, be nothing more than a handshake, the seller of the adulterant has breached the contract; the buyer contracted to purchase honey which he did not receive; the buyer can sue. If the buyer had contracts to sell the honey and fails to meet his contractual obligations, then the elevation of damages against the original seller intensifies. Furthermore, assume the buyer, in good faith, and not knowing the barrel was adulterated, sold the product to one of his consumers who then sold it again. The legal consequences against the original seller could potentially ruin him.

"If a honey producer finds she has no where to sell her honey for a profit because one firm is controlling the price, then the plaintiff may entertain a suit for interference with free enterprise. If it is proven that the defendant is in violation of anti-trust laws, the entire operation may be shut down. Win or lose, the threat of potential litigation is a strong deterrent to corporate action. In a capitalistic society, greed has its own rewards.

"One reason neither the FDA nor a state is anxious to seek an administrative action against someone adulterating honey is the inconclusiveness of testing results when sampling honey for adulterants. Their concerns are legitimate; in a civil court, just like the state agency in a regulatory action, the burden of proof of the adulterant rests with the plaintiff; yet the testing need only prove the honey is adulterated. The tests are adequate for proof in a civil court because the plaintiff need not be concerned with the identity of the adulterant, only that the substance does not meet the Codex standard for honey. If the defendant introduces any of the more sophisticated testing procedures to prove the product is honey, given the inconclusiveness of the test to identify an adulterant, the very tests that cannot convict a violator in an administrative court become the very weapon against the defendant in a civil action."

Since her presentation in Sacramento, Ms. Gentry has met with a good many people inside and outside the honey industry. With information gleaned from these conversations, she has convinced Florida's Commissioner of Agriculture, who at first opposed the idea, that adopting a standard of identity for honey in Florida, does fall in line with his commitment to agriculture: As she quoted Commissioner Charles Bronson, "I am determined to ensure that agriculture remains a cornerstone of Florida's strong economy and an integral part of our way of life. Growers and the public can depend on the Florida Department of Agriculture and Consumer Services to support and promote this critical industry."

One of the hurdles to get a Florida honey standard of identity was to find a legal way of getting one adopted, without legislative action. This was accomplished using "rulemaking." According to the booklet, *State Library and Archives of Florida; Rulemaking Under Chapter 120 Florida Statutes*, revised 2/05. "Rules are a road map for dealing with government, providing a path to the desired destination and conditions under which the trip must be made. Rules are intended to facilitate the governmental process, level the playing field, and protect the rights of all." Examples of proposed rules that are right now being considered in Florida are to increase the charge for taking fingerprints and to allow state agencies to supply test scores via the Internet. In both cases, there is no need to change or create a new law; it is merely necessary to update the language. The same is true for honey. A better, more precise definition is now needed to supersede one already in place.

Perhaps most important though is that adopting by rule provides access to civil courts, not possible if the standard were to become "law." This last is key. It converts a run-of-the-mill strategy of lobbying government to "do the right thing" into a truly ground-breaking one of accessing the civil courts as a lever to get it done. To reiterate Ms. Gentry's conclusion, it becomes possible to inflict economic pain on violators, while at the same time putting pressure on government agencies to look at enforcement options.

The next challenge in Florida was to determine the exact standard to use in proposed Rule SK-4.027: The one to be adopted substantially conforms to criteria set forth in the "Codex Standard for Honey, 12-1981, Rev. 1(1981), Rev. 2 (2001) as noted elsewhere in this article.[10]

The Florida honey standard is sitting on the Commissioner's desk at the present time, and is expected to be adopted by the end of the year. Once this occurs, lawyers will be able to develop civil cases for their clients. And the possibility will exist to engage in large "class action" suits, which can be problematic even for large corporations.[11]

Finally, it will be difficult for the FDA to ignore the standard once it becomes widespread, and so provoke it into some kind of action on the issue. In the meantime, producers and others will have a powerful tool at their disposal via civil actions.

The large-scale strategy, then,

according to Ms. Gentry is to get as many states in the nation as possible to adopt the standard, whether through rulemaking or some other manner. Thus, she counsels, "Talk about the proposal to anyone who will listen. Call your local Farm Bureau. Contact your local medical association and make them aware of the initiative. Educate them about the need for the standard as it relates to honey and health. In this fight to get the standard, we need more friends and fewer enemies. The medical association employs powerful lobbyists; adoption of the Revised Codex Standard for Honey would be a newsworthy-attractive issue for the legislative agenda they carry to the state capital.

"Find a state congressman who will support your resolution; he or she can help with arranging appointments to meet with department commissioners and offer advice on rulemaking within your state government. If at all possible, do not seek legislative action for adoption of this proposal. In Hawaii, the market for Manoa Honey is eroding because of packers blend coming into the state; they went to the state legislature proposing the passage of honey labeling laws. The house and senate approved the law, yet in July, Governor Linda Lingle vetoed the bill because of concerns with violation of the Commerce Clause and the First Amendment. Getting their department of agriculture to adopt the revised codex standard first may ease passage of their revised honey labeling law. If honey is protected as an agricultural product in your state, then adopting the standard as a rule will be far easier than going to the legislature to enact new law. If apiculture is not protected as an agricultural product in your state, then seek the adoption by rule through your consumer services agency; the connection between health and honey can definitely prompt action."

Ms. Gentry has word that the standard is being actively considered in Georgia and California, states she has actively campaigned in. Others looking to initiate adoption include: OR, TX, KS, OH, ND, SD, MD, NC, WV, VA, NY, UT, and WI.

The driving force for Ms. Gentry is that adopting the honey standard by rule could truly be one of the most far-reaching initiatives ever conceived in honey marketing in the U.S. She concluded her presentation in California with, "Do not reinvent the wheel. The Revised Codex Standard for Honey, as was submitted to the FDA, is scientifically sound and legally responsible. The standard for honey must be the **same in every state**. "Stay the course and focus first on getting the standard adopted. No standard, no action." For more information, contact Ms. Gentry at farmbees@gmail.com. BC

Dr. Sanford is a former Extension Specialist in apiculture at the University of Florida.

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Winter Ants

Mark Headings

If you find these tiny visitors, enjoy the rarity of their visit.

There is much attention given these days to various maladies affecting honey bees and the subsequent economic impacts on the bee industry. These include colony collapse disorder, *Varroa* and tracheal mites, American and European foulbrood, small hive beetles, Africanized bees, nosema, and the list goes on. There are some insect species that have associations with the honey bee colony that appear to be more of a curiosity than having any significant impact on health of the colony or economic impact on the industry. There is an estimate that only 3.0 to 3.5% of nearly one million known species of insects are considered pests of economic importance. Furthermore, about 7% are considered beneficial. Therefore, approximately 90% of the known million species are considered neither pests nor beneficial. The diversity of life forms in the insect world can fill us with a sense of fascination, awe and, yes, even enjoyment. I would, therefore, classify the Winter honey ant, *Prenolepis imparis* (Say), as a member of the 90% group. It is a member of the Order Hymenoptera, as are honey bees. These two insect species, however, belong to different families within the Order; namely, Formicidae (the ant) and Apidae (the honey bee).

The objective of this investigation was to describe the Winter honey ant and its behavior, especially as it pertains to its relationship with the honey bee colony. The Winter honey ant is also known as the small or false honey ant. It is sometimes called the Winter honey ant because it has the unusual ability to continue foraging above ground during cold weather, even down to near freezing temperatures; however, it generally forages in the temperature range of 45° to 60°F (7° to 16°C). The word "small" is in reference to its small size of about three mm in length and the word "false" is used to distinguish it from the true honey ant. This is a very small timid insect when compared to the worker honey bee which is aggressive and measures up to 15 mm in length. In fact, generally, the ant is likely not even noticed.

In northern areas, such as Ohio, this ant does not hibernate during the cold months of the year, but rather lives deep under ground and then comes to the surface when temperatures are suitable. In contrast, an ant such as the mound-building ant, *Formica obscuripes* (Forel), is a much larger aggressive thatching ant that hibernates during the Winter months. I have personally reached my hand down into the ground below the mound during Winter and brought up a handful of nearly motionless ants. The Winter honey ant's nest generally consists of a vertical tunnel extending up to 3.6 m deep with horizontal chambers located at intervals along the tunnel. In northern regions, such as Ohio, the ant may exhibit aestivation for a month or two during the hottest months of the year and in warmer climates, such as Florida, it may continue for seven to eight months. During this period, the ant remains below ground. It has been reported colony sizes range from about 600 to 10,300 ants (Tschinkel, 1987). These are relatively small numbers and, in fact, I have never observed large numbers of these ants above ground at any one time.

Several descriptive physical characteristics of the ant (other than being only about three mm in length) is that it has a somewhat shiny light to dark brown color, only one hump or node on the petiole (which is the narrow mid-portion of the ant's body), and the basal segment of the antenna, called the scape, is longer than the ant's head. This insect seeks to feed primarily on sweet substances. For the past few years, I have personally observed the Winter honey ant feeding on extrafloral nectar of selected plant species in early Autumn; and it reportedly also feeds upon honeydew from certain plant-feeding homopterous insects such as aphids, scales, etc. It may also occasionally be found in house kitchens seeking sweetened foods and beverages. By late Autumn in Ohio, most deciduous plant foliage has dried up and plants either die or go dormant for the Winter months. Likewise, during that time of year, most honeydew producing insects are no longer active. Consequently, the honey bee hive becomes an attractive alternative food bank during the cooler months of the year.

During late Autumn and early Winter of 2007, I observed Winter honey ants crawling up the sides of hives, across the top of the outer cover, and also across the top

Gorged Winter ant. Note the stretched out abdomen.

of the inner cover. On December 2, 2007, I first noticed ants crawling on the side of a hive when the ambient temperature was approximately 46°F (8°C). Then on December 22, 2007 (the first day of Winter), I saw ants crawling up another hive and likewise on the outer and inner covers. I photographed some of the ants on the inner cover having enlarged abdomens indicative of having filled up on honey from inside the hive. As a result, the abdominal segments are stretched leaving translucent areas between them. Ants (like honey bees) are social insects and, therefore, carry food collected inside the abdomen back to the colony. Also, on the second date, bees in all my hives had broken cluster and were coming out of the hive entrances and flying about. The ambient temperature was about 52°F (11°C). Honey bees were first reported by Phillips and Demuth (1914) to begin forming their Winter cluster at about 57°F (14°C).

Watch for this tiny ant visitor to one or more of your beehives in late Autumn and on Winter days when temperatures are moderate in northern states, such as Ohio. Don't be concerned, just allow the Winter honey ant to fascinate you. It is very unusual for any insect to be outside moving around above ground in those temperatures, during that time of year. It needs to work for a living as well and will take only what it needs, which is not much. BC

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Apiforestation

. . . planting pollinator-friendly flowers and trees on surface mine sites.

Tammy Horn

Sourwood trees are distinctly Appalachian as is the author of this article. Those in the forestry circles call sourwoods "trash trees" because they have very little timber value, but we beekeepers know sourwood for one of the finest honeys the United States produces, and there's only one place you can get it. Sourwood also blooms at a dearth time for other plants. In eastern Kentucky it is a fairly reliable Fourth of July bloomer. Given these benefits, sourwoods are at the center of a new reclamation project in eastern Kentucky. In working to re-establish the diversity of Appalachian forests, coal companies such as International Coal Group, LLC Hazard and James River Coal have agreed to plant sourwoods and other bee-friendly plants in an effort to make the landscape beneficial for beekeepers.

Sourwoods have a funny way of bringing folks together. In 2006-2007, I was the National Endowment of Humanities Chair of Appalachian Studies at Berea College. As Chair, I wanted to explore the potential effects of surface mining on honey bees in Appalachia. I wanted to follow in the paths started in the 1970s courtesy of Jerry Bromenshenk's research in Montana on the relationship between open-pit coal mines and honey bees and since the 1980s with Tim Haarmon at Los Alamos. Honey bee monitoring sites also exist around the world, including "hot spot" places such as Chernobyl.

So, in 2007, with the assistance of Tom Webster and Mark Lee at Kentucky State University and Sean Clark at Berea College, I put some hives on a research plot commonly known as Starfire. In the 10 weeks I had bees on Starfire and at another location called Robinson Forest, the bees at Starfire gathered more pollen in less time than the other bees.

But it was not as easy as simply knocking on the guard shack at an active surface mine site. First I had to educate myself on the federal and state laws regarding coal mines. Congress didn't pass a federal law until 1977.

After traveling to Australia to study their coal mine culture, I think that the acrimony between environmentalists and industry in the States is largely of our own making. The federal standard in Australia requires coal companies to reclaim according to the "original approximate use" (OAU). This standard is easier and less expensive for coal companies to adhere to return grazing land back to pasture post mining use.

In contrast, the United States requires coal companies to reclaim to "original approximate contour" (OAC), in an effort to restore the original topographical lines that once existed. It is my opinion that such a policy is impractical and expensive. In an effort to circumvent this standard, many coal companies will try to find commercial development ventures that will agree to locate on reclaimed surface mine sites. The federal government approves of this practice, but there has been a hierarchy in terms of appropriate reclamation. Coal companies have been encouraged to prioritize in the following order: 1. commercial development; 2. residential development; 3. recreational development, and 4. last (until very recently), forests and other waste lands.

There are varying results from this practice. Land inevitably will continue to settle, no matter how much the ground has compacted. Federal prison wings, hospital wings, and hotels have all been built on former surface mine sites, only to be condemned because of cracks in foundations, etc. But other former mine sites are now recreation centers, shopping centers, and residential areas. So letting coal companies focus on commercial development as a form of reclamation has had mixed results in some communities.

But most of these surface mines are located in isolated areas, places that are not commercially viable. For the past 10 years, coal companies have had the option of exploring reforestation techniques that would be of long-term commercial value as timber. The key leaders in this shift are Paul Rothman, who is the Director of the Division of Natural Resources in Kentucky and his former professor Don Graves. These men shaped the standards for the Appalachian Regional Reforestation Initiative (ARRI), begun in 1995 when the price of coal was much lower than today. The ARRI standards establish groundwork for a timber industry, encouraging coal companies to plant high-value hardwoods, use four-feet of subterranean soil, and require less compaction of the site.

Neither man kept bees. However, both could see potential for a commercial beekeeping industry if coal companies were to include bee friendly trees such as sourwoods and basswoods.

Because I am a writer (and need to incorporate an element of play into my work), I have started referring to this practice as *apiforestation*, the planting of pollinator-friendly flowers and trees.

It's a good time to introduce Edwin and Elaine Holcombe from Shelbyville, Tennessee. These are folks who believe in the principles of good stewardship and faith-based values. In the time we have been friends, Edwin has taught queen rearing in Azerbaijan, both have been to Guatemala, and a group of work-exchange students from Tajikistan happily worked in their honey house in 2007. In other words, these are active and open-minded folks. But Edwin and Elaine have always wanted to do

similar extension work in the United States. They offered to assist in my project.

Eastern Kentucky Environmental Research Institute, now in its fourth year, seemed like an obvious fit for the Holcombe gifts of money and bees. Its director is nationally-renowned, water-quality expert Dr. Alice Jones. Our research fits well together: if more trees are planted, water quality improves.

The other player is Don Gibson, Director of Mine Permits and Regulatory Affairs as International Coal Group, LLC, Hazard. Don wanted to participate in establishing a honey bee industry with some reclaimed mine sites, but funding was an issue.

Don and I agreed that sourwoods should be the central image around the commercial bee industry, but who knew that it would be so difficult or expensive to find sourwoods?! The nursery industry generally needs four years to adjust to new demands, and so we considered 2008 to be the first year of the Lost Mountain Honey Project, which has now morphed into the Coal Country Beeworks cooperative.

James River Coal is the second company to offer to participate in planting sourwoods. "We are can-do people," explained John Tate, and "this is the right thing to do for the right reasons." Brian Patton, the company president, has followed through, consistently expressing the desire for better community relationships and a willingness to support better reclamation methods in an effort to promote local beekeepers.

The other logistical issue was a "right to use" land lease, which I highly recommend folks get before putting bees on any site, but especially industrial use sites. In this lease, information such as plantings, maps, fences, road upkeep, and communication patterns were detailed and signed by ICG and then more recently James River Coal and EKU. On average, it takes about three-four months to get a "right to use" land lease drawn up.

To date, we have the following statistics for those interested in such things:

- 30 beehives at ICG; 10 on James River Coal, with one site being prepared;
- 4000 sourwood trees planted, some with success, some have become deer food;
- Two beginners' workshops in Perry County, 45 participants, with a third scheduled for October 30th.
- Two science teachers' workshops, one on Thunder Ridge, one hive-building workshop: 50 participants;
- Two students presenting at conferences: Hanna Watts presented at HAS on geographic information systems; Ray Eaton presented a current profile of the project at Appalachian Regional Reforestation Initiative conference August 9, 2008
- Two NPR-affiliate radio interviews
- One television station shoot
- One film shoot
- One meeting with Office of Surface Mining officials in Pennsylvania

And I would be remiss if I didn't mention three bear-proof fences designed and engineered by Craig Cella, Penn State apiarist who drove down to show me how to install them.

From this point until next year, the following activities have been planned:

- Three "bees and girls" workshops scheduled, the soonest being October 29th.
- Four other coal companies – TECO, Peabody (IN), Massey Energy (WVA), and Pine Branch Coal.
- Undetermined amount of sourwood, basswood and Fall asters, buckwheats, etc.
- Penn State research in viral diseases and collaboration with Dennis van Englesdorp's native pollinator research
- A meeting with Peabody Coal environmental research specialist and Indiana Beekeepers Association, November 8.

The Coal Country Beeworks cooperative promotes a fundamental principle: diverse economies depend on diverse landscapes. In order for the colonial status of Appalachia to change, the unique mesophytic forests that existed prior to mining need to be reestablished so folks can be beekeepers, honey producers, queen rearers, scientists, etc. In this way, the two-tier economy that has defined Appalachia can be more diverse.

In short, there is responsible mining; there is irresponsible mining. Doing away with surface mining will not, de facto, make underground mining more responsible (witness: Utah disaster).

Nor is it feasible to consider doing away with mining altogether – at this point in our nation's energy policy. If folks are cold, they will deforest the mountains just as surely as surface mining does and in less responsible ways. We can look to Haiti and Zimbabwe for proof of that. Those once-remarkable forests are now mere stubble and stumps.

So, the Coal Country Beeworks' "apiforestation initiative" makes surface mining more responsible by promoting other industries in addition to the timber industry. Focusing on sourwoods as a marketing ploy means that Appalachia can compete in the honey market without having to compete with the clover fields in the Dakotas, or the citrus groves in Florida and California, or the tupelo swamps in Florida, and Mississippi.

Turns out that sourwood is not really sour at all, but rather a pretty sweet deal for all involved. BC

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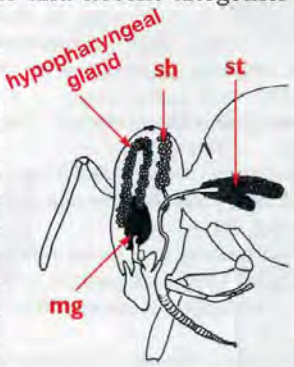
a closer look

HYPOPHARYNGEAL GLANDS

Clarence Collison

Nutrition, division of labor, Summer/Winter bees, and worker/brood interactions - all keys to the HPG.

The hypopharyngeal glands (HPG) are paired food-producing glands located in the heads of worker honey bees. Each of the two glands consists of a very long, coiled tube, to which are connected several hundred small round bodies, called acini. The acini produce a proteinaceous secretion – a sticky, milky fluid often called "royal jelly" – which is fed in varying amounts to larvae, queens, workers and drones. The glands also produce digestive enzymes for honey processing (Simpson et al. 1968). Hypopharyngeal glands are rudimentary in queens and absent altogether in drones (Dade 1962). The development and activity of these glands is elastic, varying with bee age, colony needs, time of year, and worker diet.



Hypopharyngeal glands are undeveloped when bees emerge from their cells, but within six to 12 days they are mature and active. The small glands of newly emerged bees have a dense cytoplasm with little evidence of secretory activity (Simpson et al. 1968). Protein (pollen) consumption is necessary for the glands to develop fully. Nurse bees have the most functional hypopharyngeal glands, as it is their principal duty to feed the brood. As workers age, these glands degenerate, and by the time they become foragers the glands are generally inactive. However, if no young bees are present to feed larvae, foragers can redevelop their hypopharyngeal glands and assume their former role as nurse bees (Huang and Robinson 1996). The rate of hypopharyngeal gland degeneration is very flexible and appears to be more dependent on colony conditions and time of year than bee age. The glands of late Summer nurse bees degenerate more slowly than those of early Summer nurse bees. During the Winter, when there are small amounts of brood to none to be fed, the hypopharyngeal glands are well developed in most of the workers, but their synthesizing activity is greatly reduced (Brouwers 1982, 1983). This lack of activity indicates their storage function.

Gland development can also vary independent of bee age. Worker bees of the same age performing different tasks within a colony can exhibit different levels of HPG development (Huang et al. 1994). Bees can also sustain brood food production for longer than normal, as demonstrated in a 98-day continuous brood rearing study (Hydak 1963). Workers in broodless colonies have well-developed glands, and are in a physiological state similar to overwintering bees (Fluri et al. 1982).

Nurse bees have inactive glands until their third day of larval feeding (Huang and Otis 1989), at which point the secretion of jelly begins. The proteins secreted in the jelly are derived mainly from pollen, which is ingested in large quantities by nurse bees (Crailsheim et al. 1992). Nurse bees are responsible for extracting protein-rich nutrients from pollen, then distributing the digested protein via hypopharyngeal gland secretions to practically all of their hive mates; this provides vital protein to bees that are not consuming much pollen (Crailsheim 1991,1992). The extent to which nurse bees supplemented their colony with protein was studied using radioactive labeling. When eight-day-old nurse bees were injected with ^{14}C-phenylalanine (labeled amino acid), they subsequently incorporated this amino acid into the proteins of their hypopharyngeal glands (Crailsheim 1991, 1992). The ^{14}C label was passed in glandular secretions to the queen, brood and also to young drones and workers of all ages. In small colonies containing 400-800 bees, nearly one-quarter of the ^{14}C label had been fed to other members of the worker caste; during one night, each nurse bee fed four to five foragers with proteinaceous food.

The consumption of pollen by nurse bees is also obligatory for maintaining enlarged glands during periods of broodlessness. In a study, using caged Winter bees, pollen seemed to keep the glands in a hypertrophied "stand by" mode, and a diet without pollen resulted in a retrogression of the glands within a week; however, in the absence of brood, pollen consumption did not stimulate protein synthesis (Brouwers 1983). Interestingly, the large size of the hypopharyngeal glands of

overwintering bees is not indicative of a high level of activity. Huang et al. (1989) observed that even in broodright colonies, medium-sized glands were more active in food production than undeveloped or fully developed (hypertrophied) glands.

The presence of brood is no doubt the largest factor affecting glandular activity. Using tracer methods, Huang and Otis (1989) showed that the glands of three to 16-day-old bees from broodless colonies have reduced synthesizing activity compared to broodright colonies. In another study, decreasing the amount of brood gradually over a period of six days had little effect on the size of nurse bee's hypopharyngeal glands, and when almost all brood was removed at once, secretory activity maintained normal levels for four days, then declined (Hrassnigg and Crailsheim 1998). This observation is consistent with the results of Huang and Otis (1989), who found a lapse of about three days between brood removal and glandular decline. Brood provides the workers with a signal, apparently involving a brood pheromone (Mohammedi et al. 1996), which induces protein synthesis in the glands (Brouwers 1983; Huang et al. 1989). Huang et al. (1989) found that workers obtain the signal only when they have direct access to the larvae; eggs and pupae did not elicit glandular secretion. They also observed that in the presence of brood, protein synthesis reached a maximum in three days, and the activation period appeared to be independent of the amount or developmental stage of brood. This implies the mechanism of gland stimulation is qualitative rather than quantitative.

The activation of HPG's appears to be a complicated process. Juvenile hormone (JH) has also been shown to be involved in the development of this gland (Rutz et al. 1976; Fluri et al. 1982). Huang et al. (1994) found that hypopharngeal gland size was inversely correlated with worker age and rate of JH biosynthesis.

Foraging conditions also influence task ontogeny and the development of HPG's. The glands can remain well-developed during bad foraging conditions, or degenerate quickly during good foraging conditions. Forager bees were observed to always have degenerate glands, irrespective of the colony's brood status (Hrassnigg and Crailsheim 1998). A chemical distinction between the glands of nurse and foraging bees was revealed by electrophoretic profiling (Kubo et al. 1996). Three major bee-milk proteins with molecular weights of 50, 56, and 64 kDa were found in the hypopharyngeal glands of nurse bees that were not present in the glands of foragers. The proteins condense in the duct after secretion from acini. Conversely, bee glands of foragers synthesize a major 70 kDa protein identified as alpha-glucosidase which is not produced by nurse bee glands. This enzyme oxidizes glucose to an acid that is important in keeping dilute nectar and syrup from fermenting during the honey ripening process (Winston 1987). Foragers and older worker bees, or bees that are overwintering, also produce the enzyme invertase (sucrase), which is important in processing floral nectars into honey (Simpson et al. 1968). Invertase can be equally abundant in large glands filled with secretion masses and in glands apparently almost completely atrophied (shriveled).

Hypopharyngeal glands have two distinct states in synthesizing different proteins depending on the role of being either a nurse bee or forager. Understanding the role of these glands is important in grasping honey bee biology and behavior. These glands are intimately involved in the colony's nutritional status, division of labor, differentiation of Summer and Winter bees, queen-worker differentiation and worker-brood interactions (Huang 1990). Furthermore, they are essential to the production of honey, which is of utmost importance to the beekeeper. BC

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HERBAL REMEDIES

There's more than beauty in these helpful plants.

Abbas **Edun**

The purpose of this article and the others that are to follow in the next few months is to introduce the reader to plants which not only have useful, medicinal value to us as well as to other animals, but are also beneficial to honey bees because they yield nectar, pollen or propolis.

Alfalfa

ALFALFA

Alfalfa (*Medicago sativa L.*) is a part of the subfamily Faboideae of the family Leguminosae. It is also known as Buffalo Herb, Lucerne and Purple Medic. Alfalfa is a herbaceous, clover-like, perennial which produces large amounts of nutritious forage material. It can live from three to 12 years, depending on variety and climate.

The plant, which grows to a height of up to three feet, arises from a much-branched crown that is partially embedded in the topsoil. As it develops, several stems bearing numerous compound leaves with three leaflets arise from the crown buds. Clusters of small blue-violet flowers arise from the upper axillary buds of the stems.

Because it's extraordinarily long and tough taproot can extend as much as 30 feet into the soil, alfalfa is able to access a large quantity of nutrients, salts, and other necessary elements, and in areas of limited rainfall it is able to withstand extremes of drought. The plant is well known for improving soil by nitrification due to the bacteria, *Sinorhizobium meliloti*, in the nodules of its root. This nitrogen-fixing ability makes it a valuable cover crop, and increases the vigor and yields of succeeding crops.

It is remarkably adaptable to widely varying climatic conditions, as it is able to tolerate both heat and cold. Alfalfa is widely grown throughout the world as forage for cattle; it has the highest feeding value of all common harvested hay crops, being used less frequently as pasture. It is the most important forage crop in the United States, and is cultivated in large quantities, mainly in California, Idaho, Kansas, Oregon and Washington.

The nectar produced by alfalfa flowers is highly attractive to honey bees and they make excellent crops of high quality honey from it. It was, at one time, estimated that an acre of land yielded between 54 and 238 pounds of nectar during a peak flowering day. As the plant is a poor source of pollen, honey bees will usually collect it only when no other source is available. When they have only alfalfa upon which to forage, there is a rapid diminution in population. The dramatic impact that the aggregation of bees in alfalfa seed fields had on yields resulted in an increase in migratory beekeeping to those seed fields in the west.

In India and China, alfalfa was used to treat digestive problems for thousands of years. It is nutritionally one of the most versatile herbs that has as yet been discovered; it has helped people suffering form malnutrition to remain energetic and healthy. It is has also been known to whet the appetite, and to make us resistant to diseases.

The plant is a valuable source of vitamins A, B_1, B_6, C, E, and K, as well as chlorophyll and dietary fiber. The proper balance of calcium, iron, potassium and zinc is of special value in alfalfa. All these elements are needed for the proper functioning of the various organs in the body. The leaves of the plant are full of protein containing the eight essential and 10 non-essential amino acids.

ALMOND

The sweet almond (*Prunus communis L.*, var. *dulcis*), is a part of the subfamily Prunoideae of the family Rosaceae. It belongs to the same group of herbs, shrubs, and trees as the apricot, cherry, nectarine, peach, plum and rose, which are found all over the world.

It is a deciduous tree, of moderate size, usually between 12 and 30 feet in height, with a trunk of up to 12 inches in diameter. The flowers are pale pink or white with five petals, produced singly or in pairs, before the leaves early in March, and in great profusion. The leaves are lance-shaped, with serrated margins.

The flower has a single pistil with two ovules, one or both of which may develop into fruits. Nectar is secreted within a floral cup which contains the ovary. The cup is formed by bracts, petals, and stamens. Pollen is produced on the anthers that loosely surround the stigma. The abundant flowers are open late in January until about the end of March. Pollen from a flower of the same

Almond

tree, the same cultivar, and sometimes of certain other cultivars, will not fertilize, or even produce a pollen tube in the style.

The flowers are self-incompatible and a profitable crop depends upon the cross-pollination of almost 100 percent of the flowers. Honey bees are the primary insect pollinators of the flowers; they visit them eagerly both for nectar and pollen which stimulate the rearing of brood. In 1964, the authors, Griggs and Iwakiri, stated that under weather conditions favorable for their flight the individual flower is most receptive to cross-pollination the day following opening and remains decreasingly receptive for the next three or four days.

The hives should be sufficiently populated to ensure that every flower is visited, and the bees must visit different cultivars to obtain their nutrition. In this way, the pollen is spread between trees to the maximum extent. Nectar foragers are active on almonds throughout the day if weather permits, but pollen foragers are mostly active around noon.

Almond production in the U.S.A. is limited almost exclusively to the Sacramento and San Joaquin Valleys of California where the nut is harvested in the Fall. A profitable crop depends upon the cross-pollination of practically all flowers. This is entirely contingent upon the seasonal importation of honey bees. Growers need to have at least two colonies per acre at almond blossom time; some growers use up to five for a heavier yield. In the Valleys of the Golden State, over 800,000 acres are planted in almonds. It takes almost all of the commercially operated pollination colonies in the U.S.A. to cover the trees in such a vast area.

Higher concentrations of low-density lipoprotein (LDL or "bad" cholesterol) and lower concentrations of functional high-density lipoprotein (HDL or "good" cholesterol) are strongly associated with cardiovascular disease because they promote atherosclerosis. This disease process leads to heart attack, stroke and peripheral vascular disease. Research published recently suggests that eating almonds may be a good way for people with abnormal cholesterol levels to lower their LDL and raise their HDL levels.[1] However, because nuts are high in calories and fat, some doctors are reluctant to recommend almonds to patients who have high cholesterol; it might lead to weight gain and subsequently to heart disease.

The versatile almond has a higher calcium and dietary fiber content than any other nut and helps us to stay fit. Calcium contributes to strong bones, and fiber promotes healthy digestion. Almonds also contain the phytochemicals kaempferol and quercetin, which might help protect against cancer.

The oil of sweet almonds is an emollient and is known for its ability to soften and condition the skin. It contains glucodides, minerals and vitamins and is rich in protein. The oil is good for all types of skin and helps to relieve irritation, inflammation, itching and muscular aches and pains.

ANGELICA

Angelica archangelica L., a biennial or short-lived perennial herb, is a part of the subfamily Apioideae, belonging to the Umbelliferae (parsley) family.[2] It is a member of the same group of herbs and shrubs as anise, caraway, carrot, cumin, dill and fennel. It is also known as Alexander's Archangel, Masterwort, Root of the Holy Ghost, Wild Celery and Wild Parsnip.

Angelica is able to withstand severe environmental conditions; it thrives in Scandinavia, the cold climates of eastern Europe and the Himalayas. It requires moisture and grows abundantly on bottomlands, damp meadows, stream banks and moist cool woodlands.

The plant has a very unique structure. From its long, dense, fibrous and fleshy root, a thick and hollow stem grows, sometimes as high as seven feet. Branches develop from joints in the stem. The dark green leaves are serrated and pinnately compound.

In the middle of Summer, the flowering parts of Angelica begin to emerge, enclosed in a papery sheath, which opens to show small white or greenish hermaphrodite[3] flowers in large umbels up to 6 inches in diameter. There are two nectaries within each of the small florets. Each nectar gland is generally located at the base of the stylopodium,[4] on top of an inferior ovary; its redolent and abundant secretion is through surface stomata. Several compound inflorescences consisting of umbellets, create a beautiful show of ultraviolet light and visually prominent landing platforms with readily available nectar and pollen for bees.

It has been said that angelica has healing powers. It became well-known as a herbal remedy in 1665 when an epidemic of the bubonic plague decimated European cities. Angelica water was the primary constituent of the formula used as a remedy. It was combined with treacle and nutmeg. The mixture was kept just a bit below the boiling point of water and given to victims of the plague twice a day. It was called the "King's Majesty's Excellent Recipe for the Plague" and was published by the British Royal College of Physicians. Later in the 17th century, Angelica was used to relieve colds and other respiratory disorders. It was also used to fight certain infections and increase vigor.

The main constituents of the plant are angelic acid, angelicin, linoleic acid, safrole, scopoletin, valeric acid and volatile oils, making it useful in the treatment of a variety of ailments: asthma, bronchitis, colds, fever, flatulent colic and other stomach disorders.

Because of its anti-inflammatory effects, angelica may act to decrease the discomforts which are often associated with arthritis and rheumatism. It is used to induce menstruation and abortions, and should not be taken in large quantities by pregnant women. The herb is generally revered as a health restorative and it could possibly result in adding years to our lives. A recent study done on animals reported that alpha-angelica lactone, a constituent of the plant is a useful anti-cancer antidote; however, it is not clear if it has any inhibitory effect on carcinoma in humans.

In spite of its popularity as a herbal remedy, angelica can present some serious health problems. The fresh root is poisonous and must be thoroughly dried before use. In addition, certain compounds called furocoumarins contained in the plant can cause a person exposed to the sun or any other source of ultraviolet (UV) radiation to develop photodermis or severe sunburn. It is therefore advisable, during the use of preparations containing angelica, to avoid too much exposure to UV radiation. The herb should not be used medicinally without the supervision of a doctor and should never by be taken by diabetics. BC

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

[1]See Circulation: Journal of the American Heart Association, which is on-line. Canadian researchers teamed up with the Almond Board of California (ABC) to study the effects of almond on the cholesterol levels of 27 men and post-menopausal women with high cholesterol; their average age was 64 years. The study was partly funded by ABC.

[2]Also known as Apiacea, derived from "apis" the Latin word for a bee.

[3]That is, they have both male and female organs.

[4]In some Umbelliferae, it is an enlargement at the base of the narrow elongated part of the pistil between the ovary and the stigma.

A History — by Brian Sherriff

The Sherriff Bee Suit

Distinctive, Fashionable and Practical

In 1968 my wife Pat and I went to a local Agricultural Show not far from our home in Cornwall, the extreme South West of England, called the Royal Cornwall Show. We visited the Dog, Poultry and Rabbit Tent and then found the Bees and Honey Marquee.

We knew nothing about beekeeping but did know that we enjoyed honey and that we ate about 150 lbs each year!

Once inside we were captivated by the honey and beeswax exhibits, but in particular the live bees in the observation hives. We got talking to the trade exhibitors with the result that we left the show with two British National Beehives and the next day two colonies of bees arrived. Both colonies died out the following winter – we obviously had a lot to learn!

The next year our bees did very well and we bought seventeen WBC hives and equipment from a retiring beekeeper and had a good season. I should say that these hives are double walled and have a 'cottage' like appearance and were named WBC as they were invented by a man called William Broughton Carr.

We found we could improve my income from keeping bees and producing honey and ended up buying three hundred and 60 beehives from Heather Hills Honey Farm at Bridge of Cally, Perthshire, Scotland and transported them down to Cornwall some six hundred odd miles. On the journey down our trailer axle broke we could do nothing more than leave the trailer and bees whilst we travelled home separately. Meanwhile, the Automobile Association took the complete trailer full of beehives back to a depot. As the trailer of beehives did not appear the next day we became very concerned as we knew the bees would certainly be in need of food and water and did not want to start our new venture with dead bees! On contacting the AA again telling them that there were **LIVE BEES** on board we were amazed at how soon the trailer appeared! All was well and the bees thrived in our mild climate.

Beekeeping was very enjoyable; however, I disliked the traditional veil protection available at the time. The style of beekeeper's clothing seemed very makeshift as it involved tying a string around my waist and the hat was most uncomfortable. Heavy and cumbersome – invariably the brim would drop forward over my forehead bringing the netting at the back tight to my neck so that the bees were able to sting! Once when travelling to an out apiary I stupidly forgot my veil and hat so had to return home for it. If it had been possible to drive from apiary to apiary whilst already wearing beekeeper's apparel this would cut out the possibility of forgetting the necessary protective wear. Obviously there was a need for improvement in basic protective clothing for beekeepers.

I was a member of the British Bee farmers Association and we used to receive magazines from other countries. Responding to adverts in the various bee journals in search of a better bee suit we received quite a few beekeeping catalogues but could only find the basic designs that we already had which was a hat of some sort worn in conjunction with a veil.

Patsy was a designer of beachwear, corsetry and brassieres for leading chain stores and at the time I managed our factory manufacturing beachwear, brassieres and leisurewear for leading stores at home and overseas.

One evening putting our heads together to find a solution for a more practical and comfortable bee suit Pat came up with a design for me to make in the factory – a beekeeping suit for making life easier in the apiaries! ***The distinctive* and innovative *Sherriff Hood and veil was born!***

It was a hood and veil, which we made to fit onto a tracksuit which we were making already in the factory for export to the surf life clubs of Australia. The suit was a two-piece with a pullover top and self-supporting trousers – the hood was made of the same fabric at the back and sides and at the very front was a piece of white veiling. The whole hood was supported and tensioned with nylon boning as used in our corset production. The white netting also came from bra production!

Trying it out for the first time in the apiary it soon became apparent that a white veil was no good as it reflected light back, it was very difficult to see out. We had an order for black brassieres in the factory so we tried black net and it worked a treat. We now had a full suit, quick and easy to put on, with no openings and could work in the apiary with no bees getting in.

Beekeeping friends also came out with me and were keen for us to make bee suits for them which we did. Soon after another beekeeping friend wanted one so he had one too. It then occurred to us how silly to give them away so we decided to

Brian Sherriff in the early days.

One of B.J. Sherriff's early ads showing the early version of a Sherriff suit, that appeared in Bee Culture.

improve the suit and offer it to other beekeepers.

At first we produced a top only with a hood and veil attached to a shallow smock with sleeves, which was developed to wear over a boiler suit. In 1968 we offered this to the market by advertising in Bee craft and British Bee Journal. This garment was called 'The Commercial'. Sales were encouraging so we produced a polyester cotton two-piece with self-supporting elastic waist trousers, elastic ankles, front pockets and hive tool pocket all with our own Sherriff design veil.

The polyester cotton hood with nylon veil was attached to a smock, which overlapped the trousers and was also elasticised at the waist. We named this garment the 'Bee Handler'. This popular garment was featured in our first brochure together with 'The Commercial', a full boiler suit to go with it along with gloves and white boots. Next we designed the 'Countryman' smock with hood and three large roomy front pockets.

Last but not least we developed our boiler suit coverall adapting it in to an All-in-One with our integral throw back hood and called it the S36.Apiarist suit – the ***Original***. Before we knew it we found ourselves with an exclusive range of beekeepers garments to suit all ages and requirements from vests to waist length smocks to full all over cover.

Now in our **40th year** the Apiarist suit is legendary – many of our customers having had the same suit for over 25 to 30 years or more on average proving that a quality garment is always worth the extra. A customer rang us just the other day to proudly say that his garment was 39 years old and still going strong! Most customers say that it was the best investment they ever made!

Around this time we were asked if we sold children's protective bee suits. We soon brought out the two-piece range of children's attire for age four up to age 10. At this time we also scaled down our Apiarist suit to fit a child of age 10 to 12 year and this garment was named the Junior Apiarist.

In the factory, we took on contracts for The Ministry of Defence making R.A.F. battledress blouses, sailors' uniforms and collars. The boys would arrive at 'H.M.S. Ganges' and 'H.M.S. Raleigh' shore stations as raw recruits, I would visit the station and measure them for a uniform that had to be ready for their marching out parade six weeks later. We also produced made to measure uniforms for Dartmouth Cadets and tropical dress uniforms for naval officers. With these skills I was able to improve our bee suits.

When making for the M.O.D an inspector is present in the factory and his job is to stamp each garment as perfect – if it is not perfect he will not stamp it and it has to be corrected before he will pass it. All Sherriff bee suits are passed in the same way as we recognise that quality is the key to success – each garment bearing it's individual number.

In the early 1970s we inserted an extra piece of side veiling into the hood to improve visibility and a zip fastener at the throat to enable the wearer to use the smock with the hood resting flat at the back of the shoulders.

In 1978 we started to export our garments. First we advertised in *Gleanings in Bee Culture* for the American market and soon after advertised in New Zealand, Australia, Canada and Ireland. Our first overseas visit was to Savannah Georgia, U.S.A in 1981 for the American Beekeeping Federation Convention. Patsy and I, and our youngest daughter, Angela, had a very good reception and sold suits to beekeepers, some with very few hives and others with thousands of bee hives.

It was at this particular convention that we met a commercial beekeeper who was interested in our 'Bee Farmer' which is a ventilated vest with hood and zip and designed to be worn under a coverall. This beekeeper worked in Florida and used a 'Bobcat', a small four-wheeled forklift, to load about 500 hives onto his truck in about two hours. He found that with our hood and veil he had a 'blind spot' at the side and asked for more netting in this area. We redesigned our hood and it now has two side panels as a result of his request. This beekeeper and his team now use our suits whilst loading trucks with two six pallet hives with each bobcat load and maybe a thousand hives at a time on a vehicle taking bees to pollinate cranberries maybe 2,000 miles away in the North of America.

As the years have passed we have improved and 'fine tuned' our garments endeavouring to produce a high quality original design which appeals to beekeepers all over the world – a Beekeeper's 'uniform' which pays a great deal of attention to the wearer's safety and comfort.

Having the added advantage of a Commercial Bee Farm we were fully aware of the need for a garment to be

Brian selling his wares at one of the many shows he and Anji go to each year.

Anji modeling one of Sherriff's extraordinary beesuits.

clean so that diseases are less likely to be transferred from hive to hive/apiary to apiary – particularly, when new beekeepers are visiting apiaries whilst on courses or field work.

With this in mind all Sherriff garments are fully washable.

We have attempted to produce a garment that gives beekeepers an identity, with clothing that brings beekeeping into a 'leisure industry' after all, a person taking up golf expects to buy golfing clothing, so does a yachtsman, cyclist, climber or walker expect to have clothing suited for his particular pastime and to identify that pastime. Why shouldn't beekeepers do the same?

Tried and tested in our apiaries at home and abroad – Pat, Angela and I were the first to introduce colored fabric suits on to the market – after all why should beekeepers clothing be dull!! Our ultra light bright red (favoured when working with the Africanised bee) or white fabric garments are probably the lightest on the market weighing half the weight of its counterpart in polyester cotton.

Also, we designed the first beekeeper's wear to include a *body shield* net liner for extra protection where it's needed and this is called our Maxpro Range.

Now Sherriff's is the recognised design for Beekeepers Protective Clothing with our innovative throwback hood and veil – it is often the protective apparel featured on film coverage for bees, having been featured in a great many films featuring insects and in the well known National Geographic magazine.

We sell our clothing worldwide with our 10 main countries being, U.K, Ireland, U.S.A, Canada, Australia, New Zealand, France, Belgium, Italy and Spain. We visit these countries selling our suits and bee related gifts each year at conventions, Honey shows and also visiting associations and giving slide presentations about beekeeping in other lands.

We also exhibit at fifteen or more Honey and Agricultural Shows in England, Scotland and Wales as well as those overseas. We welcome comments and suggestions about our suits and by listening we can update and improve our garments.

Sadly my wife, Patsy, without whom the design of our Original bee suit would not have been possible, passed away in 1994. Many of you reading this may well have met her at one our many conventions as she was such an important part of our team and is still greatly missed – especially as she was fun loving and had a good word and cheery smile for everyone.

We always appreciate the efforts put in by voluntary helpers at the shows and we realise that without their help the shows would not exist, we could not exhibit our clothing and meet and have fun with all these marvellous people. We meet beekeepers all over the world and it would be difficult to find a nicer group of people. BC

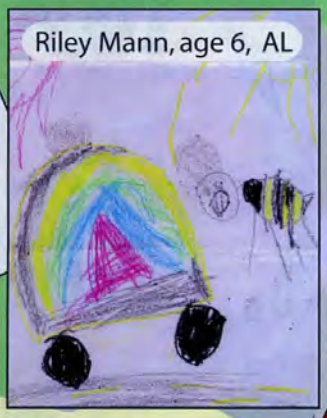
Brian Sherriff, and daughter Anji produce beesuits by the thousands from their factory in the U.K.

All The Buzzz in...

Hello Bee Buddies,

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

Cameron Gearns, age 5, MN



Riley Mann, age 6, AL

What are your favorite bee books? Send me the titles of your favorite bee books and get a prize.

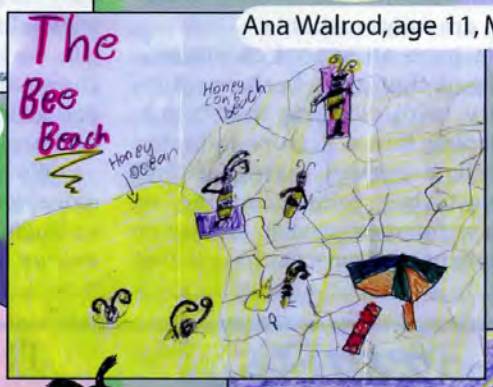
Ceci Spann, age 7, WI

Bee Buddy Winner

The names of all the Bee Buddies who sent me artwork, poems or questions over the last year were placed in a drawing. Thank you to everyone who participated. And the winner is…Rosalyn Sommers, age 5 from Iowa. She received a beautiful bee finger puppet.

Booking It This Winter

A great way to learn more about bees and beekeeping is by going to your local library and checking out some books. Here are some of my favorite books that feature our fine, flying friends the honey bees. You may even want to add some of these books to your Christmas list.



Ana Walrod, age 11, MS

Very Young

Little Bee: Finger Puppet Book by Chronicle Books
Fuzzy Bee and Friends by Roger Priddy

Early Elementary (ages 4-8)

Nonfiction

The Beautiful Bee Book by Sue Unstead
Bee by Karen Hartley
The Fascinating World of Bees by Angels Julivert.
Honey Bees (Jump into Science) by Deborah Heiligman
The Honey Makers by Gail Gibbons
Honeybees (All Aboard Science Reader) by Joyce Milton
Hooray for Beekeeping! by Bobbie Kalman
Life and Times of the Honeybee by Charles Micucci.
The Magic School Bus: Inside a Bee Hive by Joanna Cole and Bruce Degen.
Time For Kids: Bees! by the editors of Time for Kids

Fiction

Bee & Me by Elle J. Mcguinness and Heather Brown.
The Bee Tree by Patricia Polacco
Follow That Bee by Beth Engelman Berner and Jenna Riggs
When the Bees Fly Home by Andrea Cheng

Ann McGaughey, age 9, CO

Older Kids (ages 9 – 12)

The Bee Tree by Stephen Buchmann and Diana Cohn
Clan Apis by Jay Hosler (graphic novel)

... Bee kid's corner

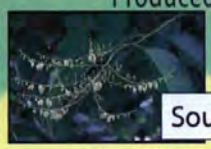
Produced by Kim Lehman -www.beeladyprograms.com
www.beeculture.com
December 2008

During a Russian Christmas meal, bread is first dipped in honey for the sweetness of life and then dipped in chopped garlic for the sadness and disappointments of life.

Honey For the Holidays

In ancient Rome, honey was served so that the New Year might be sweet.

A Slovak tradition is to dip a special Christmas Eve waffle in honey and eat it together with garlic. Honey is for goodness and health. Garlic is to scare away sickness.



Making the World a Sweeter Place

These plants add sweetness to the world. Not only do many of these plants make the world beautiful with their flowers but the provide nectar for bee to make honey.

Alfalfa
Basswood
Buckwheat
Clover
Eucalyptus
Fireweed
Goldenrod
Mesquite
Orange Blossom
Sage
Sourwood
Tupelo
Wildflower

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

Photos - Kim Flottum

Meet Luke

Luke Greene is a beekeeper. He is also four years old.

His persistent questions about how honey was made and what is in a beehive landed him a bee suit of his very own. He now works bees with his parents in New Hampshire. Since he's gotten a taste of the beekeeping bug, he wants to do more.

Here are a few things we learned from Luke in an interview.
Bee B Queen: Why did you get started in keeping bees? Luke: "To help daddy, in case the bees need to be smoked."
Bee B. Queen: What is one of your favorite things about keeping bees? Luke: "Getting the honey"
Bee B. Queen: What have you learned about the bees? Luke: "No running, cause you'll get stung really bad, cause the queen will come out and sting you on the cheek."

Luke, I can't wait to hear what you've learned when you reach the hallmark age of five.
Happy Beekeeping!

Beecome a Bee Buddy

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

Name: _____
Address: _____
City, State, Zip Code _____
Age: _____ Birthday: _____
E-mail (optional) _____

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

Thoughts On CCD

Joe Traynor

Some current thinking on the causes and the future of this elusive problem

The following is distilled from the reams of disparate dispatches from the CCD front. I have tried to condense this mass of information into a coherent whole. None of what follows is original – all has been expressed in one form or another by others.

When CCD first came on the stage in 2006-2007, a number of possible causes entered the stage at, or close to, the same time:

Drought in many areas
Difficulty in controlling *Varroa* mites
Nosema ceranae (believed to be widespread since at least 2006), and here since at least 1985
Decreased bee pasture + increased corn acreage
Chemical buildup in comb
Neonicotinoid pesticides

A good argument can be made for any one of these as the main, or sole cause of CCD; a better argument for a combination of two or more. If only one of the above had occurred, it would have been much simpler to either designate or eliminate it as the cause of CCD.

Based on field reports, CCD can devastate a given apiary in a short period of time, sweeping from one end to the other, leaving previously populous colonies with only a handful of bees and a queen. Since rapid decline of an organism (consider, as many have, a honey bee colony to be an individual organism) is typical of a pathogen, current thinking is that a pathogen, either *N. ceranae* or a virus (or a combination of both) is the basic cause of CCD.

If a virus causes CCD, is it a new "super" virus, or one of the known bee viruses – Kashmir, DWV, APV et al – or perhaps a mutation of a known virus to a more virulent form? We don't know, but assuming that a virus causes CCD allows us to speculate on remedial measures.

Consider other CCD-like problems in humans and plants:

Target	Disease	Pathogen	Main Vector
Humans	Flu	virus	humans
Humans	Malaria	protozoa	mosquitoes
Humans	W.Nile virus	virus	mosquitoes
Humans	Lyme	bacteria	ticks
Citrus	Greening	bacteria	psyllid
Grapes	Pierce's	bacteria	sharpshooter
Tomatoes	Mosaic	virus	aphids

In each of the above instances, the Target can withstand the Vector in the absence of the Pathogen – mosquitoes are a minor concern to us if they don't harbor a pathogen; without a pathogen, psyllids, sharpshooters and aphids are far less devastating to crops. Honey bees are faced with a formidable double (or triple) whammy: the pathogen and either of two vectors, *Varroa* or the *Nosema ceranae* fungus (also a pathogen) can take down a colony. In most areas, *Apis mellifera* has not had enough time to be able to co-exist with these two relatively new vectors.

In the human-plant list (above) control of the pathogen (and thus the disease) is achieved by controlling the vector (except for flu). Beekeepers are aware that *Varroa* control, and now Nosema control, are vital in protecting colonies from CCD. At the January 2008 Sacramento meetings, Brett Adee, a commercial beekeeper from South Dakota and California, arrived late for the CCD panel and had time for only a few words (as I remember them): Control *Varroa* and you solve CCD. Sometimes profound wisdom can be expressed in just a few words. Lyle Johnston, a commercial beekeeper and pollination broker from California, has a little different take: control *N. ceranae* and you won't have CCD. A third opinion comes from David Mendes, an east coast commercial beekeeper, and Vice President of the Federation, I'm guessing that nutrition trumps *Varroa* and Nosema control. The three aforementioned worthies would make most lists of Top Ten U.S. beekeepers and as such their opinions deserve serious consideration, especially since all three are speaking from personal hands-on experience. Let's look at the three CCD candidates more closely.

Varroa

Brett Adee has strong backing from the scientific community that controlling *Varroa* can eliminate (or minimize) CCD. A study, published in 2001 by UK scientist Stephen Martin, *The Role of Varroa and viral pathogens in the collapse of honeybee colonies: a modelling approach*, indicated that a relatively small number of *Varroa* could take down a colony in the presence of certain viruses (J. of Applied Ecology, 38:1082-1093, 2001). Note particularly the use of the word collapse in the title of the article and the year (2001) that it was published, both indications that CCD has been around longer than many of us might think. In 2004, Martin teamed with a mathematician to expand his 2001 article (see *The dynamics of virus epidemics in Varroa infested honey bee colonies*, J. of Animal Ecology, 73:51-63, 2004). Recent work showing that *Varroa* mite soliva impairs the already limited immune system of honey bees, leaving the bees more susceptible to a wide spectrum of health hazards, gives further support to Brett Adee's thesis.

Nosema Ceranae

Lyle's contention that controlling *N. ceranae* is vital in avoiding colony collapse is supported by the fact that Joe DeRisi, the University of California in San Francisco, found that all CCD colonies contained *N. ceranae*. Nosema may not transmit viruses directly but, by damaging a bee's gut, can provide an entry path for viruses. The direct pathogenic effect of N. ceranae may be far more harmful than its possible role in virus transmission. The consensus now is that N. ceranae has been with us for a number of years (at least 25). Much of the recent work

on N. ceranae has been done by Mariano Higes in Spain, where N. ceranae is also prevalent. *N. ceranae* has taken over from the less virulent *N. apis* and the timeline for this takeover somewhat mirrors the timeline of increasing CCD problems throughout the world. *Nosema apis* was classified as a cool-weather problem and beekeepers in warm areas (Florida and Southern California) didn't treat for Nosema. Beekeepers in warm areas are now treating for *N. ceranae* and their bees look better as a result. High spore counts of *N. ceranae* are being found this Summer and Fall and many beekeepers are convinced that Nosema control is critical towards getting colonies to make it through the Winter. The fact that Nosema spores can survive in empty equipment for months could explain the finding that when equipment from CCD colonies is placed on good colonies, the good colonies come down with CCD. For more information on *N. ceranae* see **www.scientificbeekeeping.com** where Randy Oliver has posted a number of his articles, plus his article in this Journal last month.

Nutrition

Dave Mendes' contention that nutrition may trump *Varroa* and nosema control also has support from both the scientific community and from beekeepers. Frank Eischen, USDA Researcher from Weslaco, Texas, has found that colonies that are well supplied with supplemental protein patties are better able to withstand both *Varroa and nosema.* Beekeepers that are on a strong supplemental feeding program feel such a program gives them more robust colonies. In a human population, the elderly are more susceptible to the flu virus; in a honey bee colony, old bees are more susceptible to virus attack. Young bees contain vitellogenin (dubbed by Randy Oliver as the "fountain of youth" substance; see Randy's site, above, for an informed discussion of young and old bees). A well-fed colony contains more young bees.

Summary

A good case can be made that a virus, spread by *Varroa* (and possibly *N. ceranae*) is the sole cause of CCD. An equally good case can be made that *N. ceranae*, by itself, is the sole cause of CCD (and possibly an indirect cause, by spreading a virus). Certainly, a combination of *N. ceranae*, *Varroa* and virus is a possible cause. Undoubtedly, optimum nutrition will give bees a stronger immune system that in turn will provide some protection from both viruses and Nosema. To date there is not enough evidence to indict neonicotinoids, but more is on the way.

Attacking CCD

If the above discussion is credible, a three-pronged attack is necessary to escape CCD: *Varroa* control, nosema control and nutrition. I believe that Brett, Lyle and Dave would agree. I know of no beekeeper that has a good handle on these three entities plus good tracheal mite control, that has had CCD problems. Because most bee colonies look great in May-June-July a beekeeper can be lulled into thinking he will not have CCD in Nov.-Dec.-Jan. But if those Summer colonies carry a virus load + significant *Varroa* or nosema populations or if they carry a high nosema load alone, they could (will?) succumb to CCD later on. Beekeepers that avoid CCD make it a point to treat for *Varroa* in August; they sacrifice a part of their August honey crop in order to keep viruses from spreading. (A pitfall of this approach is that colonies can plug out leaving little room for brood development and fewer young, resistant bees for the Winter). Sacrificing an August honey crop and making sure colonies have ample room for brood add significantly to management costs, but these expenses can be offset by significantly less Winter loss. Like Lyle, many beekeepers now feel that controlling *N. ceranae* is critical to avoiding CCD. Until more information is forthcoming on neonicotinoids it would be prudent to avoid areas where topical or water-run applications of these materials are used.

Neonicotinoids

Is it possible that neonicotinoid pesticides are contributing to CCD? Absolutely! A number of highly respected beekeepers, including Dave Mendes, are convinced of a CCD-neonicotinoid connection but to date, there is no definitive evidence. The circumstantial evidence is impressive: the neonics cause memory loss and impair the immune system, both of which can be linked with CCD. U.S. and Canadian studies with neonic-treated seed have shown no problems with melons or canola but there is scant or no information on topical or water-run applications. Project ApisM is funding a 2009 study on neonic-treated blueberries and cranberries that, hopefully, will shed some much-needed light on the subject. In a perfect world, the EPA should have screened the neonics for bee hazards before they were introduced and the EPA, rather than beekeepers, should be funding current neonic-bee tests. Efforts along these lines are shaping up, however, and by the beginning of the year there may be some comparative efforts in place.

The Future

Many believe that current chemical controls for both *Varroa* and nosema are not sustainable and that it is a matter of time before such chemicals will be found in honey at concentrations high enough to torpedo the honey market. The ultimate solution is genetically improved stock that is resistant to viruses, *Varroa* and nosema and much work is being done on these lines. Some beekeepers are having good luck with survivor stock from a few selected breeders. Until resistant stock is widely available, CCD problems will continue to plague the bee industry and beekeepers must use the few weapons currently in their arsenal, some only temporary, others of limited effectiveness. BC

Joe Traynor is a pollination broker in Bakersfield, CA.

Haystead's Honey & Mead

Alan Harman

Getting There Is As Complicated As Solving A Rubik's Cube

It took Steve Haystead four years to finish his figurative Rubik's Cube, and now he's making award-winning mead at his Bardic Wells Meadery in Western Michigan.

As one piece fell into place in his quest for a meadery licence, another seemed to slip away and he was no nearer to completing his regulatory puzzle.

But even as the moves became more complex he persisted, because he saw the mead licence as a way to fund his life-long obsession to be a beekeeper.

He was sidetracked for a while, filling his time as a school teacher; getting a masters degree in business administration; working in management positions from manufacturing to health care; and more recently as a freelance business headhunter.

"That's what I was doing when I decided to get into beekeeping," Haystead says. "I had always wanted to do it since I was a kid. I remember 6th grade, they showed a movie on bees, and I was fascinated by the social dynamics of a beehive. I never lost that dream."

Now completing his 11th Summer of beekeeping, he recalls he bought a 20-acre cherry orchard outside Montague, MI, just so he had a place to keep bees and started off camping there with his wife, Jan, and five beehives.

The next season he had 15 hives and two years later hit 300 hives.

Haystead is self-taught, learning how to keep bees by the book – in fact, dozens of books.

"I read a couple of beginner books," he says. "I had no mentor, so it took me a lot of hard lessons. I have probably 90 books now in my collection. I learned by reading and reading. I learned real quickly you have to subscribe to *Bee Culture* to learn new things and get different ideas.

"I don't know what the attraction is, but once you get into it, you just can't get enough of it. I just truly have this passion for beekeeping.

They have the perfect partnership. Steve loves beekeeping and making mead. Jan is a chemist and mathematician who works on the formulas; tests the mead's acidity; checks the 12.5% alcohol levels; the PH content, and then enjoys drinking the results.

The irony is Jan is deathly afraid of bees.

"She never told me that because she didn't want to get in the way of fulfilling my dream," Haystead says. "It shows the sort of support she's given me through this whole 11-year journey.

With a working knowledge of beekeeping under his belt, Haystead's next problem was how to take a passion and turn it into a livelihood.

In an area rich in apples, peach, cherry, blueberry, sunflower and vegetable production, he moved into pollination services and found all the farmers needed bees.

"It just amazed me how quickly we were accepted into the community – and it was because we were beekeepers," he says.

Haystead discovered pollination was a good break-even proposition, but after doing this for few years he started looking around for something else.

"You had some pocket money, but you sure weren't going to retire on it unless you wanted to work the rest of your life," he says.

"What I have tried to do with my beekeeping is to really experience it. I like to do all those things you read about."

Haystead tried doing packaged bees, doing his own splits and making beeswax candles.

"I raised my own queens just to say that I did it," he says.

Then he read some of writer Roger Morris's books on mead making, and it was one thing he hadn't done.

"I thought I would make a batch of mead and give it to people, and that would be the end of that," Haystead says. "About seven years ago, I made my first batch of mead. I did it like every other winemaker – followed a recipe and went through the motions.

"It was so gawd-awful, I was embarrassed," he says. "It was absolutely awful. It was really, really bad mead. I at least needed to do it to an acceptable level of proficiency."

Haystead started researching wine- and mead-making to find why his tasted so bad.

"It turned into almost an obsession to make better mead," he says. "I sampled mead from about 20 of the commercial meaderies and found a lot of people were selling what I thought was bad mead.

"My thinking was people deserved better, and I decided I was going to make better mead. Then I started thinking if I could make better mead and people really liked it, maybe instead of the pollination gig, making mead would make business sense of what we are doing here."

For the next five years he continued his mead making and found his product was getting better.

"We entered the mead into a competition in Philadelphia the third year," he says. "Instead of having friends and neighbors patronize me and tell me how good it is, I said let's get a really objective opinion."

He entered two meads and his traditional won first place. A coffee mead won third place.

"I can't tell you what that feels like," he says. "It just feels so good to be recognized and validated."

That's when Haystead applied to make mead commercially. It took him four years to complete the process.

"It is beyond time consuming," he says. "You have to be able to keep track of a lot of things, and you have to understand where different agencies are coming from."

He was dealing with the Michigan Liquor Control Commission, the U.S. Department of Agriculture and the Treasury and Policy Board, previously called the Bureau of Alcohol, Tobacco, and Firearms.

"There were several stages when I was ready to give up, because it looked like it would never happen," Haystead says. "You just wonder if you are ever going to get there.

"You have to understand they have different perspectives. They have different reasons they are involved in the process. A lot of it seems unnecessary."

He decided to step back and work out what the officials were thinking.

"Despite the fact it might seem silly to me, there's a reason they want these forms and this documentation and these things done," he says.

And until the officials were satisfied, he could not sell a single bottle of mead.

"Look at it from a cash-flow perspective, and I am strung out before I get my first dollar. Until the licenses were granted, I could not even bottle any mead although I was allowed to make it in limited amounts."

Haystead feared he would end up buying thousands of dollars worth of equipment and never getting a license.

"It's like Rubik's Cube," he says. "You just don't know that you are ever going to get everything all lined up. It's hard to figure out what order to do everything. Even when you go through the process, it's hard to know what order to do it."

But Haystead says the bureaucrats were not setting out to make his life miserable.

"They were not unhelpful," he says. "They were just doing their job following the regulations. I was very pleasantly surprised. Every agency I dealt with wanted me to get the licence. But that didn't change the fact I still had to do everything by the book."

Haystead concedes there are a lot of businesses making money handling the regulatory process.

"But that's expensive, and I didn't have that sort of resource," he says." I can't even imagine, given the scale I am at, that it would make any business sense to hire someone to do these things. I had to learn it myself, trial and error, and get some things wrong."

Haystead started off needing three different licences from three government agencies.

"There was no point in which you go, 'We made it.' Because every time you would get to a point, you would realize, "okay that's this, but I still need to do this.'

"You deal with this agency and you think okay, we go from here to here and we get this done, and then you realize it doesn't work that way. You have to juggle all these balls at once.

"You are trying to get all this stuff to come together. I think it went Department of Agriculture okayed health issues; then the Liquor Commission does an inspection; and security becomes more complicated because I am doing this in my basement."

Haystead had to be fingerprinted, and the liquor commission did a criminal record check.

"They also need to know where your money is coming from," he says. "I had to put a budget together for them to see. It's the alcohol part. They have a very strong interest, and it goes back to prohibition, in making sure you are legitimate."

Haystead says there's not a lot of discussion or a lot of margin for error.

"You have to do it their way," he says. "You have to be disciplined. This is not a laid-back endeavor. You have to be reactive to their agenda, to what they need.

Then Haystead found he had to get a sales-tax license for his mead. He also had to get city approval for the meadery. Next, he had to get a bond, spending money on this when he was still a year away from production. He had to have the bond to get the license. The same requirement applied to liquor-liability insurance.

"You need the insurance to get the license. But even with the license, you still cannot sell product," he says.

"At this point, I just about said, 'Forget it, this is not worth it. This is never going to end.'"

The three licenses finally came in the space of a year.

The Department of Agriculture certificate came in February 2007, the federal license in May, and the liquor-control license in April.

With all the licenses in hand, Haystead figured he was ready to go. But no. Now he needed to get his mead formulas and recipes approved.

He downloaded the forms, filled them in and mailed them.

Six weeks later, they came back rejected. No dialogue. No explanation.

"Eventually, I was able to talk to someone, and it took another five or six weeks to get the technical stuff," he says. "I was expressing my measurements in Celsius. They wanted them in Fahrenheit."

It took six months to get the formulas approved and Haystead couldn't start with his labels application until then.

The federal label approval process is done electronically, but as a result there is no dialogue and the process dragged into months.

"Labels were being rejected, and you don't know why," he says. "I don't know what I am doing wrong. That part was truly the absolutely worst part, and it was compounded by the fact it was the end of 3½ years. After doing everything that everybody asked, cooperating at every step, now it felt like somebody was messing with me.

"It was months of electronically submitting labels, getting them rejected, resubmitting them, getting them rejected; until you finally get the right thing."

In the process, he needed a $60-an-hour graphic artist, often just to get one word changed.

Haystead cites the drama around the fact he does not use sulphites in his mead.

"I don't do anything that is not consistent with organic management techniques," he says. "On my label, I had, 'No sulphites added.'

"It was rejected as false and misleading, because it implies everybody else is adding sulphites. What I learned was I could use, 'Contains only naturally occurring sulphites.'"

But each change meant going back to the graphic artist.

"You are spending more money, more money, more money. Every little change, every one word you needed to change, you have to go back to the graphic artist and then resubmit."

But finally the figurative Rubik's Cube was finished. All sides turned green as the labels were approved in December 2007.

"We were finally good to start," he says.

To make that start, Haystead wanted to use one room in his basement for the meadery. Regulations required the entire basement be void of any personal belongings, including furniture, knickknacks and other stuff that normally gravitates to the below-decks area of a house.

He also had to sign authorizations allowing agents to walk in and carry out an inspection any time night or day. "They don't have to knock; they can literally walk through the door."

Haystead sold his first 375-gram bottle last January, in the process becoming the first meadery in Michigan and only about the 80th in the United States. There are only about 200 in the world.

Used to running his honey market on credit with outstanding invoices, Haystead soon found mead has a blanket of regulations that include a ban on credit.

"If I wholesale mead to a liquor store, it is COD," he says. "You do not leave without getting paid. The whole industry is regulated on the premise nobody is going to owe anybody anything.

"It's been a very stark adjustment to just selling honey.

"Every month, I fill out reports and send copies of mead invoices. The record-keeping is going to take more and more time as I make more and more mead and get more and more customers."

For every gallon of honey, Haystead makes three to 3½ gallons of mead.

"I'll harvest about 1,000 gallons of honey this year," he says. "I want to do some honey sales under my Cherry Hill Honey label, but I will be doing less and less.

"Now we are to the part where it is good old-fashioned business planning. How much mead can we sell, how do we sell it, how do we get in to marketing."

Haystead says getting $12.50 for a bottle of mead sounds wonderful.

"But how many bottles can I sit here and sell and keep my bees caught up and all the other things a beekeeper needs to do? If I go to hire labor, there goes my profit margin.

"So now we're wrestling with this in terms of how much mead can we make, how much can we sell, how do we sell it?"

He had to decide on his prices immediately.

The regulations require those prices be published, and there's no horse-trading.

"You have to publish a wholesale price, and you have to publish a retail price," Haystead says. "There are certain frequencies and certain guidelines where you can change those numbers."

Steven and his wife Jan

Meanwhile, he's looking at the idea of a tasting room, either at the meadery or in nearby Montague, a lakeside tourist town.

This means more regulations to be met, supervised by the USDA, and it also brings Haystead back to hiring people to operate the outlet while he is out beekeeping.

But looking back, he says operating a meadery is no less complicated than any other serious business,

"There's a lot of it that just isn't fun. Beekeeping is fun, and I think most beekeepers love keeping bees and selling honey and the interaction with customers."

Anybody considering opening a meadery needs to think long and hard because it's not only all the regulatory red tape to put up with, it's a whole other skill set.

"It's different from beekeeping," Haystead says. "It is much more manufacturing than it is agriculture, and I have done both. It is different."

Haystead started off making five gallons of mead at a time. He gets 10 bottles from a gallon.

"We started out with nine different varieties," he says. "Now we are starting to whittle it down. If you make a five-gallon batch, it's one thing. But if I have to make 100 gallons - good lord, how many blackberries can you pick?

"It was fun to do a five-gallon batch, but you realize it makes no business sense to be working through the woods picking your own blackberries."

He is selling Traditional mead with nothing added to the honey wine; Cyser, which has apple added; Cherry Berry, a blend of cherry and blueberry; and the coffee mead, called Cordial Magic.

"What we have tried to do is give people a spectrum," he says.

Mead, one of the world's oldest fermented beverages, is a smooth, soft and distinct alcoholic beverage. Variations range from dry to sweet.

It can be made from honey, alone, or have added ingredients such as fruits, spices and even some vegetables. The law requires it to be fermented from at least 51% honey.

Haystead adds his ingredients during the actual fermentation, saying dividing up and separately flavoring one large batch seems like cheating.

"We're purists, and I've got to believe it makes a difference."

He had a formula approved for a mead called rootfruit, which his wife thought was "absolutely insane," because it was made with carrot juice, apple and ginger root.

"How did it go? It's gone, sold out," he says. "It's fun to create concoctions. Mead is just an incredibly fun drink. You need to learn the science of it. It stunned me how much algebra is involved in making mead at a commercial level and how much science is involved.

"The more experienced you get, the more familiar you get with the process, the fermentation, the more creative you can get."

Haystead, who uses only his own honey and local ingredients, was surprised when one formula involving maple syrup was rejected.

"I made this, and people just loved it," he says. "I thought, 'Man, nobody else is doing this. This is just going to be great.' I sent in the formula, and it was rejected!"

Turns out, maple syrup and molasses are not allowed on a bonded winery premise.

"For some reason, that's a magically illegal ingredient," he says. "The molasses makes sense but maple syrup? There's no discussion, no negotiation. It's just, 'No.'"

To handle his mead business, Haystead has cut the apiary back to 120 hives and averages 100 to 125 pounds a colony a season.

He's now trying to work out how much he can do in terms of honey and mead production.

"Expand, and you have to make a quantum leap to where it's profitable enough to employ somebody and still keep making money," he says. "Looking at that now, I don't know what the right level is where you maximize profitability."

Haystead says the challenge is not to get too far from the bees.

"Whatever model we put together, I have to make sure there is time for me to do the bees. The perfect thing would be to have it substantial enough, I can just do the bees and say, "You guys do the mead.' But I've developed this expertise, and I want to use it.

"The model when we started this was I was going to do the bees and then make the mead during the winter months. But I am realizing that it's not quite that simple. People will knock on the door in August. And instead of being with bees, I'm spending a couple of hours selling mead."

That's where hiring staff and the extra work it creates comes into the equation.

"It's more like manufacturing, because you start getting capital investment in equipment, dealing with labor and labor laws, workers compensation," Haystead says.

"You can end up very far removed from a guy who just wants to put on his blue beesuit and play with bees." BC

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Water – Plain and Simple

Generally unexciting, but absolutely necessary in the colony.

I'm struggling here

I've written my introductory paragraph several times. So far, nothing has worked. How can I explain to you why I am writing about summer issues during Winter months? Because, by next Spring/Summer when colony water supplies are once again an issue, we still will not have the answers we need. Right now, we should be thinking and planning about how to help our bees be better neighbors next Summer.

Last October I attended a City Council meeting in Cleveland, Ohio. They were discussing the practicality of keeping bee colonies within inner-city Cleveland. Naturally some councilors were concerned while others embraced it. A fundamental tenant was that supplemental water could be provided thereby reducing the peskiness of water-foraging bees. This was the right answer, but I squirmed as I tried to conceptualize exactly how this watering device would work. I will discuss some possibilities below.

Last July, during a typical Ohio drought, a hot issue arose between two homeowners – one with a pool and one with forty colonies of bees. Neither were doing anything wrong, but one couldn't comfortably use their pool during hot weather and the other was being stressed to move his colonies somewhere else. I was asked what kind of watering device should the beekeeper install to prevent water foraging bees from going to the neighbor's pool. I didn't have a good answer.

Some more truth

Issues like this are definitely going to come up next Summer. Bees and their keepers are quickly moving to town. Traditional answers like, "Use Boardman feeders filled with water," or "provide a shallow pan filled with water," are not going to continue to carry the day. Beekeepers need practical information on how, where, and when to provide supplemental colony water. Should such water be scented? How much water should be provided to adequately compete with neighborhood pools? How does a beekeeper keep supplemental water free of algae and scum? How does the beekeeper discourage birds and other animals from contaminating supplemental water with fecal droppings? These are some of the questions for which I still don't have good answers; therefore, I am writing a summer article during a cold month. As an industry, we need a plan for next season.

First, what makes up a water source?

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

Water foragers and swimming pools

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

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

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

Another issue - bees and dirty water

Another water-related and troubling situation is: "I've seen honey bees drinking water (or whatever) from the cement pad of my beef cattle holding pen. Won't this nasty water get into the honey?" This framework of questioning immediately results in shudders and wrinkled noses around the room and is definitely not honey's best hour. The fact is that bees do not always look for the cleanest sources of water. They will readily collect from manure pits, stagnant pools or other questionable water sources having nitrogenous byproducts or trace minerals that bees need. Obviously, the physical size of many undesirable water sources, combined with the smell and taste, would make such a site much easier for a water forager to find when compared to a drum or some other manageable container of clean water. Consequently, bees probably have more difficulty locat-

Drowned bees floating in a swimming pool.

ing and collecting from a small, clean water supply. If you watch water foragers while they collect from a clean source, foraging bees will expose their Nasanov gland (the scent gland) in order to help other bees find the same source.

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

Why bees drink

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

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

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

Frequently, during these periods, the majority of the adult bee population will completely move out of the hive – a sight frequently seen in parts of the southeastern and southwestern U.S. During these times, bees will mass around the entrance of the hive giving the few remaining bees inside the colony more space to evaporate water and cool the bee nursery. Additionally, by removing so much body mass, internal hive temperatures will drop. For many parts of the U.S., 96°F and higher is not an uncommon ambient temperature. The colony need for water collection is daily or even hourly. In the Summer, a full sized colony will use *at least* a quart a day. In arid areas even more.

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

Having little to do with hive temperature, bees also collect water

Water foragers on a stream bank

to dilute honey in order to feed it to developing bees. Bees can also use metabolic water (water produced as a physiological byproduct). During cold months, water for brood can be gotten from either frost or ice within the colony.

Clearly, bees need abundant supplies of water all year. If you don't provide it for them, they will find it somewhere else. In fact, they will frequently find it somewhere else even if you do provide water for them. Let a faucet drip, provide an internal water supply, keep a bird bath filled nearby, install a fish pond, or buy a plastic child's swimming pool, but by all means, keep your water sources wet. Once they dry out, like children developing bad habits, bees will move to other sources. Bees are going to drink - one way or the other.

Bee Hive Water Facts

1. Time for a bee to load up – one minute
2. Normal time for the water run – three minutes or less (67%), 10 minutes or less (92%).
3. Rest period between trips – two to three minutes
4. Water trips per day – 50 (100 max)
5. One quart of water will take 800 bees working all day
6. Daily water use per colony – around ½ pint – 2½ pints

(From Park, 1928)

I don't have new answers

While I don't have new answers, I do have the same old questions. This Winter, I plan to speak with individuals in the animal care business to see how water is provided to livestock and poultry. Noticing that water foragers quickly find my grandkid's wading pool water, next Spring I plan to use such a container as an initial container for experimenting. I hypothesize that a mesh covering of chicken wire will keep out birds and other animals. The watering device will need floats of some kind to prevent bees from drowning. I am trying to have an idea how to position the watering device so that the downspout on my storage barn can provide rainwater runoff into the container. If available, water from a faucet could be allowed to trickle into the container, but that is water-wasteful. Would a float valve be practical? Should I check with swimming pool companies to determine how to treat the water with a chlorine concoction in order to control microbial and fungal growth or is there a risk that chlorine products will give honey an off-flavor?

Someone must have an idea

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

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'Bout a 100 – Sideline Beekeeping

FACING THE CHALLENGES OF SIDELINE BEEKEEPING - II

Larry Connor

Where we have been

Last month we started to examine a list of challenges specifically facing sideline beekeepers, which is in truth a list that affects all people who keep bees. I clearly think that sideliners are taking a larger hit with the items on the list, and for a variety of reasons. We discussed various queen problems, and what we can learn from G.M. Doolittle and his work dating back over 100 years.

Here is the rest of the list of items we need to discuss.

2. Bee forage: What and where is it being produced? Is there enough to support my colonies? Or should I plan to feed colonies. And if so, when should I feed my bees? Should I be feeding in the Summer when everything is in bloom? And if so, what with – pollen, sugar syrup or both? And is high-fructose corn syrup really bad for my bees?
3. Honey: It seems I either have too much or not enough.
4. Winter losses: How to eliminate them, or at least get them to an acceptable level.
5. Fear of contamination of the hive and bee products with chemicals used in apiary work and from the environment.
6. Laws, rules and regulations restricting free trade of honey.
7. Neighbors: The Good, The Bad and The Ignorant.
8. Time: How can I manage it better?
9. Beekeeping is getting so expensive.
10. Allergies to bee venom in the family

Honey bee forager collecting both pollen and nectar from a sweet clover flower in Illinois. Abundant moisture in 2008 produced a lush growth of sweet clover and other nectar and pollen plants, leading to a very good honey crops. A few years ago these same fields were barren due to a death of moisture, and the honey crop was short. Plants stopped blooming in July and the bees had few resources later in the season.

Bee Forage & Nutrition

I am amazed at the number of advertisements that have popped up in the last year for supplemental protein feed for bees. It is as if the industry just discovered that Mother Nature does not always provide the perfect nutrition for bee colonies. A significant part of this may be attributed to CCD, and the reflection that previous problems with colony failure, decades ago, were ultimately linked to poor colony nutrition. Beekeepers have forgotten, or never learned, to think of the beehive as a bank. Like many banks, there are days of heavy deposits of pollen, nectar and water, and many days with heavy withdrawals of the nutritional resources stored there as it is consumed for brood rearing. It is also important to remember that when the bank is full, the daily deposits are less important than the overall riches of the hive. Conversely, if the bank is nearly empty the daily deposits of nectar and pollen are absolutely essential for colony survival or the hive may rapidly die of nutritional starvation.

A theoretical colony enters the Winter with adequate supplies of protein (pollen) and carbohydrate (nectar/honey) resources collected the previous season. As day length increases in January (in the northern hemisphere), the colony and queen are stimulated to initiate egg laying even though the outside temperature may be well below freezing, and it is several months before the bees are able to break cluster and fly outside the colony to collect fresh pollen and nectar to replace the resources consumed during the Winter. The food reserves must be located within the area where the bees are growing and developing, in what we call the brood nest. If there are no food reserves, or if they are positioned in an inconvenient location (because the beekeeper moved them), colony growth will not restart and the population may eventually dwindle and die.

In the Spring and Summer months the colony is able to build the size of its banked food reserves and ideally produce many new combs of fresh honey and stored beebread. Anything that interferes with the production of new bees, their work as house bees and then later as field bees will negatively influence the success of the colony. Obvious influences include brood diseases, virus infections, pesticide exposure, over-treatment with miticides, periods of weather where the bees are unable to forage, and of course mites, both tracheal and *Varroa*. Special

mention goes to *Nosema*, an adult bee mid-gut parasite that weakens queens and worker bees so they are unable to perform normally.

But then comes a dearth, a break in the production of pollen and nectar caused by a dry climate due to lack of rainfall. But there are other causes: If you are a mid-Atlantic beekeeper and you get a major freeze in April, you lose in several ways. First, the flowers that were producing your nectar crop (or were about to) are dead. Dead flowers do not secret nectar or produce viable pollen. With trees like tulip popular, black locust and basswood, the freeze will stop production for the entire year.

Second, a dearth reduces the bank deposits to the hive, which will be forced to rely upon stored pollen (often from the previous season) and honey.

Third, the cold spell will often cause smaller colonies and nuclei/splits to go into a tight cluster and abandon the brood that is outside the cluster. This shock to the development of the hive means that the bees will be forced to clean out cells of dead sisters AND there will be reduced emergence of new foragers to help grow the colony resulting in a population inbalance. The combination of reduced population growth and frozen forage will overdraw the colony's bank of food reserves, especially pollen. This thwarts growth and may cause some colonies to die. While over wintered colonies are affected, new package colonies – with their absence of a balanced bee demographic – as well as Spring increase colonies, are seriously and negatively affected by a Spring freeze.

A second type of dearth we have seen in the past few years is due to a lack of rain, resulting in a totally dry Summer. Actually, for many folks the drought started in mid-Spring, and the absence of rain reduced normal plant growth and development – the bees had limited forage to visit. If not affected by late freezes, the last nectar many colonies received was from flowers on trees and shrubs: apples, other fruit trees, tulip popular, basswood, black locust and the many sumacs. In Michigan these trees are all done by some date in June. If the land is arid and the wetlands dry up, the clovers, wildflowers, loosestrife, goldenrod and asters are seriously reduced in growth. Because of this moisture failure, the bees will not only *not* produce a crop of honey essential for Winter survival (not to mention the beekeeper's survival), but the colonies will *not* produce adequate numbers of Winter bees that are ESSENTIAL for colony survival during the next Winter and for Spring buildup the following season.

Big o' Fat Winter Bees

If you are raising kids, especially teenagers, you know the process makes you grow old. Any arguments out there? The effort of raising children sucks the energy right out of you. The same is true with bees. Not only does a nurse bee feed on the resources of the hive to raise brood, they must draw on the fats and nutrients of their bodies to produce new bees. This is why old field bees are unable, in most cases, to raise brood very efficiently. So while a colony must have both stored pollen and honey in the hive to feed bee larvae, the nurse bees in the colony must also contain the essential nutrients as well if the brood cycle is to be effective. That is what we mean by Fat Bees – those with abundant food (fat and protein) reserves.

If there is a dearth during the later part of the season – July or August on – then there will be few Fat Bees – Winter Bees – in production. There may be some brood rearing, but not as much and the resulting bees will not be as well fed as they should be, and will be inferior as nurse bees. These poorly fed bees – Skinny Bees – are poorly prepared to raise new bees in the Winter and early Spring. If bees are produced, they will also be poorly fed. It is a vicious cycle, and both the bee colony and the beekeeper suffer.

On the farm in Galesburg Michigan in August, the bumble bees were working the start thistle and the large red clover flowers, while the honey bees were working the smaller red clover flowers for nectar and all the flowers for pollen. Red clover will dry up when the moisture fails, quickly turning brown. All the clovers are critical to many colonies for their rich protein-loaded pollen.

Sideline beekeepers often lack the knowledge to care for this problem. They often work other jobs and have less time to monitor the status of their colonies. Although some sideline beekeepers are growing their operations as their "real" jobs have been put out of business – a common situation here in Michigan with the folks who are/were working for the auto industry. As folk's limited savings and bee income allows, they are growing the number of colonies they own and operate for honey production, pollination and nucleus sales. Yet, they often lack experience and training from people who have been through this before. So they make mistakes. They assume the bees will find food during a dearth only to find dead hives in the late Winter. They take out a second mortgage (if they can get financing) and purchase packages only to lose them to a combination of CCD, queen problems and inadequate feeding. It is not a very good business plan; in fact, it is not a plan for anything but disaster.

Fewer Hives, Better Feeding

So many sideline beekeepers are well advised to slow down and gear back on the size of their operation. Many of the commercial beekeepers have already made this decision – where a single beekeeper once kept 1,000 colonies, he or she now keeps only 600 or 700. By keeping fewer colonies they are able to keep them well fed, better managed and subject to more effective mite control methods. The bay-back will hopefully be a larger production per colony.

Jumping ahead on the list about time and resource (fuel) costs, most beekeepers with a large number of apiary locations know that there are some apiary sites that are not as efficient as others. They may produce a crop of honey in some years, but not in all years. They may

Honey bee on Fall aster flower in September in Michigan. The fall flowering plants like the goldenrod-aster complex are critical for the development of fat bees full of the nutrients needed for brood rearing during the Winter. Just a few years ago there was no bloom from the asters and goldenrod for a wide area of the country. It may be a coincidence that the first reports of CCD were made following this general dearth. Or is it?

be the farthest from the home base, or the most time consuming because of the demanding, high-management landowner. These are the yards that should be eliminated, or the site sold to another beekeeper, with or without bee colonies.

Other factors come to mind that can cause a reduction in the size of an operation. Common issues are health and aging, and the lack of help. Like all of agriculture, beekeepers are aging and fewer young people are entering the profession – it's a double whammy for the industry.

With fewer colonies, and hopefully only the best locations, the beekeepers are able to spend more time per bee colony on management, cutting out queen cells to prevent swarming, and feeding bees when they require it. The key here is simple – since they are in the colonies so much they see the problems as they develop. It is not rocket science, but it is good beekeeping.

Protein feeding of bee colonies is traditionally classed three ways:

1. Pollen cakes or patties – a mixture of real bee-collected pollen mixed with sugar and water to form a cookie dough mixture to put onto colonies in the late Winter and early Spring to stimulate brood development. Supplemental sugar syrup feeding balances the nutritional mix. This is the best way to feed bees IF the pollen is free of foulbrood scale/spores and chalk brood mummies. I only recommend feeding in this manner if you use pollen from your own colonies. There are times of the year I would not use pollen from my hives since I would not be sure that there is not a low level of insecticide residue in the pollen. There are other times when I know that very little is being sprayed, and the pollen collected is fresh and nutritious.

A honey bee pollen forager on the brood comb of a growing Spring colony.

Pollen should be air dried for a day or two, screened to remove debris, and frozen. Unlike the fermentation process the bees use to convert bee pollen to beebread, pollen from pollen traps has inadequate honey or beneficial microbes added to insure the preservation of its nutrition. Freezing it keeps it fresh. Sideline beekeepers are smart to research the use of pollen traps and a chest freezer.

A variation on this theme is to pour fresh frozen pollen pellets into empty brood combs and work them into the comb with your hand or a spatula. These pollen frames are wonderful for Spring buildup and also for use in queen rearing. When raising queens, why depend on the pollen the bees are collecting, since there are variations every day in their foraging patterns? The addition of a man-made frame of pollen will do what is needed. Because of the risk of wax moths feeding on these pollen frames, only put them into strong colonies.

2. Pollen Supplements – are mixtures of natural pollen and some other mixture of protein foods. These may include soy flour, brewer's yeast, and a wide range of specialty yeasts and proteins. The pollen must be from the local operation or treated by irradiation to kill disease spores but maintain the nutritional value of the pollen. The addition of pollen to a diet is a stimulus to the bees to feed. These phago-stimulants are essential to the bees taking the pollen, especially when natural pollen is available. Usually a relatively small percentage of pollen is needed to stimulate the bees to feed.

3. Pollen Substitutes – contain no pollen, and are mixtures of only protein and nutrient mixtures. The majority of the diets being advertised fall into this category. A successful bee diet was the Beltsville Bee Diet developed by the late Dr. Elton Herbert from the Beltsville Bee Lab, but it is no longer available. There are other products on the market now that rival that diet. Ask or research yourself to see which works best for your bees, your management style, and your budget.

A key component of all these feeds is sugar. The addition of sugar stimulates feed as well, and it is used by the bees to stimulate brood food production.

Feeding During a Dearth

There is growing evidence that beekeepers must recognize the times when the bees are not collecting adequate reserves, and colonies need supplemental protein and carbohydrate feeding to insure their survival. This feeding of bees from July to October when food deposits are not coming into the colony food reserves – such as during a dearth – should stimulate a colony to produce an adequate population of fat Winter bees, and thus improve the colony's chances of surviving into the next season. BC

Copies of a new reprint of G. M. Doolittle's Scientific Queen Rearing *are now available from Wicwas Press. Check out the website www.wicwas.com for the on-line bookstore. Or write Dr. Connor directly for a copy of this valuable book at 1620 Miller Road, Kalamazoo, MI 49001. LJConnor@aol.com*

Replace That Old Comb

Here's why!

Jennifer Berry

Some time ago I completed a project on the effects of old comb versus new comb on honey bee colony growth, brood survivorship and adult mortality. This paper was originally published in the *Journal of Apicultural Research* 40(1): 3-8 (2001). (To read it in its entirety go to our website **www.ent.uga.edu/bees** and click on the research archives icon.) Here is a shortened version of that research.

This topic is still timely because of the more recent findings regarding chemical residues in wax and pollen in colony comb, and, because this is the time of the year it is easiest to remove that old, disease-ridden, chemical laden junk, and replace it.

Honey bees use structures like trees and man-made hives for shelter, but it is the beeswax that provides the basic building material for the interior nest substrate. Adult worker bees secrete oval shaped wax scales from glands located on their abdomen and then modify these scales with mandibular gland secretions in order to construct the comb. Wax secretion usually occurs during peak foraging times because large quantities of honey or nectar must be consumed by the worker bees in order to produce these wax scales (Gary, 1992). The comb, made up of an array of hexagonal cells placed back to back, is the site where immatures are reared and food is stored. The comb also plays an important role in communication by providing the substrate on which dances are performed and chemical messages transferred (Winston, 1987).

When comb is first constructed it is pliable and nearly white in color but changes over time due to constant use and incoming resources. Comb used for food storage takes on a yellowish hue due to the accumulation of pollen (Free & Williams, 1974). As comb used for brood rearing ages, it becomes darker, almost black, and more brittle (Hepburn, 1998) because of accumulated fecal material (Jay, 1963), propolis and pollen (Free & Williams, 1974). The darker color may also be a result of numerous contaminants that are collected and absorbed in the wax over time.

Wax comb consists primarily of hydrocarbons and ester components with a small percentage of free acids and alcohols. These minor components are believed to give wax its plasticity (Tulloch, 1980) and ability to absorb many types of materials. Some of these materials include fungal and bacterial spores, pesticides and heavy metals which may be detrimental to a colony's welfare. Here is a list of some biotic and abiotic contaminants found in wax.

Biotic: American and European foulbrood spores, Chalkbrood spores, Nosema

Abiotic: Amitraz, Arsenic, Azoxystrobin, Boscalid, Bromopropylate, Captan, Carbaryl (Sevin), Chlordimeform, Chlordane, 2-chloroethanol, Chlorpyrifos, Chlorothalonil, Chromated copper arsenate, Copper naphthenate, Coumaphos (CheckMite+®), Diazinon, 4,4'-dibromobenzophenone, 1,4-dichlorobenzene, Dicofol, Endosulfan, Esfenvalerate, Ethion, Ethylene dibromide, Fenthion, Fluvalinate (Apistan™), Malathion, Menthol, Methomyl, Organochlorine (multi-residue), Organophosphorus (multi-residue), Methyl parathion (Penncap-M), P-dichlorobenzene, Pentachlorophenol, Phenkapton, Phenol, Phenothiazine, Polychlorinated biphenyls, 2,4,5-T,Tributyltin oxide (TBTO), Vinclozolin

As materials accumulate in wax comb the diameter of cells becomes smaller (Winston, 1987). Each time a larva pupates, it spins a silken cocoon, parts of which remain in the cell after the adult emerges (Jay, 1963). Over time, the mass ratio of silk to wax increases, and thereby wax comb goes from a single-phase material to a fiber-reinforced two-phase composite product (Hepburn & Kurstjens, 1988). The bees, along with the cell size in old comb, are smaller.

Pheromones also are absorbed and transferred in the wax comb and, depending on their volatility, may remain for a considerable time (Naumann et al. 1991). One pheromone group relevant in the current context is brood pheromones. These contact pheromones are emitted by brood and communicate to nurse bees the immatures' presence, age and nutritional needs (Free, 1987). Nurse bees, responsible for brood care, detect these pheromones more readily in older comb, and feed the brood more often. Therefore, larvae reared in comb with a previous history of brood rearing may receive somewhat better care with resultant higher survivorship (Free & Winder, 1983).

Prior to the presence of *Varroa destructor* (Anderson and Trueman) in the United States, wild, temperate honey bee colonies were known to survive for about six years (Seeley, 1978). Once the colony died, wax moths, mice and other nest scavengers usually removed the wax comb, leaving an empty cavity for the next colony to inhabit (Gilliam & Taber,

New comb cells are lighter in color and larger. (Jaycox photo)

1991). Modern beekeeping practices disrupt this natural recycling process by housing bees on semi-artificial comb that may be years or even decades old. Advances in beekeeping equipment, like the Langstroth hive and wire-reinforced foundation, have added years to the longevity of wax comb.

In the United Kingdom, beekeepers are encouraged to replace old combs as part of good husbandry practices (Brown, 1999). In the United States, Bonney (1990) recommends replacing two of the oldest combs each year to ensure that the hive body will not contain comb over five years old. Nowadays this may even be too old. Even so, many beekeepers believe that it is not economically feasible to regularly remove and replace old comb. Not only is the new foundation expensive and time consuming to replace, there is an energetic cost for the bees who must draw out the foundation into a functional comb using metabolically-derived beeswax. The typical nest contains around 100,000 cells (Seeley & Morse, 1976) which takes about 1,200 g of wax to construct. The amount of sugar required to secrete the wax is energetically equivalent to 7.5kg (16.5 lbs.) of honey, about one-third of the honey stores consumed by a colony over winter (Seeley, 1985). Therefore, beekeepers believe they lose money, time and honey yields by replacing old comb.

However, it is possible that the economic savings of using long-lasting comb may be offset by deleterious effects of old comb acting as a biological sink for toxins and pathogens or as a physical constraint on larval development. This question led me to investigate the effects of comb age on honey bee colony growth, brood survivorship and adult mortality.

In a three-year field study, we compared the quantity of brood produced, brood survivorship, average body weight of adult bees and population of adult bees in colonies housed on brood combs comprised of either old beeswax or newly drawn, first-year beeswax.

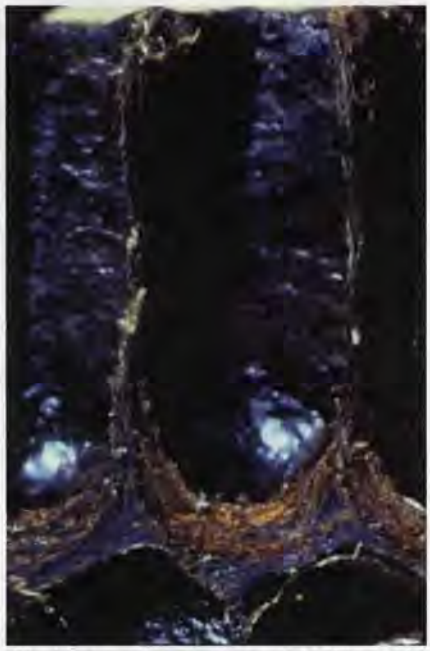
Outcome for this particular study resulted with colonies maintained on new comb having a significantly higher area of total brood, area of sealed brood and higher young bee weight. Comb age produced no statistically significant treatment effects in ending adult bee population or change in adult bee population; however, the trend was for higher ending bee populations in new comb and, correspondingly, a greater loss of bees in old comb. Brood survivorship was either unaffected by treatment or higher in the old comb class.

The increased brood production measured in the new comb may have been the result of several different events taking place inside the colony. It may have been due to the survivorship of the brood, quality of brood care delivered by nurse bees, or the queen's egg production. Let's review the latter. Queens are able to distinguish between worker cells and drone cells by appraising the width of the cell with their forelegs (Koeniger, 1970). The cell diameter in old comb become smaller over time (Abdellatif, 1965); thus, an average reduction of cell diameter in old comb may have a negative effect on a queen's egg-laying productivity.

Older comb is also known to harbor numerous pesticide residues and diseases which may be detrimental to the brood's health. They're spread from colony to colony by tainted wax and materials brought into the hive. The queen may be sensitive to these contaminants and not lay eggs in particular cells. Also, the old comb may harbor brood pheromones (Free & Winder, 1983) that act as egglaying inhibitors to the queen because she perceives the cell to be already occupied.

Another phenomenon relevant to this study is the observation that bees prefer to store honey and pollen in cells that have been previously used for brood rearing. In the wild, as a colony grows and continues to add new comb, brood rearing gradually shifts into this new comb and the honey is stored in the old brood comb (Free & Williams, 1974). In unmanaged colonies this behavior may serve to avoid the negative effects of old comb on brood production. However, modern beekeeping practices inhibit this natural process by forcing bees to reuse old brood comb for brood rearing and to store honey in comb usually only used for honey storage.

Higher weight of emerging young bees in new comb is best explained by differences between the average diameter of cells in the two comb age classes. As mentioned before, while brood comb ages, the diameter of the cells decreases due to accumulated cocoons and fecal material that are deposited by the larval and pupal instars developing within the cell (Jay, 1963). The body weight of a worker bee is mediated by genetics (Ruttner & Mackensen,1952) as well as by environmental effects such as the amount of food fed to larvae (Daly & Morse, 1991; Fyg, 1959) and the size of the natal cell (Jay, 1963; Abdellatif, 1965). Buchner (1955) determined that the mean weight of newly emerged bees from old comb in which



Would you raise your young in this environment? (Jaycox photo)

68 generations had emerged was about 19% smaller (96.1 mg) than the controls (118.3 mg). Morphological characteristics of European worker bees reared in smaller Africanized comb were smaller than those of European bees reared in the larger European comb (Rinderer et al., 1986). Daly & Morse (1991) found that larger worker bees could be reared from the large cells of drone comb. Glushkov (1958) discovered that bees reared in enlarged cells were heavier and larger resulting in more honey being produced by the colony and larger cells constructed. Worker larvae reared in enlarged cells received more food (21% more protein and 39.7% more glucose) than worker larvae reared in normal worker cells (Volosevich & Kulzhinskaya, 1953). The bulk of the evidence suggests that the weight of newly emerged bees is proportional to the volume of the cells in which they are reared (Nowakowski, 1969) and the amount of food fed to them by the nurse bees.

In this study bees reared in new comb weighed about 8.3% more than those reared in old comb, which is similar to Abdellitif's (1965) finding that worker bees reared in old comb in which 70 generations had been reared have an 8% reduction in body weight.

Lower bee populations in the old comb may result from an accumulation of foreign contaminants sequestered in the older comb causing higher mortality. Also, contaminants in the wax comb may mask hive signature and nestmate recognition cues, making it difficult for foraging bees to return to their own colony. Some nestmate recognition cues are obtained from the wax comb (Breed & Stiller, 1992), and Breed et al. (1988a) discovered that colony odor acquired from wax comb can mask the genetic differences between bees. Colony odor is transferred to the adult bees by exposure to the comb substrate and can alter the recognition phenotype in as little as five minutes (Breed et al., 1988b).

Brood communicate to the worker bees their presence in the cell, caste, age and hunger levels through mechanical and chemical signals (Free, 1987). The chemical signals are the brood pheromones that may be the causative agent responsible for the increased survivorship found in old comb in this study. Wax comb acts as a reservoir for absorbing and transmitting pheromones which may explain why honey bee swarms are more attracted to older comb (Naumann et al., 1991). The presence of brood pheromones stimulates pollen foraging (Pankiw et al., 1998), enhances brood recognition (Le Conteet al., 1994) and stimulates nurse bees to feed larvae (Le Conte et al., 1995), all of which are important factors in brood survivorship. Free & Winder (1983) determined that brood survival was greater in cells which had been used previously for brood rearing than in comb cells never used before. Taken together these studies demonstrate that pheromones incorporated in wax comb may improve brood survivorship. The differences in brood survivorship noted in this study may be partly explained by more optimal concentrations of brood pheromones in older comb. In this study we found the seemingly paradoxical results of higher brood production in new comb but higher brood survivorship in old comb. We believe that this is best reconciled, internally and with the literature, by positing that the egg-laying rate of queens is highest in new comb, but once placed in a cell the chances of a larva's survival are best in old comb. Nevertheless, overall brood production is highest in new comb. Apparently the benefits of maximized egg production exceed the benefits of maximized brood survival.

Over three years of field study, honey bee colonies housed on new comb had higher area of total brood, area of sealed brood, and weight of newly emerged bees. Brood survivorship was the only variable significantly higher in old comb. And finally, mortality of adult bee as affected by the age of comb in which they were reared or maintained was lower in new comb but not significantly. The bulk of the evidence suggests that new combs optimize overall honey bee colony health and reproduction. These findings suggest that beekeepers should eliminate very old brood combs from their operations. BC

Naturally drawn new comb is white, and generally quite fragile

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

References for this article will appear on Bee Culture's web page.

LANGSTROTH'S ORIGINAL OBSERVATION HIVE

Peter Sieling

L.L. Langstroth, the father of modern beekeeping, included plans in his book *A Practical Treatise on the Hive and the Honey-Bee* for an "observing-hive" based on his hanging frame and bee space principles. Building a replica of his original observation hive offers an appreciation of woodworking and beekeeping 150 years ago.

A carpenter in the mid-1800's would have cut and assembled this project with hand tools – a rip and crosscut saw for cutting to size, brace and bit, jack and finishing planes to flatten and smooth the lumber, and a rabbeting plane to cut rabbets. A modern woodworker can do the same, but a planer, table saw, and drill press speed up the process.

Langstroth's design allowed for the limitations of the available hand tools. I originally planned to make an exact replica but in the end I made some minor changes to speed the assembly.

Preparation

For both accuracy and safety, you'll need a tenon jig (see sidebar) to shape the ends of the side strips. The tenon jig holds the work piece vertically as it moves over the blade. It's easy to make and you will find many more uses for it in the wood shop, including making bottom boards, inner covers, telescoping covers, and top bars for frames.

You can use almost any wood species that has been properly kiln dried. I got a little carried away and made several observing-hives, using cherry, butternut, walnut, and red oak. Yellow poplar is one of the best choices: it's inexpensive, easy to work, stable, and more durable than pine.

Instructions

1. Plane the parts to thickness, straighten one edge and rip to width. Langstroth used 7/8" thick lumber for several components. Modern lumber suppliers usually plane lumber to ¾", but most 4/4 lumber will clean up at 7/8". 7/8" is important for this project because the 5/8" entrance hole is drilled into the end grain leaving little room for error.

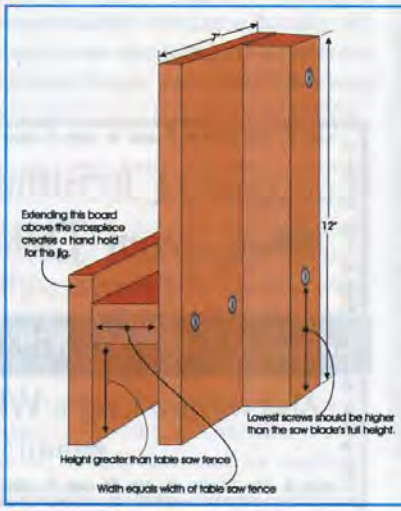
2. Cut parts A, B, C, and E to the exact length. Trim the rest later, when you assemble the hive.

3. On the base board, bore a 5/8" diameter hole for the entrance. Langstroth used a brace and bit, boring a 3½" long hole, then boring at a sharp angle from above to meet the first hole. It's easier to drill a 4¼" deep hole into the end. Use a sharp spade bit and set up your drill press carefully to avoid breaking through the base. Later, with the hive bottom attached to the base, drill straight down with a Forstner bit until the bit intersects the 5/8" hole in the base, which leaves an almost flat bottom.

4. Rabbet the hive base. Use a dado blade on the table saw or do it in two cuts with a saw blade. Langstroth makes the rabbet 7/16" deep and 3/8" wide. That makes the inside width of the hive 1½". Center the hive bottom on the base board end to end and side to side. Fasten from underneath with 1-5/8" drywall screws. Pre-drill and countersink first. Don't place them in the entrance and vent hole areas.

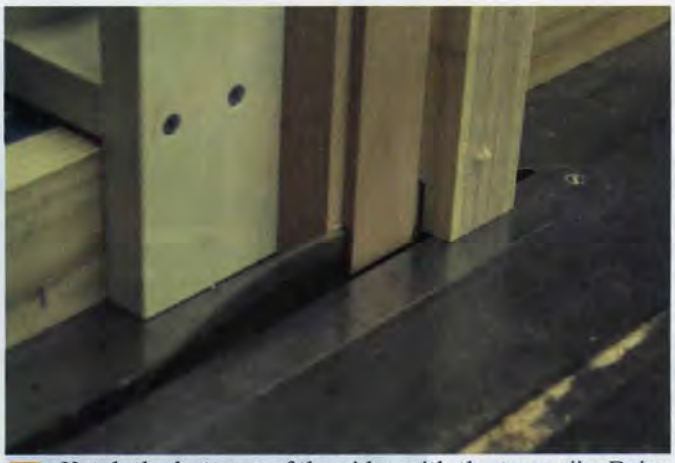
5. Rabbet the sides ¼" deep and 3/8" wide, making the center raised portion 1½" wide, the same as the base.

Tenon Jig



There are many tenon jig designs. This is one of the simplest. Make your jig to fit your saw fence. Clamp it together and make sure it is perfectly square before attaching the parts. Use a clamp to hold the work piece to the jig.

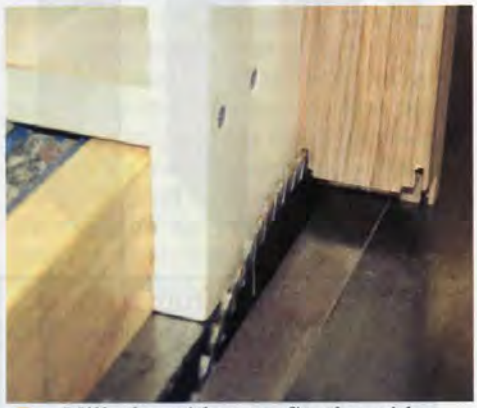
6. Drill the vent holes on the sides and bottom. Langstroth makes them oblong by drilling two 7/8" holes, 1-1/8" apart center to center, then chiseling out the waste wood. It's hard to do that neatly. A Forstner bit on a drill press allows you to drill the two holes and clear out the center section. Hold the piece firmly or clamp it. Drill the end holes and the center section. Work your way down the hole about 1/8" at a time, and clean the sides with the bit. Finish with a sharp chisel, file, or sandpaper.



7. Notch the bottoms of the sides with the tenon jig. Raise the table saw blade to 7/8". Place the hive bottom against the blade. (You can unscrew it from the base board for now.) Adjust the fence/tenon jig to remove a ¼" slice.

Lower the saw blade to ¼". Using the miter gauge crosscut the waste wood. The sides should fit tightly against the hive bottom.

8. Mill the tops of the sides for the frame rests. This time make the cut 5/8" deep, and 7/8" wide.

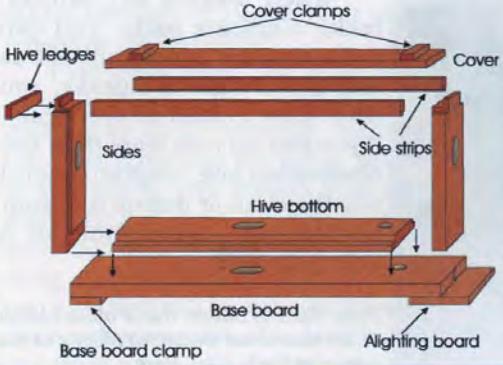


9. Mill the sides to fit the side strips. Langstroth left this step out of his plans. The side strips are 1" x ¼" so notches can be cut to fit. The problem, at least for obsessive-compulsive woodworkers, is that the side strips will have a rabbet to fit the glass panes. That rabbet shows on the ends of the hive. It's a little more time consuming, but you can cut this notch in two steps, leaving a ¼" x 1/8" corner which will fit into the side strip rabbet.

10. Rabbet the side strips to fit the corner made in step 9. It should be 1/4" high and 1/8" deep.

11. Before assembling the hive, smooth all the parts and round the sharp edges with sandpaper.

Exploded view

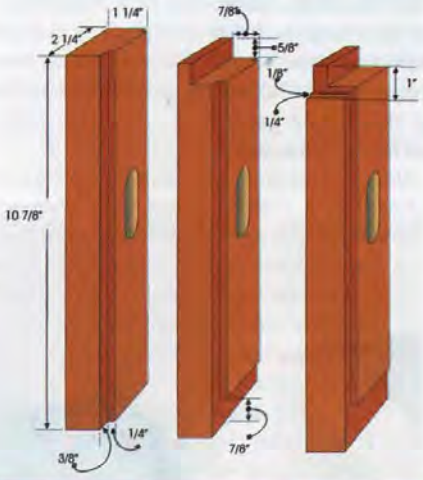


Part	Description	Quantity	Size
A	Base Board	1	24-5/8" x 4¼" x 7/8"
B	Hive Bottom	1	2¼" x 18-5/8" x 7/8"
C	Sides	2	1¼" x 2¼" x 10-7/8"
D	Side Strips	2	3/8" x 1" x 20-5/8"
E	Cover	1	21-5/8" x 4¼" x ½"
F	Glass panes	2	9½" x 18½"
G	Alighting Board	1	4" x 4¼" x ½"
H	Base Board Clamp	1	4¼" x 2" x ½"
I	Cover Clamps	2	4¼" x 7/8" x ½"
J	Hive Ledges	2	4¼" x 7/8" x ½"

12. Fasten the sides to the hive bottom. Fasten the hive bottom to the base board. Langstroth leaves this step to our discretion. I used pocket screws to attach the sides to the bottom, and drywall screws to fasten the bottom to the base. A pneumatic 18 gauge brad nailer also works for both hardwoods and softwoods.

13. Trim the side strips to the exact length and fasten them with ¾" brads and glue.

Sides



Making Langstroth's Frame

Langstroth's observing-hive will take a modern frame, but for fun you may want to make an original frame. Use a soft wood such as pine, basswood or poplar.

1. Make 2 end bars, 8 1/2" x 7/8" x 1/2".

2. Make 1 top bar, 19 1/8" x 1" x 5/16".

3. Make 1 bottom bar, 17 3/8" x 7/8" x 1/4".

Pre-drill the bottom bar before nailing to prevent splitting. Using an 18 gauge brad nailer with 1 ½ – 2" brads doesn't require drilling.

Fastening a starter strip of foundation isn't easy. I used a heat gun and melted wax on the underside of the top bar, then pressed the foundation into position. Put the frame in the brood nest of an active colony until they draw it mostly out and the queen adds eggs. Put it into the new hive with the adhering nurse bees.

The easiest way to stock the hive with additional bees is to remove a small hive from its spot and replace it with the observation hive for an hour or two.

14. Fasten the alighting board and base board clamp to the base. Fasten the cover clamps to cover and hive ledges to the ends of the hive.

15. Apply a finish to the exterior parts of the hive. Use a natural bee-friendly finish such as the beeswax finish from the July 2008 issue of *Bee Culture*, page 35. Let the bees put their own finish on the inside.

16. Trim window screen just oversize to fit the ventilation holes and glue in place.

17. Slip panes of glass into place and insert glazier's points. Alternatively, glue or tack thin strips of wood or molding to hold the glass.

18. Langstroth doesn't provide for supplemental feeding, but does suggest drilling a hole in the cover. You place a jar over the hole and the bees will store surplus honey in it.

You now own a replica of the first practical observing-hive, designed by Reverend L.L. Langstroth. Langstroth allowed members of the clergy to use his hive designs for free, so if you are a clergyperson you can build this hive without fear of a lawsuit. Now that the patent has run out, the rest of us can make his hive, too.

Kits Available

Garreson Lumber has a limited number of kits available.

Pre-milled kit comes ready to sand, assemble and finish. Price is $80 + shipping. Available in cherry, butternut, walnut, and oak.

You-build kit is milled to thickness. You mill the ends, cut rabbets, drill vent holes, assemble and finish. Available in poplar. Price $30 + shipping.

To order, call 607-566-8558 with VISA, MasterCard, and Discover.

When making any project, make duplicate parts. You can make practice cuts on the extras and if you make a mistake, you won't have to start all over again. If you end up with more than one observation hive, congratulations! Sell the extra or donate it to your beekeeping organization for a door prize. BC

Peter Sieling builds these observation hives and other beautiful pieces at his home in Bath, New York.

And Now Introducing . . .

What are your responsibilities as a speaker?

Ann Harman

You have been invited to be the principal speaker at a – local, state, regional – beekeepers meeting. If your host association Program Chair read the article in the October issue of *Bee Culture* all the important details are firm in your mind. But what if the Program Chair doesn't subscribe to *Bee Culture*? Oh dear.

That is when you need to do some homework. If you received little information you need to contact that Program Chair with a myriad of questions. Let's review some of them.

At the meeting. How many people usually attend? What is the general level of expertise – many beginners? How many minutes for the presentation? Question time? More than one talk? Workshop? A/V facilities? Will you be asked at the last minute to sit on a panel? (That seems to be quite common, especially the last minute bit.) Think of what you need to know about venue and audience.

Before and after the meeting. Did the Program Chair give you instructions about flying or driving? Do you need to save all receipts for motel and meals? Was your compensation discussed? If flying, will someone pick you up, take you back to airport? Think about the logistics of simply getting to and from the meeting and where you will be staying, if overnight.

So now that you have the necessary details, we can look at your presentation planning.

I certainly hope you have provided the Program Chair with suitable material for an introduction. Perhaps you have spoken to the group before or you are so well known that you don't see any need for introduction material. Well, possibly the majority of the audience doesn't need information but there will be some, especially the new beekeepers, who don't know you from a bar of soap. Provide the Program Chair, in advance of the meeting, with a few short sentences about your work with bees. If you wish you can embellish the introduction with additional information in the opening comments of your presentation. A humorous anecdote can be a welcome addition to the opening or ending of your talk.

The person running the meeting, whether Program Chair or President, should have made it clear to the audience and to you beforehand about questions from the audience. You can repeat the policy about questions, especially ones during the talk, at the beginning of your presentation. All beekeeping associations, large or small, have the one overly enthusiastic beekeeper whose question must be answered immediately even if it will be covered about five minutes later in your talk..

You do know what your topic is – or topics are. Although you might think selecting one of your previous presentations will make it unnecessary to review it, better think again. If this is a totally new presentation you better get busy on it now! All too often speakers are seen slinking off to a quiet corner to finish up their Power Point. OK – you're busy. You *can* find time beforehand.

Why review that tried-and-true talk you have given umpteen times before? Well, for one thing, how old is it? Has some new research added to or changed parts of it, no matter how small a part? You can be certain that there are those in the audience that will notice a bit of stale information. No, they probably will not say anything but they are thinking that you are out-of-date or don't care. Either way not a good image.

During a review of the Power Point slides you may well rediscover that one slide that you have been meaning to fix. Now is the time to finally make the changes you keep forgetting. Without that review, when the suspect slide appeared on the screen, you may have paused and thought "must fix that slide" and may even made excuses for it. Now the audience knows you didn't review the slides.

Here is something else to think about. Are all those slides your creation or did you borrow some from a colleague and simply stick them in without finding out exactly what they are about? Open those slides up and study them. Otherwise you will probably stop and try to figure them out during your presentation. What *do* those lines represent? What *are* the units on the y-axis? While your brain is muddling along you've lost the momentum and are losing your audience. Some of those slides may just have become meaningless. Yes, the red line goes up and the green line goes down on the graph. The audience can see that but what does it mean? Saying it is from a colleague is fine but you still have to tell your audience what the information is.

If you are actually giving someone else's Power Point presentation you need to know as much about it as if you made it yourself. If you are a last-minute substitute, go off in a corner and see if you can learn enough about it to make a smooth presentation. If you have had several days or weeks, practice it. Present it to your dog even if he sleeps through it. You can evade questions by simply stating that the questioner should contact the original author.

Another reason for a review is timing. Will your presentation run smoothly, unhurried in the time allotted. (See, you do need to know the amount of time the Program Chair has built into the program.) I have

sat through presentations where the speaker has dashed through the last five slides or has skipped six or seven in the middle (flash, flash, flash...) just to make the talk fit the scheduled time slot. If in doubt, eliminate slides. You can always dawdle along in some slides and add some extra information. That makes a better presentation than the dashes and skips.

Plan ahead. What will you do if a speaker in the time slot before your presentation keeps talking away for five or 10 (or more) minutes past the allotted time and the Program Chair or President does nothing. This happens and it is unfortunate. You and the audience are the losers. In your review of your Power Point do you see any places where you could speed up or omit some information without damaging the message of your presentation? If you are immediately following the long-winded speaker it is difficult to omit slides before you take your place at the podium. Therefore you need that backup plan. So there is another reason for reviewing your slides.

It's time for the morning break. As you head for the coffeepot and the honey cookies you are waylaid by a number of eager beekeepers, each with at least six questions. Well, it is nice to be appreciated but you really would like a cup of coffee. Nobody in the association is coming to your rescue. Don't just stand there. March forward and suggest that everyone would like a cup of coffee.

At many meetings these days a Workshop is actually just another presentation to a small part of the total attendance. Concurrent workshops can have anywhere from five or six beekeepers up to 30 or 40. Beekeepers really like to ask questions in a workshop setting or offer their versions of your topic. A good speaker will plan for this more relaxed setting and encourage questions and comments. Allow plenty of time and encourage participation by the attendees. You will actually learn from them. Perhaps that new information can be incorporated into one of your future presentations.

Power Point presentations have opened up a whole new world of creativity, sometimes successful, sometimes disastrous. After sitting through a large number of Power Points over some years I find that those creating one really have not learned much from either successful or disastrous ones they have seen. Granted, it is difficult to imagine your small computer screen transferred to a large screen in the front of an auditorium. Your slides that look so beautiful on your computer get gobbled up by the auditorium screens.

My prize for the most illegible was an entire presentation done with pale yellow print on a white background. I was in about the fifth row and to this day do not know what those slides contained. In second place was one with purple letters on a dark red background. I still wonder what messages that conveyed.

I recently acquired two rather inexpensive books on Power Point presentations. These two books were highly recommended in their book reviews in *Chemical & Engineering News*. I find the books complement each other in their approach and information. Both use a number of illustrations and both touch on how people assimilate information. I found the sections on the effects of colors particularly fascinating.

Here is the information on both books:

Clear and to the Point by Stephen M. Kosslyn, 2007. Oxford University Press, New York, NY. 222 pp, $16.95

Beyond Bullet Points by Cliff Atkinson, 2008. Microsoft Press, Redmond, WA. 349 pp, $29.99

These books can be found in the large bookstores or at Amazon. Before you embark on a new Power Point presentation I suggest you read through these two books. Then you may find yourself going back to some of your old presentations and changing a few things. Your audiences will appreciate that.

If you are just starting to be a speaker or have made hundreds of presentations I wish you well and may you receive the applause and appreciation you deserve. BC

Ann Harman gives many talks and also plans meetings in and around her

GLEANINGS

DECEMBER, 2008 • ALL THE NEWS THAT FITS

HIVASTAN RECEIVES EPA SECTION 18 APPROVED

Central Life Sciences, whose founders invented insect growth regulator technology more than 30 years ago, today announced that the Environmental Protection Agency (EPA) has renewed Section 18 clearance for Hivastan™. Hivastan™, a contact miticide with a thick, pliable formulation, is a powerful weapon to help beekeepers protect their bees against *Varroa* mites. It is currently available in seven states: Colorado, Idaho, Illinois, Mississippi, Missouri, Oregon and Washington.

"*Varroa* mites developed resistance to several of the previously approved control products," explained Mark Taylor, Business Manager for Central Life Sciences. "The active ingredient in Hivastan™ is new to the beekeeping industry, which makes it a valuable tool in the battle against resistant *Varroa* mites."

Hivastan™ contains fenpyroximate, a highly effective miticide that has been formulated into an easy-to-use delivery system. During testing with the U.S. Department of Agriculture, Hivastan™ was placed in hives for six weeks, providing effective *Varroa* control during and after treatment.

To provide maximum control, Central Life Sciences recommends treating all infested bee colonies with Hivastan™ once a year – prior to the first honey flow in the spring or in the fall after the last honey flow.

"*Varroa* mite control requires an integrated pest management approach," said Taylor. "Given the resistance issues with currently registered products it is extremely important to follow a rotational strategy to slow down or prevent the development of resistance. Hivastan™ fits well into a rotational strategy for mite control."

Hivastan™ is available in 25-pound buckets containing enough product to treat 50 hives. Each treatment consists of eight oz (225 grams) of product per hive. This is enough to treat a typical colony for six weeks, and any excess product remaining after this period should be removed from the hive.

For more information on Hivistan™, visit www.CentralApiary.com or call 1-800-248-7763.

Apistan is a registered trademark and Hivastan is a trademark of Wellmark International.

NEW DIAGNOSTIC TOOL

University of Montana researchers and their UM-affiliated company, Bee Alert Technology Inc., have employed a powerful new tool created by a U.S. Army lab to discover a honeybee virus invading North America.

The new virus does not cause Colony Collapse Disorder – a mysterious malady depopulating beehives around the globe – but the method used to find the virus may help scientists unravel the CCD mystery in the future.

The invading bee virus is called ***Varroa destructor* virus-1**. First definitively identified in Europe in 2006, VDV-1 is carried by both honeybees and the tiny *Varroa* mites that afflict them.

The invading virus was discovered in two honeybee samples collected by UM scientists in the southeastern United States. Jerry Bromenshenk, a UM biology research professor, said he and his colleagues gathered the incriminating samples as part of a larger sampling effort in beeyards affected by CCD across the nation.

Bee Alert had the samples analyzed at the Edgewood Chemical Biological Center, a U.S. Army-backed laboratory based at the Aberdeen Proving Grounds in Maryland. Edgewood has developed a liquid-chromatograph proteomics mass-spectrometry device, which can identify all the peptides (short lengths of proteins) in a given sample.

"Every virus, every fungus, every bacteria has its own group of peptides that are unique to it," Bromenshenk said. "We provided bee samples from a wide area and a number of colonies, and they very quickly produced a fingerprint of every pathogen that the bees are carrying."

The Edgewood analysis didn't provide a smoking gun for what causes CCD, but it did reveal that a European bee virus had "jumped the pond," Bromenshenk said.

"What's significant about this is typically we don't know about new pathogens arriving on U.S. soil until there is some sort of outbreak and significant loss of colonies going around," said Colin Henderson, a Bee Alert employee and UM College of Technology faculty member.

He said an exciting aspect of Edgewood's new technology is that is reveals *everything* contained in a sample. Using typical genetics-based methods like the polymerase chain reaction laboratory method – the same type used in the O.J. Simpson case – scientists have to specifically target genes and match those with the sequences they are searching for. This is extremely expensive and time consuming. The Edgewood method identifies all the peptides, and these then are cross-referenced with an index of millions of peptides stored at the National Center for Biotechnology Information and other databases.

The UM samples provided as many as 15,000 lines of information, Henderson said. "And once the data is stored, unknown sequences may be discovered, and you can re-screen the file without rerunning the sample. It makes this a very powerful tool."

"This became a perfect marriage of a technology looking for a real-world application," Bromenshenk said. "Edgewood had a tool that provided a solution to problems, and we had a problem but no tool."

So what does it mean for bees that VDV-1 is loose in the New World? Well, nobody really knows. Bromenshenk said the virus reproduces itself in both honey bees and *Varroa* mites. It's also closely related to a family of bee viruses that cause deformed wings, aggressive behavior, and death of brood.

"But we haven't seen it express itself among honey bees yet," Bromenshenk said.

Henderson said the Edgewood process gave them a rare early detection of a new virus. "It will be an excellent model for epidemiology," he said. "Bees move with people, and you get the same quasi-social interactions. We will be able to study how rapidly the pathogen gets from one

Continued on Next Page

SIERRA CLUB JOINS PESTICIDE FRAY

The Sierra Club accuses the U.S. Department of Agriculture of caving in to lobbyists over massive bee deaths and compares this with Germany taking a major step to keep their bees pollinating crops.

In light of the mounting evidence that new seed chemical coatings are deadly to bees and action by Germany calling for their immediate suspension, the Sierra Club reaffirmed its call for a U.S. moratorium on specific chemical treatments to protect our bees and crops until more study can be done.

It cites Germany's federal agricultural research institute as saying, "It can unequivocally be concluded that poisoning of the bees is due to the rub-off of the pesticide ingredient clothianidin from corn seeds."

At issue are the neonicotinoids, including clothianidin, being used in a new way – as seed coatings.

For years, farmers have been spraying neonicotinoids onto their crops to stop insect infestation. Now Bayer, Syngenta and Monsanto have acquired patents to coat their proprietary corn seeds with these neonicotinoids.

"Part of the equation in the U.S. is genetically engineered corn, as more and more corn seeds are being gene spliced with a completely different species -- a bacterium," says Walter Haefeker of the German Beekeepers Association Board of Directors. "Bayer and Monsanto recently entered into agreements to manufacture neonicotinic-coated genetically engineered corn. It's likely that this will worsen the bee die-off problem."

A Sierra Club statement says American Beekeeping Federation former president David Hackenburg has been urging the U.S. Department of Agriculture to do more study.

"Look at what's time based," it quotes Hackenburg as saying. "The massive bee decimation started when regulatory agencies rubber stamped the use of neonicotinoid spraying and coating."

Sierra Club genetic engineering committee chairman Laurel Hopwood says the club joins the concern of beekeepers.

"It's unfortunate that regulatory agencies are using double speak," he says. "They claim to protect our food supply – yet they aren't doing the proper studies. The loss of honeybees will leave a huge void in the kitchens of the American people and an estimated loss of $14 billion dollars to farmers. We call for a precautionary moratorium on these powerful crop treatments to protect our bees and our food."

—Alan Harman

HONEY BEE MEMORY

Researchers at Australia's University of New England (UNE) are opening a new window into the remarkable world of memory in the honey bee.

Experiments conducted by UNE's Emeritus Prof. Lesley Rogers and Prof. Giorgio Vallortigara from the University of Trento, Italy, have revealed an impressive complexity in the way bees store and retrieve their memories of odors.

Recruiting subjects from the grevillea bush flowering at Rogers's laboratory door, the scientists trained them to associate a lemon scent with a reward of sugar. Bees "smell" with their two antennae and "drink" with their proboscis, and they quickly learn to extend their proboscis – the so-called "proboscis extension reflex" – in response to an odor they associate with a sugar reward – even in the absence of that reward.

Rogers and Vallortigara are international authorities on the specialized use of the left and right sides of the brain in many aspects of cognition and behavior. Rogers is a pioneer of research that, over the past 30 years, has shown that such specialization – once thought to be unique to humans – is widespread among vertebrate species.

The research at the university in New South Wales now is revealing comparable "lateralization" in the much smaller brains of invertebrates, including the finding that bees learn to associate odors with rewards more efficiently when using the right antenna than when using the left. The UNE experiments were designed to track this lateralized response along the surprisingly intricate corridors of the bee's memory.

Using the evidence of the "proboscis extension reflex", the researchers found that, initially, bees remembered the reward associated with the lemon scent when the scent was presented to their right antenna but not when it was presented to their left antenna.

After six hours, however, this memory was recalled only when using the left antenna. This could be shown simply by presenting a droplet with the odor on the left or right side of the bee.

"While we don't yet know whether it's the memory site itself or the recall pathway that 'shifts' during this period," Rogers says, "this result corresponds to findings in vertebrates showing that long-term and short-term memories are stored in different parts of the brain.

"This shift from one antenna to the other may allow the bee to learn new scents of nectar-giving flowers, using the right antenna, without interference from older memories. Such lateralization seems to be a necessary – or advantageous – feature of any brain with paired sensory organs, regardless of its size."

Vallortigara is director of the Center for Mind/Brain Sciences at the University of Trento, and also an adjunct professor at UNE. This research began when he visited UNE's Center for Neuroscience and Animal Behavior on a Faculty Distinguished Visitor Award in 2007.

The paper reporting on the research is being published in PLoS ONE, the journal of the Public Library of Science.

OBITUARY

Jack Warren Meyer, 1923-2008. He was born on March 21, 1923, in Colton, California, to Alfred Henry and Alice Minnie (Crowther) Meyer. Jack was the second son of Henry and Alice. Irel, his older brother, and Jack worked together almost all of his life.

Jack's father, Henry, immigrated to the United States from Switzerland at the age of 12 years. Henry and his father worked to bring their family from Switzerland to the United States where they settled in Cache Valley, Utah. There, N.E.Miller introduced Henry and his brother, Gus, to beekeeping. Both Henry and Gus' families are still involved in the bee business today.

Jack was preceded in death by his father, mother, brother, two granddaughters, and a great-grandson.

Survivors include his wife Dorris, and his children Jack Meyer, Janet Tobler, Susan Barber, Reynold Meyer, and two step-children Lynn McLing, and Myrna Odell. In addition, he is survived by 32 grandchildren, 81 great-grandchildren, and many nieces and nephews.

Jack was involved in the beekeeping business all of his life and had the privilege of working beside his father, his brother, his son, and his grandson. All of his children and many of his grandchildren have fond memories of working side by side with their father/grandfather and their Uncle Irel. Each have stories to tell of lessons learned during those years growing up.

Jack and Irel were pioneers in migratory beekeeping and invented numerous items for use in the beekeeping industry. They are best known for developing the EZ loader, a motorized handcart for moving bees, honey supers, and drums of honey. In addition, they also bottled honey and melted wax.

While raising bees, producing honey, and rendering wax, Jack lived and worked in many states, including California, Utah, Idaho, Montana, Wyoming, Minnesota, Florida, Mississippi, Louisiana, Texas, South Dakota, and North Dakota.

Jack died on July 20, 2008, at the age of 85 years in Madison, South Dakota.

DIAGNOSTIC ... Cont. From Pg. 69

place to another, spreads and moves around. It's amazing that we are getting to it while it's still localized."

UM researchers got state Board of Regents approval in 2003 to form Bee Alert Technology Inc., a company designed to transfer technology from the University to real-world agricultural and military applications. The company employees workers from both the central UM campus and the College of Technology.

"I think this shows the strength of the merger between our two- and four-year systems," Henderson said. "There is a lot of synergy within the University system."

2008 Year End Index

AUTHORS

TITLES

Happy Holidays

To All Of Our Readers, Advertisers, & Friends

We're looking forward to another wonderful year with you

Kim

Dawn

Kathy

Display Advertisers

Holiday Bees

Nancy Tozier Sieling

Make beekeeping the theme of your holiday decorating this year. These easy to craft decorations will add a unique touch to your holiday décor. Make extra Pollen Sachets and Honey Stick Stockings to use as small gifts or party favors. Involve even the smallest family members in both beekeeping and decorating this year by having them color a hive full of Cut and Color Bees. Don't just deck the halls with garlands of hand colored bees, use them as gift tags as well. Make your tree a bee tree this year!

Finished ornament bee.

Ornament Bees

You will need:
Small round gold unbreakable Christmas balls
Sculpey modeling clay in black and white
2½" Wired sheer Holiday ribbon
Aleene's Fast Grab craft glue
Permanent marker
Ornament hooks
Baking pan
Waxed paper

Open the package of black Sculpey. Pull off a chunk and knead it with your fingers until it is soft and pliable. For each bee you plan to make, roll a ball ½" across. Pinch a point on one end, then press the opposite end against one of the balls as though you were sticking it on to shape it to the ball. Once you have made all your heads, wash your hands thoroughly. It is very easy to transfer black from your hands to the white Sculpey. Knead a piece of white sculpey until it is soft and pliable. Roll two tiny balls for the eyes of each bee, the press them onto the black heads where you want them to be. Place all the heads in a wax paper lined baking pan. Preheat the oven to 130°F, or as low as you oven goes if it cannot be set that low. Bake for 15-20 minutes. Remove from oven and cool. The heads should be hard.

Stripe the gold ornaments while the heads are cooking, from top to bottom, all the way around, using a permanent marker. Once the heads have cooled, make a dot in the center of the white eye with the marker. Place a small quantity of craft glue on the back of the head, and press it onto the body, holding it in place for a few seconds to insure bonding. Set it aside until the glue has thoroughly dried. Cut a 6" long piece of the ribbon and cut it in half again down the center to create two pieces 6" X 1¼" with wire on one edge. Crease each piece at 3" to mark the center and twist it there. The wire edge will hold it in place. Tie the piece of ribbon into a loose loop. Slip it over the top of the ornament and tie it tightly. The wire edge should be the upper edge. Pull the ends of the "wings" up, and trim them at an angle to an appropri-

Bee heads ready to be baked.

Making skep ornament.

ate length. Place an ornament hook through the hole on the top.

Skep Ornaments

You will need:
One 3" Styrofoam egg per skep
Twine or jute
Small headed straight pins
¼ yard burlap
Aleene's Fast Grab craft glue

Cut approximately ¾" off the bottom of the Styrofoam egg with a sharp knife, making sure it sits squarely. Pull a length of jute off the spool, and fold over a 2½" section. Using a small headed straight pin, secure both layers of jute to the top of the egg by pushing the pin straight in, leaving a tail ½" long. Draw a bead of glue on the egg from top to bottom in four places. Hold the tail of the jute down, and starting at the top, begin to wind the jute tightly around the egg. When you get to the bottom, cut the jute and secure the end with a dab of glue and a pin. Set the skep on the burlap, and trace around the bottom edge. Cut out the circle and glue it to the bottom of the skep. Once the glue has dried, remove the bottom pin.

All of the supplies you'll need.

Pollen Sachets

You will need:
¼ yard white sparkle chiffon or other translucent fabric
1 spool of narrow Holiday ribbon
2 tablespoons of bee pollen per sachet
Ornament hooks

Use a plate or other household item to trace a 6" circle on fabric. Cut it out. Cut a 15" length of narrow ribbon. Place two tablespoons of bee pollen in the center of each fabric circle. Gather up the edges to the center and tie tightly with ribbon, and tie a bow. Trim ends evenly at an angle. Slip an ornament hook under the back of the ribbon.

Honey Stick Stocking

You will need:
red felt
Scraps of fur, rick rack and ribbon
Aleene's Fast Grab craft glue or Fabritac
Honey sticks

Cut two identical stocking pieces out of red felt. Cut another strip of felt ¼" wide and 5" long. Fold it in half after placing a dot of glue between the ends. Draw a bead of glue around the edge of one stocking, then lay the loop, a dot of glue, and the other stocking on top of it. Press firmly. Decorate your stocking with fur around the top and scraps of rick rack and ribbon in bee colors. Allow the stocking to dry thoroughly and fill it with honey sticks.

Cut and Color Bees

Photocopy or trace the bee on card stock. Cut it out and fill in the colors with markers, crayons, colored pencils or paint. Poke a hole through the top of the hat with the ornament hook, and maneuver it into place. Hang on it your tree, or color enough to make a bee garland. BC

Nancy Tozier Sieling creates bee crafts from her home in Bath, NY. She is an occasional contributor to these pages.


Making the pollen sachet.