Bee Culture

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BEEYARD EXCURSIONS *Autumn Hedra helix (common Ivy) in bloom. Common in England, not so common here. Bees love it. Then clockwise from upper left. 1) Honey entries at the 75th National Honey Show in London. You have to be really, really good to win here. Interestingly, you have to be better to judge. 2) Some of the many trophies given out at the National Honey Show. 3) Basalt columns, or, remnants of comb from Apis Tyrannosaurus rex mellifera, we're not quite sure. 4) The oldest pinned insect in the Universe at Oxford University. 5) A beeyard in Northern Ireland, overlooking the sea. The rock wall for protection from the eternal wind. Working here would be a dream.*

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

DECEMBER 2006 VOLUME 134 NUMBER 12

FEATURES

DEPARTMENTS & COLUMNS

Wikipedia

Thanks to Malcolm Sanford.

I must say I was rather surprised when I dropped my newly delivered issue of *Bee Culture* and as plain as day there was my name in print. I want to thank you for your mention of the Beekeeping Wikibook that I have a hand in creating. Unfortunately it has been a good while since I've been able to contribute to it, but with any luck your article may help bring some much needed attention, and authors, to it. The entirety of "wikiculture" depends on the interest and dedication of its audience, you have played it a great service by informing the readership of *Bee Culture* of its existence.

Robert Englehardt
Albuquerque, NM

Full Time Beekeeping

I am writing in regards to beekeeping in Southern California. All my life I have had an interest in beekeeping and have raised bees as a hobby. Now I would like to get involved in beekeeping on a full-time basis.

Currently, I am in federal prison and due to release in June of 2007. The last four years I have been doing intense study on beekeeping and I have over 20 years of experience in keeping bees as a hobby. I am also computer literate and am fluent in English and Spanish.

In addition I completed a vocational course in building trades which included foundations, framing, roofing, job estimating and reading plans.

My prison sentence was for money laundering in relation to a marijuana case. I have made a commitment to change my life and am determined to make a career for myself in the beekeeping industry.

I would be grateful for any information regarding beekeepers in Southern California or any possible employment opportunities in that area.

Christopher Fordham
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P.O. Box 1031
Coleman, FL 33521-1031

Future Beekeeper

I am an inmate in the Texas Department of Criminal Justice. I am also a "future" beekeeper.

Your publication, *Bee Culture*, has excited and inspired me. I was introduced to *Bee Culture* by a wonderful gentleman whom I have never had the privilege of meeting – Mr. Waldo McBurney, age 104 years, of Quinter, Kansas. It is certain that many of your subscribers will know him. Though Waldo and I share the same last name, we are not related. Kudos to Mr. Waldo McBurney for blessing me!

I will be released from prison in a few more months (August 31, 2007), and it is my fervent desire to become a beekeeper. All of my knowledge of honey bees has been gleaned from your publication and two "old" books that I have read. I can't wait to gain actual experience.

It is my desire to correspond with experienced beekeepers so that I can gain more knowledge. If "anyone" would please correspond with me, send to the address below.

Robert McBurney-462897
P.O. Box 4500
Tennessee Colony, TX 75886

How Little We Know

The bee, the bee, an amazing thing;
From the tip of her tongue to the end of her sting.
The bees, the bees, been studied for ages;
Volumes of books and million of pages.
The bee, the bee more questions than answers;
Who picks the new home?
Who teaches the dancers?
The bee, the bee, with her hayseed brain;
Just an insect, I guess?
But too hard to explain!

I'm starting off with this jingle, just to show how little we know about the subject.

Now we have another theory, by Walt Wright and even names it 'shotgunning'. I'm not here to shoot him down (pardon the pun). But to try and shed more light on the topic

of "Dance Language" and odor on how scouts find the reward whether it's nectar, pollen, water or a new home site.

The last one (home site) creates more problems than the other three, simply because the scouts are bringing nothing back but information.

I posed a question in the *American Bee Journal* several years ago that went something like this – "We have a nest site one mile away from a new swarm that's in a rock crevice that has never been occupied by bees before (odor). One scout finds this crevice, and somehow the swarm does pick this spot. Walk me through the procedure from this one scout to the eventual occupation by the swarm."

The one answer I got was this, "the first scout deposits Nasanov scent at entrance and goes back to cluster, and gives her dance – "Distance and Direction." Other recruits find location and also deposit Nasanov scent to where it finally becomes strong enough for other recruits to find." I have no argument with this theory, except without the dance it could never work.

I believe the dance and odor go hand in hand for the whole process to work.

In another scenario, suppose I gave you a location in a town several miles away. I didn't know the address but only the block number. With only this information you would never find the exact location. But if I gave you the house number (location) you would have no problem. The house number is the odor to a recruit bee.

All of my bees have been ac-

quired by swarms, either physically putting them in a hive, or enticing them to go in by putting out "decoy hives" in various locations. We have lived in our present house for about 40 years and although we don't have any hives here (it's a residential area), I guess I've captures about 30 swarms by simply stacking bee equipment by the garage. There were a few years in the early 90s when there were *no* bees. I'm almost sure it was because of the mites.

I have written to you about this before. In fact that's where I came up with the jingle at the beginning of my letter.

Jim Cowan
Aberdeen, WA

INNER COVER

London, Tuesday, October 24, 2006, 12:50 PM. Almost to King's Cross train station, searching for the car park, road under construction, double red (don't even think of parking here) lines everywhere, police watching, no left turn, no right turn, dead end. Finally, there, turn left here, and there's a spot. Turn in, unload, four people pulling six cases and carrying two. Get the tickets. Gate 7. Leaves in 10 minutes. Rush down the ramp, up the walk, find a car, baggage stashed, two seats and two best friends stand outside the window waving goodbye. The train pulls away.

Heading to Mytholmrod, near Manchester, for more friends, more beekeepers and another meeting.

Let me back up. The previous Thursday, Friday and Saturday we were working at, speaking at and watching the National Honey Show at the RAF museum in London, staying in a very modern, very sterile Day's Inn. But the show - hundreds and hundreds of entries, displays, samples, models and photos. And right next door RAF planes and helicopters and gliders and heroes. Beekeepers everywhere, mostly from England and Ireland, but other countries as well. Talks and discussions on pheromones and politics, queen problems and marketing and even honey bee math one night downtown. Bee meetings are pretty much the same everywhere, it seems. Even talk of the Irish Gormenston next year. Maybe. The dorm sounds interesting.

But then, off to Grand Missendon on Saturday. A tiny, magic village with that Grand name. And wonderful, even grander people, the quietly elegant Peter and Marianne and their stately, dignified home. And monuments, Oxford University (and for all who know of insect collections, the oldest pinned specimen in the world, a butterfly, stuck upright in 1702).

But early the next morning off to King's Cross where all this began. Two stops down, two to go.

Half way to Mytholmroyd – "Bridge out, everybody off the train, find another way"

Now what?

Well, instead of one easy stop there are two running changes, with carts and lifts and rush hour crush, along with school kid's holiday and lots of tots underfoot. But finally to Mytholmroyd, with Jerry and Ruth, and only an hour late. Their home was built about 1720 or so. Ancient. Pieces all strung together. Once this part was the barn, that part for sheep, one for people, and some for storage. Small rooms, low ceilings with hundreds and hundreds of ancient bee books all about. But best of all about 25 or so beekeepers all crowded round the fireplace. The monthly meeting!

Talk of queens and *varroa*, chemicals and regulations, frame types and wintering and the bloody weather this year. Bee meetings, it seems, are pretty much the same everywhere you go.

The next day was rainy, spent in the misty Calder valley with grand views, lots of sheep, stone walls, hedges and Sylvia Plath's final rest. Mills, and the birth of the Industrial Revolution dominate the local history. But best of all was that final night at a pub for supper with lots of beer and dessert. Excellent!

Early next morning, off to the Northern Ireland Beekeeper's Institute, just outside Belfast in Hillsborough, Northern Ireland. To Michael and Rae Young's modern abode, with all the corners square. Interesting twists, the several places we stay.

This meeting too...*Varroa*, and foulbrood, government regulations, marketing and the Chief Inspector and vendors and great amounts of excellent food, with shrimp starters, an ice cream social and lots between. Again, beekeepers everywhere, especially out in the hall. Bee meetings, it seems, are pretty much the same, everywhere you go.

And that's the message here. Even with different countries, homes, people, foods, cars, roads, history, customs, plumbing and even electric plug-ins, bee meetings, and beekeepers, it seems, are pretty much the same, everywhere you go.

We are not alone in most everything we do. We must not act as if we are.

•

A vegetable farming magazine I receive had an excellent editorial regarding the recent disaster the spinach industry faced. The final recommendation was that it would no longer be business as usual for those leafy vegetable growers. Acres and acres of spinach were disked under when the news broke, and spinach sales plummeted. Even at the breath-taking loss of $3500 per acre, growers had no choice. Mom isn't likely to bring home a perceived bag of poison...whether it is poison or not. Why take the chance? Why indeed?

The same message must penetrate this industry. Especially before we have to destroy thousands, perhaps millions of dollars of our best product – honey. And absolutely, positively, before an action some beekeeper, somewhere takes that causes a health problem, or worse than anything anyone can possibly imagine, the death of someone who consumes our product.

We conveniently and carefully look the other way when we talk of the chemicals we put into beehives to do something to mites. It's a wink-wink, nod-nod situation. But it's against the law. It's illegal, it's stupid, and it must stop.

Moreover, why do you think the U.S. quit importing honey from China, from Argentina and other places?

Pretty Much The Same; and, *NOT* Business As Usual

Because of chemicals in the honey that were illegal, that's why. This isn't rocket science, after all.

All of the home grown, unregistered, illegal chemicals that this industry is reputed to be using in the war against *Varroa* are going to be our undoing. Further, all of the ways we find to circumvent the law, to find an easier way, to find a cheaper product, *to cheat*, must stop. Why is cheating OK, anyway? Why is breaking the law OK?

If we can't keep bees alive using what's legal, what is OK, what is a proper management technique, then we need to challenge our researchers to look in other places, or we need to fund researchers more so they can do more, or we need to create some agency that will do the research we need. That's where our money, our time and our energy should be spent.

It can no longer be, business as usual.

•

This is the end of a year where chaos has reigned, for sure. It was, for almost all of us - Weather 1, Honey bees 0 - when it came to honey production, but because most beekeepers in most places suffered the same fate, it balanced out, kind of, and because nobody has any honey, everybody will do better than if it had been just us. Score that one a tie.

Almond pollination, pro and con, good, bad and ugly made headlines all over the world this past year. Starting early when some bees could get into California, and some couldn't, because of ants and disease and hard-to-believe prices. Then, once there, where to go and what to do and who to ask and why did I come here, really? Confusion, or at least disorder was the rule of the day for awhile. And then, are they strong enough? Are there enough to begin with? Are they good enough? Are they from Australia? Are they from a snow bank somewhere? Do you have a contract?

Almond pollination certainly added to the chaos this year, and, interestingly, is still going on...though it seems we've learned some things some of us already knew, so it shouldn't be quite so bad/interesting/curious/panicky/wonderful (take your pick) as last year. Next month will tell, however.

And of course there's the trespassing thing out in California. Will that get resolved? Perhaps, over time, it might, maybe. It could get worse, though, it seems, new mandarin varieties will save somebody's bacon. Maybe.

"Throw the bums out", was the phrase of choice for almost all year because of the elections in November. It seems they did, or didn't, depending on your perspective, but the torture on TV all during the year made everybody glad it was over. It will be interesting to see if anything changes. And some things need changing, and some things, finally fixed, need to stay the same. Politics is expensive, elusive, and scary. Stay tuned.

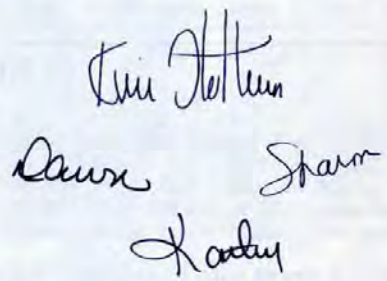
Which leads me to why I brought this all to your attention. We, too, are looking at what you like, and don't like about this magazine. Do you like the regular columnists we have, only some of them, or none at all? What about the regular features – Mailbox, The Honey Price Report, Gleanings, The Bottom Board, our new Kid's Page and the rest. What about the kinds of topics we tend to cover – How-To-Make all manner of things? Cooking with Honey recipes? Gardening with Honey Plants? Regular beekeeping articles that show and tell how to keep your bees better? The beekeeping science we cover, the legal articles we publish, the editorials?

We want to know – what do you like, and what don't you like? We routinely send out reader's surveys, and perhaps you have received one. But they tend to be small samples...only 1000 or so get sent out. This time, everybody gets a shot. But there's a couple of things you have to do.

First, I'd really like this to come in via email, if at all possible. Yes, we get lots of emails here already, and far, far too many are junk. So please, put in the SUBJECT line BCSURVEY...that way I'll know what it is and can rapidly file it for future reading. If it isn't labeled, it may, no, it probably won't get read. If you send your thoughts by mail, use BCSURVEY, 623 W. Liberty Street, Medina, Ohio, 44256 as the mailing address.

We really act on what our readers tell us. That is the primary reason there are two, well, three, magazines in this industry. Our readers want this, theirs want that. We aim to please. And you will see the results of your input over the next few months. Maybe things will stay pretty much the same. Maybe some things should change, and maybe some should go away. You decide.

Finally, all of us here at The A. I. Root Candle Company, and *Bee Culture* magazine want to wish you and yours a happy, safe and secure Holiday Season. Next Year will be Better. Peace.



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 2005, and the December 2006 prices for all products in all regions. Take a look at yours.

REPORTING REGIONS - 2005

	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	0.90	0.95	0.90	1.05	0.62	0.73	0.93	0.90	0.90	0.82	0.96	1.03	0.62-1.05	0.89	0.92	1.19
55 Gal. Drum, Ambr	0.88	0.85	1.00	0.90	0.59	0.70	0.73	0.88	0.65	0.65	0.95	0.95	0.59-1.00	0.81	0.86	1.01
60# Light (retail)	102.00	111.20	103.87	99.70	82.00	115.00	81.50	103.33	103.87	103.87	140.00	100.00	81.50-140.00	103.86	113.85	113.83
60# Amber (retail)	108.00	105.90	101.82	98.20	82.00	100.00	80.00	102.50	100.00	101.82	135.00	85.00	80.00-135.00	100.02	96.19	100.09
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	40.99	50.38	49.88	38.70	49.88	32.50	36.79	49.88	49.88	35.76	34.50	59.50	32.50-59.50	44.05	50.10	42.51
1# 24/case	59.74	57.50	64.90	56.94	61.68	56.00	62.44	62.40	51.25	75.00	74.90	66.40	51.25-75.00	62.43	60.71	61.35
2# 12/case	61.34	56.79	57.18	52.47	58.20	48.00	60.14	65.00	45.20	57.84	46.20	58.96	45.20-65.00	55.61	57.30	52.32
12.oz. Plas. 24/cs	58.48	52.46	54.19	49.48	46.95	48.00	49.91	51.60	40.44	47.64	64.75	59.44	40.44-64.75	51.94	52.60	54.49
5# 6/case	55.06	67.86	67.27	57.27	67.27	61.00	63.46	52.70	55.80	56.43	58.00	71.00	52.70-71.00	61.09	60.59	59.84
Quarts 12/case	72.00	135.00	81.91	75.75	76.00	76.00	88.74	76.00	96.00	100.00	84.20	67.38	67.38-135.00	82.86	83.27	80.76
Pints 12/case	35.00	49.95	59.65	53.00	36.00	45.13	80.00	44.00	60.00	49.50	55.00	53.88	35.00-80.00	51.76	49.20	47.88
RETAIL SHELF PRICES																
1/2#	2.44	2.41	2.58	2.61	2.58	2.58	2.53	1.65	2.39	2.44	3.00	2.95	1.65-3.00	2.51	2.59	2.52
12 oz. Plastic	3.35	3.15	3.50	3.01	3.40	3.09	3.02	3.52	3.17	3.01	3.35	3.53	3.01-3.53	3.26	3.20	3.16
1# Glass/Plastic	3.81	3.53	5.09	3.95	3.65	3.50	3.58	4.42	4.04	3.49	3.96	4.20	3.49-5.09	3.94	3.85	3.79
2# Glass/Plastic	7.40	6.46	8.25	5.94	6.49	5.60	6.11	8.12	6.24	6.68	5.55	6.64	5.55-8.25	6.62	6.68	6.40
Pint	4.49	6.88	6.80	5.70	5.25	5.17	8.27	5.56	5.33	6.50	5.02	7.50	4.99-8.27	6.08	5.77	5.57
Quart	7.88	8.55	11.52	8.13	7.95	8.25	8.00	9.09	9.00	12.75	8.63	8.99	7.88-12.75	9.06	9.16	8.88
5# Glass/Plastic	14.18	13.51	19.00	13.10	15.00	13.00	18.11	15.99	13.80	13.15	13.47	12.99	12.99-19.00	14.61	13.20	13.18
1# Cream	5.09	5.16	5.29	4.51	5.17	4.00	5.07	5.15	5.17	5.05	4.89	4.10	4.00-5.29	4.89	4.69	4.75
1# Cut Comb	5.33	4.54	6.95	5.43	6.95	4.50	6.79	4.75	6.95	5.00	6.00	5.80	4.50-6.95	5.75	5.61	4.99
Ross Round	5.50	3.97	5.74	4.65	5.74	4.10	6.88	5.00	5.74	5.63	5.83	4.99	3.97-6.88	5.31	4.85	4.70
Wholesale Wax (Lt)	2.25	2.17	2.14	1.83	1.40	2.13	2.35	2.38	2.20	3.14	1.90	2.38	1.40-3.14	2.19	1.99	1.67
Wholesale Wax (Dk)	1.60	1.73	1.40	1.50	1.15	2.00	1.48	2.00	1.45	2.33	1.50	2.00	1.15-2.33	1.68	1.73	1.35
Pollination Fee/Col.	49.00	56.33	32.00	36.50	40.00	44.00	44.50	60.00	40.00	70.94	75.00	82.50	32.00-82.50	52.56	55.86	40.32

REPORTING REGIONS - 2006

	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	1.00	1.01	1.06	1.18	1.05	1.13	1.04	1.06	0.99	1.00	1.25	1.13	0.99-1.25	1.07	1.03	0.89
55 Gal. Drum, Ambr	0.99	1.00	0.99	1.15	0.82	0.95	0.91	1.10	0.85	0.90	1.20	1.00	0.82-1.20	0.99	1.02	0.81
60# Light (retail)	108.00	114.25	120.00	96.00	105.00	100.00	97.50	105.00	119.00	120.29	97.50	126.50	96.00-126.50	109.09	110.42	103.83
60# Amber (retail)	108.00	107.75	120.00	96.50	105.00	92.00	93.88	101.67	109.00	120.16	96.75	125.80	92.00-125.80	106.37	109.61	100.02
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	44.64	50.49	40.80	39.94	48.61	46.25	40.08	48.61	48.61	35.76	35.50	72.00	35.50-72.00	45.94	43.70	44.05
1# 24/case	61.44	67.72	62.40	58.22	63.00	54.33	61.55	60.90	47.85	77.76	90.00	83.40	47.85-90.00	65.71	68.90	62.43
2# 12/case	61.68	58.34	60.60	55.06	58.50	52.00	55.40	66.00	45.20	57.84	48.65	71.05	45.20-71.05	57.53	57.25	55.61
12.oz. Plas. 24/cs	57.12	57.92	46.75	55.17	54.00	49.33	48.93	51.60	47.09	47.64	65.00	62.00	46.75-65.00	53.55	54.53	51.94
5# 6/case	65.52	65.63	70.50	57.70	67.29	66.67	60.84	50.00	55.80	56.43	60.00	81.15	50.00-81.15	63.13	65.37	61.09
Quarts 12/case	96.72	119.00	96.72	80.24	78.00	71.50	82.68	73.67	84.00	110.88	87.48	118.00	71.50-119.00	91.57	90.33	82.86
Pints 12/case	56.39	60.98	56.39	51.34	58.00	48.00	44.88	45.00	54.00	49.50	48.00	57.75	44.88-60.98	52.52	52.58	51.76
RETAIL SHELF PRICES																
1/2#	2.75	2.57	2.19	2.63	1.85	2.50	2.50	1.89	2.44	2.38	2.59	3.99	1.85-3.99	2.52	2.60	2.51
12 oz. Plastic	3.00	3.34	2.53	3.29	3.70	3.25	2.89	3.76	3.12	2.99	2.99	3.15	2.53-3.76	3.17	3.36	3.26
1# Glass/Plastic	3.88	4.08	3.39	4.08	3.93	3.90	3.61	4.09	3.95	3.92	3.92	5.04	3.39-5.04	3.98	4.02	3.94
2# Glass/Plastic	7.33	6.42	6.59	5.80	6.54	6.02	6.13	8.50	6.48	6.38	6.19	9.42	5.80-9.42	6.82	6.71	6.62
Pint	6.54	7.58	6.54	5.57	5.76	5.41	5.21	6.25	5.00	6.45	5.64	7.53	5.00-7.58	6.12	5.89	6.08
Quart	9.77	10.98	9.77	8.89	8.13	8.12	8.94	9.31	8.50	13.46	8.20	9.66	8.12-13.46	9.48	9.34	9.06
5# Glass/Plastic	15.17	14.38	15.29	13.54	15.00	13.25	13.50	15.99	13.85	13.80	12.60	18.55	12.60-18.55	14.58	14.91	14.61
1# Cream	4.50	5.03	4.89	4.35	5.71	3.75	5.44	4.96	5.71	5.00	4.51	5.00	3.75-5.71	4.90	5.05	4.89
1# Cut Comb	5.00	5.15	5.19	5.15	7.09	4.20	5.28	4.66	7.09	5.50	3.75	9.97	3.75-9.97	5.67	5.28	5.75
Ross Round	5.73	3.98	5.19	5.09	5.73	2.50	5.63	6.00	5.73	6.00	6.50	6.00	2.50-6.50	5.34	4.50	5.31
Wholesale Wax (Lt)	2.25	2.27	2.00	2.76	1.70	2.19	2.53	2.00	2.50	3.00	2.48	2.25	1.70-3.00	2.33	2.62	2.19
Wholesale Wax (Dk)	2.18	2.13	1.00	2.19	1.50	4.19	2.02	1.75	2.00	2.55	1.82	1.50	1.00-4.19	2.07	2.19	1.68
Pollination Fee/Col.	60.00	68.25	60.00	38.00	41.00	58.00	45.33	60.00	35.00	77.31	25.00	50.00	25.00-77.31	51.49	53.94	52.56

RESEARCH REVIEWED

The Latest In Honey Bee Research

Steve Sheppard

"One ... Two ... Three ... Mites! and *Revisiting Bumblebees and Bombiculture."*

Some beekeepers still routinely treat honey bees with chemicals for *Varroa destructor* without considering the level of mite infestation within their colonies. However, if other areas of agriculture provide a look to the future, we can expect a continuing move toward an integrated management system that treats the pest (mites) only when the population approaches the level where economic damage would occur. This IPM approach is standard practice in many areas of agriculture because it decreases costs, diminishes pesticide exposure of growers and consumers and increases the useful lifespan of treatment chemicals (by reducing the rate at which resistance develops in the pest). Fundamental to IPM is the use of reliable means to assess the pest population. Within honey bee colonies, various methods have been used to assess mite populations with somewhat variable results. A recent paper by Branco and colleagues (2006) provides new information to help address the issue of variability in the "accuracy" of mite population estimates.

The researchers compared three methods of estimating mite populations in 22 honey bee colonies. These included assessment of natural "mitefall" onto the bottom board, mite counts taken from both adult and sealed brood, and the number of mites that fell following chemical treatment. Although the details of some of the methods used by the authors varied from other published methods (natural mitefall was taken over weekly periods in the study, rather than over shorter periods), the primary goal of the work was to compare the methods and determine whether they could be used to reliably estimate mite populations. The findings of the authors showed that there were "good linear relationships" between the three methods. That is, all could be used to reliably estimate the population of mites in the colonies, with some exceptions. The exceptions were perhaps the most informative from the standpoint of beekeeping IPM. The authors found that natural mite mortality (i.e., natural mitefall onto a sticky board) was a reliable method to estimate the absolute number of mites in the colony, provided the colony was "broodright and not collapsing". Thus, colonies without brood (such as those in the process of supercedure) or that were so heavily infested with mites that bee brood was dying (e.g. colonies "collapsing" from mite infestation) did not give reliable estimates of mite population based on natural mitefall. The authors point out that this may be the reason that some previous studies have given somewhat variable results. The take home message is that beekeepers who are following an IPM program and using mite population numbers based on natural mitefall assays (number of mites that fall onto sticky boards), should pay attention to the status of the colonies being tested and recognize these potential sources of error.

The concept of beekeeping is not restricted to our beloved western honey bee, *Apis mellifera*, or even to the several other cavity-nesting species of *Apis* in Asia. There is a long history of keeping stingless bees (family Meliponinae) in the Neotropics. Recently has been a trend to expand the practice within Brazil and to begin to develop stingless bees as pollinators within greenhouses. However, aside from beekeeping with *A. mellifera*, the other most highly commercialized beekeeping occurs with bumble bees. A recent paper by Velthius and Doorn (2006) reviews "A century of advances in bumblebee domestication and the economic and environmental aspects of its commercialization for pollination."

The authors begin by recounting early progress in understanding bumble bee biology and colony rearing methods. Different from *Apis mellifera*, bumble bees have seasonal rather than perennial colonies, with mated overwintering queens foraging on their own to start new colonies until they have reared enough workers to take over foraging duties. Early researchers found that wild caught bumble bee queens in the Spring could be imprisoned in a nest box

with honey and pollen and would begin colony initiation. After some time, the nest could be opened to allow free flight and the colony would develop normally. By the 1960s researchers had developed methods for the continuous rearing of colonies, with systems whereby queens and males were reared in the Fall and mated in cages, the queens stored under refrigeration for an appropriate time, until they were removed to begin colony initiation as needed. By the 1980s a number of commercial systems were developed and bumble bees became increasingly important in greenhouse pollination systems, especially for tomatoes, cucumbers, eggplants, melons and peppers and for a number of crops outside a greenhouse. For example, bumble bees are presently the most important pollinators for more than 40,000 hectares (98,842 acres) of tomatoes grown inside greenhouses. More than one million bumble bee colonies were produced commercially in 2004, although only 56,000 were produced in North America. The authors also discuss the ecological concerns of shipping bumble bees around the globe, especially when species that are not native to a particular area are involved. There have been some cases of escape and establishment by these introduced species leading to negative impacts on native bumble bees. All of this leads to the recognition of opportunities to develop rearing and colony production facilities for bumble bee species native to localities where greenhouses are being used, especially in North America. The increased attention to this area of agriculture can be seen by considering that the most recent entomologist hired by the USDA-ARS Pollinating Insect-Biology, Management, Systematic Research laboratory[1] (*aka* the "wild bee" lab) in Logan, Utah has a mandate to conduct research both to describe bumble bee diversity and ecology in the western U.S. and to develop rearing protocols for these bumble bee species to assist the domestic greenhouse industry. While the rearing and production of commercial bumble bee colonies is a specialized field, it provides a further possibility for those beekeepers that want to venture forth into another world of bees. BC

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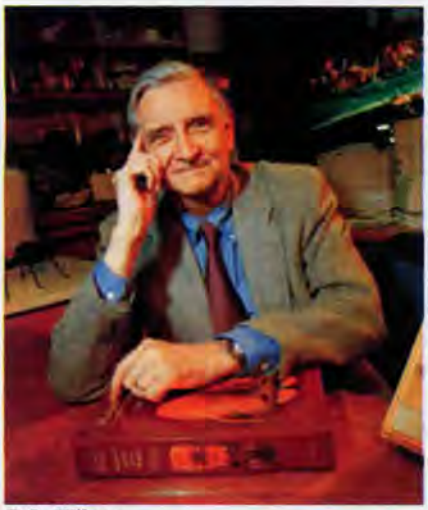
A HIVE OF ACTIVITY

The 2006 XV Congress of the International Union for the Study of Social Insects (IUSSI)

Andrew Ammons

For just a week this Summer (July 30-August 4), social insect researchers from around the world descended upon Washington D. C. in a flurry of activity that rivaled any of their favorite insect societies. These scientists came together to discuss the most recent discoveries in their fields at an international meeting that is held once every four years. These meetings represent a unique opportunity for scholars and students studying the social insects to interact with their peers from around the world. According to E.O. Wilson, the preeminent ant researcher and conservationist (who was also the premier speaker for this meeting), truly social or "eusocial" insects are those that meet three specific requirements: the presence of more than one generation of individuals in a colony (usually parents and offspring), the cooperative care of young by members of the colony, and a reproductive division of labor that may include individuals of a sterile caste.[1] At this conference, Dr. Wilson recounted his early years in science and how he began working with ants.



E.O. Wilson

The insects that have classically been thought of as eusocial include the ants, wasps, and bees from the order Hymenoptera and the termites of the Isoptera insect order. Some of the common characteristics of these insects are the presence of egg-laying "queens" (accompanied by "kings" in the termites), a division of labor where "workers" carry on the necessary needs of the colony while "guards" or "soldiers" defend the nest, and the impressive architecture of these nests (underground galleries in ants, termite mounds, beehives, paper and mud wasp nests) that may contain thousands to millions of individuals. In recent years, certain gall-making thrips and aphids have joined this illustrious group as details of their life histories have emerged. It is no wonder, then, that the honey bee species (*Apis mellifera*) is considered a traditional example of a eusocial insect. A honey bee colony contains both a reproductive and a task-based division of labor. A single queen bee lays all the eggs in a hive, while her sterile daughters do all the work of the colony. These workers experience an age-based progression of jobs in the nest, beginning with nursing larvae at a young age and advancing to comb-building, guarding, or undertaking, and finally ending with nectar or pollen foraging outside of the hive.

Considering that honey bees are classic representatives of insect sociality, it is only fitting that two separate workshops devoted to bee research occurred just before the official beginning of the IUSSI conference.

The first of these, the 5th Honey Bee Molecular Workshop, took place on July 30. This workshop was designed to allow bee researchers to present the cutting-edge work they are doing and discuss the opportunities that advances such as the Honey Bee Genome Project (HBGP) will provide to the research community. The benefits of these studies will not only lead to a better understanding of basic honey bee biology, but will also strengthen the beekeeping industry by contributing to the breeding of gentler, mite-resistant bees and to facing other challenges to hive productivity. Credit and thanks are due to the organizer of this workshop, Dr. Susan Fahrbach, from Wake Forest University (who studies the links between neuroanatomy and behavior in bees).

The first speaker was Dr. Jay Evans from the U.S. Department of Agriculture (USDA) Bee Research Lab in Beltsville, Maryland. He revealed the most up-to-date information on the HBGP and the benefits this project will have for basic and applied research. One of the highlights of these results included the discovery of genes that code for major royal jelly proteins that are totally unique to bees, and may be closely related to the "yellow" proteins in flies. It may be that the evolution of these royal jelly proteins (necessary for producing the jelly fed to young larval queens and workers) accompanied the development of increasing sociality in honey bees. Another surprise was the low number of immunity proteins identified, when it was expected that bees would have many complex and diverse immune-response proteins for dealing with the numerous pathogens that thrive in a social environment.

Dr. Chris Elsik, whose lab at Texas A & M University is organizing the genome data, presented her work with BeeBase,[2] that contains the honey bee genome information and

the tools necessary for manipulating this data. Dr. Christina Grozinger, from North Carolina State University, discussed the implications of differing gene expression patterns in virgin queens, sterile workers, and laying workers. Dr. Angel Barchuk, from the Ribeirao Preto-Universidade in Sao Paulo, Brazil, also presented work on gene expression differences, but in this case between larvae fated to become different castes (queens or workers).

Dr. Moushumi Sen Sarma presented her work with BeeSpace,[3] an internet database (associated with the University of Illinois at Urbana-Champaign) meant to link literature and scientific resources about honey bee social behavior. Dr. Anita Collins, from the USDA Bee Lab at Beltsville has found that virgin queens have an excess of unique reproductive proteins in comparison to drones and mated queens. In addition, Dr. David Queller of Rice University discussed the process of DNA methylation (a from of gene regulation in which genes are "silenced") and its possible influence on the evolution of honey bee social behavior. Methylation is an active mechanism of "genomic imprinting," a process where genes are expressed differentially in offspring based on whether they are inherited from the mother or father. Dr. Guy Bloch, from the Hebrew University of Jerusalem in Israel, revealed why the honey bee biological clock (controlling circadian rhythm) seems to be more similar to vertebrate clocks than other insect clocks, and Dr. Greg Hunt, at Purdue University in Indiana, described his sting-filled search for genes influencing defensive behavior in European and Africanized bees. Finally, Dr. Yves Le Conte (Institut National de la Recherche Agronomique, Avignon, France) recounted his work looking for specific gene expression patterns in *Varroa*-resistant bees that could be used for selecting and breeding superior bee lines.

The next meeting, the Honey Bee Pathogens Workshop, occurred that same day. This workshop was devoted to research focused on specific diseases of honey bees. Dr. Katherine Aronstein, USDA Bee Research Lab, Weslaco, organized this event. Dr. Jay Evans started the meeting with a discussion of the sequencing of the genome of *Paenibacillus larvae*, the spore-forming bacterium that causes American Foulbrood disease (AFB). This disease is one of the deadliest and costliest afflictions of honey bee larvae in America. Next, Dr. Dan Murray, also at the Weslaco Bee Lab, presented his work with *P. larvae* plasmids (circular pieces of DNA that exist in bacteria). Dr. Aronstein gave an overview of research on the genome and mating system of *Ascosphaera apis*, the fungus that causes Chalkbrood disease. Dr. Judy Chen, also from Beltsville, reviewed work on the transmission of honey bee viruses among bees, while Dr. Tomoko Fujiyuki (from the University of Tokyo in Japan) related her research on the bee-infecting "Kakugo" virus. Honey bee pathogens can inflict a major toll on the health and productivity of honey bee colonies. Studying the genomes of these pathogens will enhance our understanding of their transmission and infectivity, and at the same time lead us to new methods of preventing the damage they cause.

The formal beginning of the IUSSI conference began that night in an auditorium of the Smithsonian Institution's National Museum of

Dr. Greg Hunt

Dr. May Berenbaum

Natural History.[4] After the welcoming remarks Dr. May Berenbaum of the University of Illinois gave a humorous presentation on the increasing presence of social insects in computer-animated movies.

From "A Bug's Life" and "Antz" to the most recent "Ant Bully," Hollywood animators have taken notice of the creatures under their feet. Dr. Berenbaum's reasons for this included the ease with which the images of insects can be displayed (no complex lips or rippling muscles to animate), the fact that ants and bees are easily recognized, and our shared fascination with organisms that, while alien to us, also cooperate in activities that are so familiar (raising offspring, constructing complex dwellings, and foraging for food). It was also revealed that a new computer-animated movie set in the world of honey bees ("Bee Movie") would be coming out in November.

Following this presentation a banquet was set out around the central rotunda of the museum. It was quite a sight to see people eating and mingling around a stuffed African elephant towering at the heart of the many-storied, marble-walled lobby! The effect was at once both arresting but otherworldly, and the banquet itself was a very elegant affair.

For the next week there were main speakers, symposia organized

around central topics, and poster presentations representing every possible aspect of social insect life. A few symposia were devoted exclusively to bees, including one in honor of Dr. Charles Michener who is known for his work in bee taxonomy and evolution. Another well-known bee researcher familiar to the readers of this magazine, Dr. Mark Winston, was recognized by a symposium focused on the role that pheromones play in honey bee communication and behavior. Dr. Gro Amdam (Arizona State University), among others, presented evidence for a "reproductive ground plan" in honey bees that helps explain the evolution of bees from solitary into social species.

Other notable attendees and presenters included Drs. Tom Webster (Kentucky State University) and Tom Seeley (Cornell University), both known for their work with observation hives and foraging behavior; Dr. David Tarpy (NC State University) presenting work with queen production and replacement; Dr. Marla Spivak (University of Minnesota) who is known for her hygienic bee lines; and Dr. Olav Rueppell (University of North Carolina) who works on longevity and aging in bees. Drs. Deborah Smith (University of Kansas), Stan Schneider (University of North Carolina), Justin Schmidt (Southwestern Biological Institute), Jeff Pettis (USDA-Beltsville), Tanya Pankiw (Texas A&M), Zachary Huang (Michigan State University), Jennifer Fewell (Arizona State University), Gloria DeGrandi-Hoffman (USDA-Carl Hayden Research Center), Mike Breed (University of Colorado), and Nick Calderone (Cornell University) are some of the many prominent bee researchers that were also present at the meeting.

Of course, a meeting such as this also represents a tremendous opportunity for graduate students to present their work. Just a few of the young scientists I met included Cecilia Andere (UNCPBA in Argentina) studying the quality of drone semen, Dina Grayson (Arizona State University) working on differential metabolic rates between Africanized and European honey bees, Kristen Ward (University of North Carolina) looking at cell death rates in bees, and Brendon Fussnecker (NC State University) monitoring expression of a gene in workers and queens at flight.

While at the conference, I also visited the Smithsonian's National Zoo[5] and Natural History Museum in more detail. I was glad to see that both had observation hives, in the Invertebrate House at the zoo and in a special "Insect Zoo" exhibit at the museum. Each colony seemed very healthy and full of active bees. It is good to know that urban beekeeping is alive and well in our nation's capital!

In conclusion, I am greatly indebted to Dr. Anita Collins as an organizer of the IUSSI meeting and Kim Flottum as editor of *Bee Culture* for allowing me to attend this meeting through their financial support. I must also thank my graduate advisor, Dr. Greg Hunt, for his support and advice. Without the efforts of this group my participation in the IUSSI conference would not have been possible. BC

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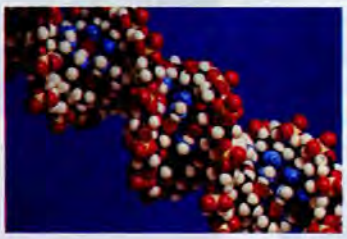
Malcolm T. Sanford

Update On The Honey Bee Genome Project

"This synergy of efforts will enable Apis mellifera to play a greater role as a general research organism, while at the same benefiting the beekeeping community in ways that many believe will be both unexpected and surprising."

In "Cracking the Honey Bee's Genetic Code," *Bee Culture*, April 2003,[1] I reported that a consortium of scientists and others led by Dr. Gene Robinson at the University of Illinois, Urbana-Champaign had developed a honey bee genome proposal, which was given high priority and had been funded. Sequencing of the estimated 16,000 genes began December 13, 2002 and was expected to be complete sometime in the Spring of 2003. After sequencing, the genome will have to be "annotated." This lengthy process gives sense to the project by providing information on where the genes are and what they are responsible for.

Dr. Robinson recently sent me a note stating that the results of both the genome sequencing and analysis are now being published. He has authored a paper along with Daniel Weaver, current President of the American Beekeeping Federation, characterizing the honey bee genome project (HBGP) as "a model of cooperation between academia, government and industry."[2] The paper further relates that in September 2005, the HBGP shifted to a broader participation by the Consortium, uniting a wide range of scientists in genomics and bioinformatics. This also included members of diverse disciplinary and organism-based communities, including those studying mammals and humans. "A total of 112 individuals in 63 institutions around the world signed on to analyze the newly available bee genome sequence!"



A special issue of the journal *Nature*,[3] one of science's most prestigious, was published October 26, 2006 featuring the project. It contains a major paper on the honey bee genome, as well as specially commissioned commentary. According to a draft of the paper, "The *A. mellifera* genome has novel characteristics and provides fascinating insights into honey bee biology. Some main findings include:

- The honey bee genome is distinguished from other sequenced insect genomes by high AT content, high CpG content, and an absence of most major families of transposons.
- The honey bee genome evolved more slowly than the fruit fly and malaria mosquito.
- The honey bee genome shows greater similarities to vertebrate genomes than *Drosophila* and *Anopheles*, for genes involved in circadian rhythms, RNAi, and DNA methylation among others.
- *Apis* has fewer genes than *Drosophila* and *Anopheles* for innate immunity, detoxification enzymes, cuticle-forming proteins, and gustatory receptors, but more genes for odorant receptors, and novel genes for nectar and pollen utilization. This is consistent with honey bee ecology and social organization.
- The major royal jelly protein family, nine genes evolved from one ancient Yellow gene, involved in queen and brood nursing, exemplify genes gaining new functions during the evolution of sociality.
- Novel miRNAs were detected and shown to have caste- and stage-specific expression, suggesting a role in social diversification.
- Key elements in early developmental pathways differ in *Apis* and *Drosophila*, indicating that these evolved after the lineages separated.
- The honey bee shows similarities to *Drosophila* for functions that differ dramatically such as sex determination, brain function, and behavior.
- Population genetic analyses using new genome-based SNPs support a novel hypothesis involving an African origin for the species *Apis mellifera* and new insights into the spread of Africanized 'killer' bees."

Dr. Robinson and Mr. Weaver in their publication relate that papers are also being published in *Science, Proceedings of the National Academy of Sciences, Genome Research,* and *Insect Molecular Biology*. They further state that it often takes time to translate a genome sequence into major scientific results. However, already tantalizing findings have emerged as listed above, and two, they conclude, are particularly noteworthy at the present time:

1) "It appears that the honey bee genome evolved more slowly than the genomes of the fruit fly and malaria mosquito. One consequence of that slower evolutionary pace is that the bee

genome contains versions of some important mammalian genes that have been lost from the fruit fly and mosquito genomes. Is the honey bee more slowly evolving than most organisms, or have the fly and mosquito (both members of the same order, Diptera) evolved faster? And if it's the former, is that because of the bee's social lifestyle? These questions can only be answered with genome sequences for more species, and thankfully, more are on the way.

2) "New population genetic analyses based on the honey bee genome by a team of scientists headed by Charles Whitifield (University of Illinois) have generated exciting new insights into the longstanding controversy of whether Africanized honey bees (*Apis scutellata*) spread throughout the New World via hybridization or displacement. The answer is *both*! Genes from *scutellata* have largely replaced many genes from one previously dominant subspecies of European honey bee, *Apis mellifera ligustica* (the "Italian" bee) while *A.mellifera mellifera* (the "German black" bee) genes have been essentially unchanged. It will be fascinating to learn why *ligustica* and *mellifera* show different "susceptibilities" to Africanization, and what this might mean for the genetics of defensive behavior, among other things."

"The HBGP has generated a huge amount of information, and public database development proceeds aggressively to make maximum use of it. BeeBase is a dedicated analysis and display environment for the honey bee genome, headed by Christine Elsik, Texas A&M University, which will be closely tied to the famous FlyBase and the planned InsectBase (William Gelbart, Harvard University). Other databases include: NCBI Honey Bee Genomic Resource, ENSEMBL, EBI-Heidelberg, UC Santa Cruz, US-DOE, and the Human Genome Sequencing Center at Baylor College of Medicine (BCM-HGSC). The BCM-HGSC site also offers the genome sequences for two key honey bee pathogens, *Paenibacillus larvae* (causative organism of American Foulbrood) and *Ascosphaera apis* (chalkbrood), projects funded by USDA-ARS (Kate Aronstein and Jay Evans, Principal Investigators).

"In addition to these databases, the honey bee genome will be the exciting frontier for development of a totally new information environment, BeeSpace. BeeSpace is a $5M project funded by the National Science Foundation's (NSF) Frontiers in Biological Research Program, headed by Bruce Schatz. (University of Illinois), working together with Robinson. By integrating the various bee databases with a complete web-navigable catalog of the scientific literature, BeeSpace[4] will enable information scientists and biologists to leverage the bee genome to create a new information environment for the study of social behavior. As is the case for the National Institutes' of Health (NIH) National Human Genome Research Institute (NHGRI) funding, this $5M represents the first funds ever allocated for bee research by this part of the NSF.

"New genomic resources are being created to make best use of the honey bee genome sequence. These are being developed in collaboration with industry leaders, government labs, and academia, including whole genome microarrays (Viktor Stolc, NASA-Ames; and Robinson, Evans and Kevin White, University of Chicago) and large-scale collections of single nucleotide polymorphisms (SNPs) for European and Africanized honey bees (Whitfield and Baylor College of Medicine).

"Just like the first phase of the human genome project, the HBGP has produced an excellent 'draft' of the honey bee genome sequence, enhanced by the detailed genome 'mapping' by Solignac and colleagues. To further increase the value of the honey bee genome sequence to researchers, a white paper to obtain additional sequence information was

submitted to NHGRI in July 2005 by a group led by Evans on behalf of the Honey Bee Genome Sequencing Consortium. The project was again accorded 'High Priority' in August, 2005, and this work will begin late in 2006. The honey bee genome project is expected to usher in a bright era of bee research, for the benefit of agriculture, biological research and human health."

To reiterate from my April 2003 article, some expected benefits include developments in areas related to:

Novel antibiotics. Increased drug resistance by pathogenic bacteria has created an urgent demand for new antibiotics. Insects are among the more promising sources of novel antibiotics and honey bees likely offer a rich source because of their sociality. Like humans, honey bees live in a social environment with nearly ideal conditions for growth and transmission of pathogens.

Infectious disease. Humans show both antigen-specific and innate immune responses to important pathogens including *Mycobacterium tuberculosis* and *Streptococcus pneumoniae.* Better understanding of innate immunity can help counter these diseases, especially when vaccines have limited effectiveness.

Bee venom, anaphylaxis and human allergic disease. Honey bees defend their hive aggressively with both sophisticated behavioral and biochemical mechanisms. Bee venom has a wide range of medically important and pharmacologically active compounds.

Nutrition. Honey bees are the premier beneficial insect worldwide. While best known for honey, the honey bee's more critical contribution to human nutrition is crop pollination, valued at nearly $15 billion/year in the U.S. Pollination increases the quantity and quality of fruits, nuts, and seeds, many of them increasingly recognized as sources of nutraceuticals. But parasites and pathogens compromise bee health and pollination activities. A HBGP will help to breed bees that resist disease and insecticides, pollinate more efficiently, but sting less.

Mental health. Some forms of mental illness, such as autism, involve problems with social integration. Bees show a high degree of social integration, and their activities are highly dependent upon their ability to read social cues; identification of several well-defined sets of social cues make for unusually tractable experimental social systems.

Biosensors. A HBGP also may enhance use of honey bees as environmental sentinels.

X chromosome diseases. Mutations on the X-chromosome are responsible for many serious conditions, including Turner's syndrome, Trisomy-X, Kleinfelter's syndrome, hemophilia, colorblindness, and fragile-X syndrome, the leading cause of mental retardation. Honey bees are "haplo-diploid;" in a sense, each bee chromosome is an X-chromosome, i.e., one copy in the male and two copies in the female. A HBGP will enable comparative analyses to address questions such as: What control regions are important in gene expression, sexual development, and dosage compensation on the X? No haplo-diploid animal has yet been sequenced.

Instincts. The societies of honey bees and other social insects occupy Wilson's second "pinnacle of social evolution," with complexity that rivals our own. Among the provocative similarities are: extensive communication systems (including the only non-primate symbolic language); highly organized defense and warfare; complex architecture (including the insect equivalent of skyscrapers – four meter high termite nests in Africa); and expressions of personal sacrifice unheard of in most of the rest of the animal kingdom.

Cognition. Bees collect food from flowers, a highly ephemeral food source, and have evolved sophisticated cognitive abilities to maximize foraging success. They are excellent at associative learning, based on the need to associate a color, shape, scent, or location with a food reward. Honey bees also can learn abstract concepts such as "similar" and "dissimilar," and are able to negotiate complex mazes by using visual stimuli as direct or abstract "signposts" or by recognizing path irregularities.

Gerontology. Queens and their workers have identical genotypes but queens live two orders of magnitude longer. Identification of all differentially expressed genes responsible for these striking differences in lifespan, facilitated by a HBGP, undoubtedly has important implications for human longevity and aging.

The HBGP is exciting not only for new information to come out of the genome itself, but because a wider range of scientists and funding agencies have become interested in honey bees. This synergy of efforts will enable *Apis mellifera* to play a greater role as a general research organism, while at the same benefiting the beekeeping community in ways that many believe will be both unexpected and surprising. BC

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? DO YOU KNOW ?

Winter Musings

Clarence **Collison**
Mississippi State University

The Winter months are an important time for the beekeeper as they begin making preparations for the coming year. Besides equipment repairs, and ordering equipment and bees, beekeepers are concerned with handling and marketing their hive products. It is also a time for the beekeeper to reflect on the past year and attend various types of bee meetings and workshops. Staying abreast of current happenings in the beekeeping industry is also important.

Please take a few minutes and answer the following questions to see where you are in mastering basic beekeeping knowledge.

Level 1 Beekeeping

1. Describe the actions of an adult bee which performs hygienic behavior within the brood nest. (1 point)
2. Adult bees that perform hygienic behavior within the hive are normally ____ days of age.
   A.15-20 B.1-6 C.7-12 D.21-26 E.10-15
3. ____ The hygienic behavioral trait expressed by worker honey bees is believed to be mediated by olfactory cues. (True or False)
4. ____ Wax foundation contaminated with chalkbrood spores can infect honey bee brood. (True or False)
5. ____ Bakery yeasts are often used in the making of mead. (True or False)
6. ____ During the mead making fermentation process, both natural yeasts and oxygen should be excluded. (True or False)
7. ____ The ideal temperature for mead fermentation is between:
   A. 60 to 65°F. B. 75 to 80°F.
   C. 55 to 60°F. D. 80 to 85°F. E. 65 to 70°F.
8. ____ Mead can be made from honey and pollen. (True or False)
9. ____ Africanized honey bee drones fly significantly earlier than European drones when they are compared at the same location. (True or False)
10. ____ Developing queen larvae receive more visits from nurse bees than developing worker larvae. (True or False)
11. ____ Sexually mature drones normally take several flights a day. (True or False)
12. The mean duration of mating flights of queens is approximately ____ minutes.
    A. 18 B. 9 C. 13 D. 22 E. 4
13. ____ Which type of honey bee is most likely to drift between colonies: workers, drones or queens? (1 point)

Advanced Beekeeping

14. ____ The comparison of royal jelly to worker jelly indicates significant differences exist in sugar concentration. (True or False)
15. ____ Honey bees that exhibit hygienic behavior have increased levels of octopamine expression in their brains and nervous system in comparison to similar aged non-hygienic bees. (True or False)
16. It is estimated that ____ percent of the honey bee colonies in the United States are hygienic.
    A. 1 B. 10 C. 25 D. 40 E. 20
17. ____ Historically, Walter Rothenbuhler proposed a two gene model to explain hygienic behavior. What two behaviors were associated with these two genes? (2 points)
18. Recent research has shown that the genetic basis of hygienic behavior is more complex than the two gene model and now it is believed that ____ quantitative trait loci influence hygienic behavior.
    A. 7 B. 3 C. 10 D. 6 E. 5
19. ____ Honey bee workers police each other's reproduction by eating worker-laid eggs while preferentially leaving queen-laid eggs. (True or False)
20. ____ During emergency queen-rearing, some subfamilies are over represented in the queen pupae that are being reared compared to worker pupae in the colony. (True or False)
21. ____ A Cloake Board is used in:
    A. trapping adult small hive beetle adults
    B. feeding sugar syrup to a colony
    C. the management of swarming
    D. the rearing of honey bee queens
    E. feeding pollen substitutes to colonies
22. ____ Why are vegetable grease patties considered to be effective in helping to keep honey bee tracheal mite populations below damaging threshold levels? (1 point)
23. ____ Laying workers are more closely related to their sons than they are to sons of a queen within a colony. (True or False)

Two volatile compounds (semiochemicals) that are emitted from live European honey bee queens have recently been isolated and identified: A) E-β-ocimene and B) 2-phenylethanol. Please match the correct semiochemical with the appropriate queen condition. (2 points)

24. ____ volatile semiochemical that signals the presence of an unmated queen
25. ____ volatile semiochemical that signals the presence of an actively laying, reproductive queen.

ANSWERS ON NEXT PAGE

?Do You Know? Answers

1. Bees that perform hygienic behavior have the ability to detect, uncap and quickly remove diseased or *Varroa* mite infested larvae from their brood cells.
2. A) 15-20
3. **True** Olfactory cues (sense of smell) are believed to be involved in the mediation of hygienic behavior. Bees detect the odor of diseased, parasitized or dead brood under a wax capped cell, which stimulates them to uncap and remove the cell contents.
4. **True** Tests have shown that chalkbrood spores contained in foundation combs are a potential risk for the dispersion of the disease.
5. **False** To assure a palatable mead, naturally occurring and bakery yeasts should be avoided. Since honey is highly acidic, acid-tolerant champagne yeasts lend themselves nicely to mead making.
6. **True** When making mead, once the fermentative process has started in your fermentation container, it is important to exclude any foreign yeasts which could contaminate your ferment and thereby produce a substandard mead. Oxygen must also be excluded, because if it is present during the later stages of the fermentative process, vinegar will result.
7. E) 65 to 70°F.
8. **True** During mead making, since honey is composed primarily of sugars and water (with traces of vitamins, minerals and other substances), it is necessary to add nutrients to sustain the growth of the yeasts. These nutrients are available from wine supply stores. Pollen can be used as a nutrient source, using five tablespoons per gallon.
9. **False** In various tests it has been found that European honey bee drones typically fly 20-30 minutes earlier than Africanized honey bee drones which may give Africanized honey bee drones a slight mating advantage.
10. **True** Developing queen larvae receive more nurse bee visits than developing worker larvae. Experiments have shown that a developing queen larva receives 1,600 feeding visits from nurse bees, compared to the 143 feeding visits received by a worker larva.
11. **True** Sexually mature drones normally only fly during the afternoon and usually make several flights each day.
12. C) 13
13. Drones
14. **True** Sugar comprises around 12% of the wet weight of royal jelly but only about 4% of that of worker jelly.
15. **True** The neuromodulator octopamine has been shown to enhance the response of bees to olfactory stimuli and play pivotal roles in olfactory-based behaviors as a reinforcing signal during olfactory learning. Research has revealed that hygienic bees have increased levels of octopamine expression in their brains and nervous system. Thus it is believed that octopamine in hygienic bees causes them to exhibit a greater olfactory sensitivity to low concentrations of the odor associated with disease infected bee larvae. It has been shown that hygienic bees are able to discriminate between odors of healthy and diseased brood at a lower stimulus level compared to non-hygienic bees.
16. B)10
17. Uncapping of brood cells containing dead pupae
    Removal of cell contents
18. A)7
19. **True** Worker honey bees police each other's reproduction by eating worker-laid eggs while preferentially leaving queen-laid eggs. This policing activity targets eggs laid in drone comb.
20. **True** Larvae destined to be queens under emergency queen rearing conditions are not chosen at random but some subfamilies are reproductively dominant and are preferentially reared as future queens.
21. D)the rearing of honey bee queens
22. The grease patties interrupt the mite's ability to detect cuticular hydrocarbons on the body of the bee which are chemical cues used by the mite in finding a suitable host.
23. **True** Workers are related to their sons by 0.5, but to sons of the queen by 0.25.
24. B)2-phenylethanol
25. A)E-β-ocimene

There 13 points in each test level this month. Check the table below to determine how well you did. If you scored less than six points, do not be discouraged. Keep reading and studying- you will do better in the future.

Number Of Points Correct
13-11 Excellent
10-8 Good
7-6 Fair

Clarence Collison is a Professor of Entomology and Head of the Department of Entomology and Plant Pathology at Mississippi State University, Mississippi State, MS.

Treat Your Pets This Holiday Season

- with honey, of course

Ann Harman

It's that time of year! But panic has not set in yet – wait a couple of weeks for that. While you are awaiting the frantic list-making and last-minute shopping, stop for a minute and do some baking. This baking is going to be a bit different from the usual sugar cookies in the shapes of reindeer and trees, but these goodies will make you very popular with your friends – your dogs, cats and horses.

The children and grandchildren will find making the treats fun. Fortunately the recipes are easy to make and difficult to ruin. If too sticky, add a bit more flour. If too stiff, add a small bit of water or milk.

You can find some cute cookie tins at this time of year. Invest in an assortment so that you can give the treats you make as gifts via your other friends – people who own those dogs, cats and horses. The humans would certainly appreciate something homemade for their critters. While you are out shopping for tins, find some bone-shaped cookie cutters. These come in several sizes so you can make small-dog size or medium or large. The cats and horses do not need cookie cutters. If you can't find bone-shaped cookie cutters the dogs won't mind. You will want to cut their cookies into strips for ease in eating. You can use regular cookie cutters in various shapes but keep in mind that the dough is frequently very stiff. In addition dogs like to prop biscuits between their paws so some shapes may be awkward for them.

Remember that honey, slightly warmed, will mix easier. Also grease the measuring cup or spoons and the honey will slide out.

ROVER'S REWARDS

3/4 cup hot water or meat juices
1/3 cup margarine
1/2 cup powdered milk
1/2 teaspoon salt
2 teaspoons honey
1 egg, beaten
3 cups whole wheat flour

In large bowl, pour hot water over margarine. Stir in powdered milk, salt, honey and egg. Add flour 1/2 cup at a time, mixing well after each addition. Knead three to four minutes, adding more flour if necessary to make a very stiff dough. Roll to 1/2 inch thick and cut in shapes or strips. Place on greased baking sheet and bake at 325° for 50 minutes. Allow to cool and dry until hard.

This next recipe makes a large quantity but the treats will keep well in a tin. You can make different size biscuits and still have plenty to keep and give away. This recipe calls for cornmeal. If you know your dog is allergic to cornmeal or wheat you can try substituting rice flour.

BOW-WOW BISCUITS

1 package dry yeast
1/2 cup warm water
2 cups flour
2 cups warm chicken or beef broth
1 cup cornmeal
1/2 cup powdered milk
1 cup wheat germ
1/2 cup margarine or butter
2 cups cracked wheat
1/4 cup honey
4 cups whole wheat flour
1 egg, beaten

In small bowl dissolve yeast in warm water. In large bowl combine broth, powdered milk, margarine or butter, honey and egg. Add yeast/water and mix well. Stir in flour, cornmeal, wheat germ and cracked wheat. Mix well. Add whole wheat flour, 1/2 cup at a time, mixing well after each addition. Knead in the final amounts of flour by hand and continue kneading for four to five minutes until dough is not sticky. Pat or roll dough to 1/2-inch thickness and cut with bone-shaped cutter or cut into strips. Place on a greased cookie sheet, cover lightly and let set for 20 minutes. Bake in a 350° oven for 45 minutes. Turn off heat and leave in oven several hours or overnight. Makes about 3-1/2 pounds.

GOOD-DOG BISCUITS

2 teaspoons dry yeast
1/2 cup lukewarm water
2 tablespoons dry parsley
1-1/2 cups chicken broth
3 tablespoons honey
1 egg, beaten
5 to 6 cups whole wheat flour

In large bowl dissolve yeast in warm water. Stir in parsley, broth, honey and egg. Gradually blend in flour, adding enough to form a stiff dough. Knead on floured surface until smooth, about three to five minutes. Roll to 1/4 inch and cut with bone-shape cutter or cut into strips. Place about 1/4 inch apart on greased baking sheet. Bake at 350° for 30 minutes.

Remove from oven and turn biscuits over. Bake for additional 15 minutes or until lightly browned on both sides. Turn off heat and allow to cool in oven overnight.

Cats have their own opinion of foods to eat. They may well want to nibble on the dog treats – or not. They may like treats made with this next recipe – or not. Well, if the cats do not like this treat, perhaps the dogs will.

Cats like their treats in small pieces, about the size of dry cat food pieces. So be patient and cut the dough into small bits. It is easier to roll the dough onto a greased cookie sheet and cut pieces about 1/2 inch square right on the sheet.

KITTY COOKIES

1 cup whole wheat flour
1/4 cup soy flour
1 teaspoon catnip (optional)
1 egg
1/3 cup milk
2 tablespoons wheat germ
1/3 cup powdered milk
1 tablespoon honey
2 tablespoons butter, vegetable oil or canola oil

Mix dry ingredients together. Add honey, egg, oil and milk. Roll out onto greased cookie sheet and cut into small cat-bite-size pieces, about 1/2 inch square. Bake at 350° for 20 minutes. Let cool and store in tightly sealed container.

You might not own a horse but one of your friends might. And that horse would appreciate a treat. Mine certainly do. A treat like these biscuits must be a nice change from grass and hay.

HORSE BISCUITS (not Seabiscuits)

1 cup oatmeal
1 cup flour
1 cup shredded carrots
1 teaspoon salt
2 tablespoons vegetable oil
1/4 cup honey (or molasses)
1/4 cup water

Mix oatmeal, flour and salt. Mix in shredded carrots. Then mix in rest of ingredients. Roll into 1-1/2-inch balls. Place on cookie sheet. Bake at 350° for 15 minutes or until golden brown.

I wonder if Santa's reindeer would appreciate the Horse Biscuits more than the cookies laid out for Santa. I think they would.

At midnight, on Christmas Eve, all the animals are supposed to be able to speak. So you might want to present them with their treats early on Christmas Eve. Then you will be able to hear their thanks. BC

Ann Harman lives with her well-fed, happy animals in Flint Hill, VA.

All The Buzzz in...

Brought to you by Bee Culture Magazine - www.beeculture.com

Dear Friends,
Happy Holidays!
I'll see you next year!

Bee B. Queen

Win a PRIZE!

To All Bee Buddies

Send us a question you have about bees and we'll send you a surprise!

Maya is an 11 week old Bernese Mountain Dog living with Erin in Seattle, WA.

Tell your friends about honey bees and share how the bees make the wax.

Beeswax Smeezwax

Comb

First of all, the comb, the honey bees' home, is made of many small wax cells. The cells are like pockets where the queen lays the eggs to develop into adult bees. The cells are a great place to store pollen and honey that the bees use for food.

Wax scales

from the worker bee's abdomen

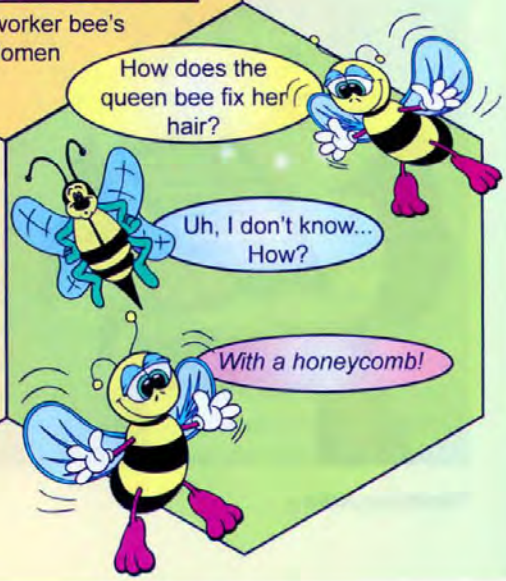
Where do the bees get the wax?

From their ears?

No, not from their ears. The wax comes from the body of the bees. Beeswax is an amazing material that is impossible for us to make. There are 300 different things in beeswax!

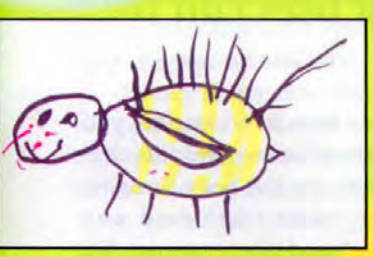
How do bees make the wax?

When a worker bee is around 12-18 days old, their job is to make the wax. They develop glands under their abdomens that produce the wax. The white wax comes out of their body between the segments on their abdomen. These pieces of wax are called scales. About 800,000 wax scales are needed to make 1 pound of beeswax. The worker bee needs to eat loads of honey to be able to make the wax.



... Bee kid's corner

Produced by Kim Lehman -- www.beeladyprograms.com



Bee art by Bee Buddy Jeremy, age 3, from Imperial Beach, CA

All of Your Beeswax

Draw a line from the words to the pictures with all these things that use beeswax.

Candles
Beard wax
Crayons
Batik
Ukrainian eggs
Polishes
Hand lotion
Soap
Lipbalm
Cosmetics










Making Lip Balm

Want to make a special gift for your friends and family? Lip balm is easy and inexpensive to make...

Basic Recipe

1. Melt 1 T. (tablespoon) shredded beeswax and 3 T. olive oil in the microwave. To do this put the ingredients in a recycled yogurt or cottage cheese container.
2. Place the container on a plate and cover with a paper towel.
3. Put in the microwave for about 2 ½ minutes.
4. Carefully take the container out using a towel or potholder.
5. Stir with a popsicle stick until all the wax is melted.
6. Pour into containers and let it cool.

We now have bee buddies in 16 states!

Some tips:

- You can use any oil like almond or coconut oil instead of olive oil.
- You can buy plastic containers for the lip balm at a department store. Plastic tubes and metal tins can be found on the Internet.
- If you want, you can add a teaspoon of lanolin. You can find lanolin at a health food store.
- Add flavoring right before pouring mixture into the containers (hobby stores carry flavorings).
- If you don't have a popsicle stick you can use a clean stick from outside, or an old pencil.

Beecome a Bee Buddy

Just 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) _____

Sponsored by *Bee Culture* Magazine

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

A DOZEN (plus) PROFITABLE THINGS FROM HONEY BEES

Herb Spencer

Beekeepers need to brag about how profitable honey bees can be!

We are all concerned about making a profit and are interested in what is most profitable. The honey bee has been overlooked for too long. The reason being, we are afraid of the bee stings.

One Let's look at the profitable aspects of keeping honey bees. Well, first; you don't have to own any land. You can live in a four-story apartment building, and have a hundred or a thousand beehives, all situated on someone else's land.

Two You don't have to build fences or large loafing sheds (small barns) for them.

Three You don't have to get up at night and check when they are hatching, as we have to do when cows are calving.

Four The honey bee works for (almost) nothing and feeds itself. If I could start a new breed of cattle, with sacks on their hind legs so they could go out and graze and fill those sacks and store it in the barn for Winter, I would be back in the cattle business, and might even have some hay to sell.

Five When the bees are swarming in the Spring and Summer I get calls from people as far away as 40 or 50 miles. The people are overjoyed that I would come and take away those 'awful bees.' Sometimes I get a "tip" of $10 or $20, as well as a good swarm of free bees. I've never had anyone call and say they had a calf or hog in the backyard and if I would please come and get it, I could have it.

Six When I had too many cattle for the pasture that I had, I drove around the country looking for more that I could afford to rent. When I get too many bees in the home yard, I start looking for another place to move some of my beehives to. It is nice to see about a 40 acre field of clover that's about ready to bloom. I'll drive up to the house and ask the farmer if I can put some beehives on his place. Sometimes he says "No Way, man!! I don't want any bees around me, I don't want to get stung!" I politely thank him and drive to the next place, sometimes just across the road to his neighbor and ask him about putting some beehives there and often he'll say "Sure!! I would love to have them here!" Then when I'm taking my honey supers off, the first farmer might flag me down and says that he wants to buy some of that honey. He doesn't realize that most of the honey came from his fields.

Seven There is very little costly equipment to buy, and it doesn't run on gasoline or diesel, and it lasts quite awhile.

Eight The honey that the bees produce is a small portion of the profit in keeping bees. The greater profit is in the pollination work that they do. Bees fly from the hive in all directions, pollinating the flowers they visit. They'll fly everywhere, pollinating wild berries, fruit, nuts, and the like, as well as the cultivated crops and fruits they encounter.

I have beeyards where there weren't honey bees before. Often, I'd notice very little other wildlife around. But within three or four years of having the honey bees in a location, you can see an abundance of wildlife that has wandered into the bee's foraging areas. They found more food and stayed and raised their young. We don't recognize the profit that the bees make, because it is not all in dollars and cents.

Pollination has been recognized by farmers, also by the fruit and nut growers around the world. Without honey bee pollination there would be less fruits, berries, nuts, and vegetables, and they would be smaller, misshapen, and, we'd have to pay higher prices to buy them.

The California Almond growers have recognized the profitability of the honey bee to pollinate their almonds. They paid $150+, per hive, to get bees brought to their state to pollinate their crop. Not enough honey bees could be found in the United States in recent years, so honey bees have been imported from other countries to pollinate their crops.

It doesn't matter how much a farmer spends on field preparation, fertilizer, and good seed to have a good crop. If it is not pollinated by the honey bees, he won't have a good crop.

Nine When I had cattle, and one of my cows and a couple of calves got over in the neighbor's yard, they would call me up and chew me out, telling me to come and get those cattle out of their yard! And to be sure to bring my checkbook. But when my bees or someone else's honey bees get into their yard or house, they call me and offer to pay me to come get them. More free bees, happy neighbors, and a few bucks profit from the bees.

Ten A lot of people think of the bees only for making honey. And yes, honey does make money. But honey has other advantages – it also makes a profit in money saved going to the doctor.

Honey helps heal cuts and burns in a lot less time than other remedies. Honey draws out the moisture from the wound, seals out the bacteria so that the wound will heal.

Honey helps clear up allergies to the pollen in the air if it is taken from the area where you live. It will help you to sleep on those nights when you have insomnia. Honey gets into the blood stream in about five minutes.

Eleven There is very little wintertime work, as the bees take care of themselves, if they have been left plenty of their own honey stores to eat through the Winter months.

Twelve There is very little competition as it seems that more people are getting out of the beekeeping game.

Thirteen The venom from bee stings will help prevent arthritis, and in some cases, cure it. So I can see a definite profit from the bee stings.

I met a fellow that I went to grade school with; he was coming out of Wal-Mart walking with a cane. When we were in school, he had six or eight white-faced cattle, and I had two or three hives of honey bees. I asked why the walking cane? He said that he had increased his cattle herd to over 300 head, and he had been butted, kicked, and banged around by those cows, until he didn't think that he had a joint that didn't have arthritis in it. He says that he spends about $40 a month for pain pills and arthritis medication.

He asked if I still had bees and I told him that I do and that I have been stung, and run out of the beeyard so many times by my bees, that I don't have a bit arthritis. He said that he should have been keeping bees.

Fourteen Several years ago, I bought some used hives and supers from an older beekeeper. I gave him two $20 bills. He couldn't come up with my change. I told him "Don't worry about it, I'll see you again." He said "Oh, no! I have the change, you wait here." He went out to a row of beehives, took the cover off one of the hives and took a frame out of it. He reached into that hive and got a Prince Albert tobacco can and put it in his pocket. He put the hive back together, and came back where I was standing. He opened the can and shook it, and out came about $30 or $40 in small bills. He said that someone had entered his house when he was gone one time, and took his money. He said that he thought that the bees would take care of it, and he hasn't lost a nickel since.

I see a profit right there. Yes ... "I think the honey bee is the most profitable thing you can put on a farm!"

So come next Spring, let's get out and encourage other people to enjoy the profits of keeping honey bees. BC

Herb Spencer keeps bees, and makes money from them, in Granby, Missouri.

Great Gift Ideas For Bee Gardeners!

Connie Krochmal

What a hectic time of year. The holidays can turn us all into grinches. But, shopping for gardening gifts need not add to the stress. Here are some gift ideas for bee gardeners that would work not only for Christmas, but for other occasions during the year, such as Father's Day, Mother's Day, and birthdays.

Generally, gardeners appreciate practical garden-related items.

Take the Germination Station from Hydrofarm, for example. This is a perfect gardening gift for those who start their own plants from seed. It includes a heavy duty plastic flat and a 72-cell plastic insert. My seeds germinate quickly and evenly in this four piece, tabletop, mini-greenhouse kit due to the heat mat that fits under the flat. I fill the plastic insert with moistened seed starting mix, and plant the seeds. Then, I place the clear plastic dome over the tray, which keeps the soil moist and warm. With the deep cells in the plastic insert, my seedlings develop healthy root systems, making them easy to transplant.

Few gardeners can get along without a watering can. One particular brand stands out in the crowd. After using my Oxo Good Grips Pour and Store Watering Can for spot watering, I can't imagine gardening without it. This makes a wonderful gift. I find the continuous soft, nonslip handle is easy to grip and comfortable on my hand. For small plants, I use the removable rose attachment on the end of the spout. When not in use, the rose stores in the back of the fill hole. The spout rotates towards the can's body for filling and storing in tight spaces. For easy measuring, look for the water line on the translucent spout, which lines up with the water levels on the body. Available in six colors, Pour and Store comes in two sizes – the 2.11 gallon/eight liter, and the 3.17 quart/three liter.

When it comes to garden hand tools, bee gardeners need ones that can withstand years of use. And it certainly doesn't hurt if they're ergonomically designed. I experienced quite a bit of wrist and hand pain before I started using the NRG Radius brand of tools. The four-tool set makes a fine gardening gift. Guaranteed for life, these are made to last.

The unique curved handles serve to maximize comfort and minimize stress to the hand and wrist. The fact that they're lighter than most garden tools also increases their comfort. Yet, they're equal in strength to other brands. The iridescent lime green, soft, comfortable handle is made from a special non-latex plastic, specifically developed for Radius tools in cooperation with Exxon.

The NRG bulb trowel has depth markings right on the blade. This is slightly longer than the regular NRG trowel. I use my NRG weeder to remove stubborn perennial weeds. The notched edges help streamline the weed removal process. The set also includes a three-tine hand cultivator, which comes in handy when preparing flower beds.

With brands to suit every taste and budget, pots and planters are great gardening gifts. Self-watering pots and containers make a lot of sense for busy bee gardeners. I'm particularly pleased with the Garden Patch Planter. During the hot Summer months, all I had to do was check the water level from time to time to be sure it hadn't dropped too low. The fertilizer application that came with the kit lasted for three months. So, there was no need to replace it during the growing season.

I followed the quick and easy assembly instructions, and filled the top of the planter with potting soil. Then, I set my nectar plants in place. The Garden Patch Planter is suitable for all sorts of plants, including bedding plants, and annuals as well as vegetables. The instruction booklet has step-by-step directions and planting diagrams, showing how many of each plant type would be needed. Designed to last for years, this attractive, plastic planter is the color of terra cotta.

Gardening and beekeeping are hard work. When sore muscles and joint pain are the result, I rely on All Terrain

Recovery Rub. This soothing herbal cream does the trick so that no pain relievers are needed.

Gardening takes a toll on my hands. That's when All Terrain Healing Hands Rub comes in handy. With herbs and natural oils, this soothes dry, chapped or cracked skin, and heals minor abrasions.

For cleaning gardener's hands, nothing is a match for All Terrain Grime Bar. I wouldn't be without it. Designed to remove grease, grime, and grit, this functional, natural, hand-milled soap provides extra cleansing power. At the same time, its special ingredients help retain the skin's natural moisture.

Anyone who is allergic to poison ivy has developed a dread for this plant. All Terrain Skin Relief Bar is designed to cleanse and soothe itchy, irritated skin that can result from rashes and skin discomfort – particularly problems caused by poison ivy, and poison oak. With herbs and natural ingredients, this calms the itch as it cleans.

So far as other gardening aids are concerned, bee gardeners need useful garden items that won't gather dust in garden sheds or garages. Charley's Greenhouse and Garden catalog features many foolproof gift items that don't cost a fortune. For those with fruit trees, help that gardener pick fruit easily and safely without a ladder. The lightweight, easy to use Fruit Picker from Charley's has a nine-foot-long handle and a cushioned wire basket to protect the fruit from bruises.

For serious gardeners, cold frames extend the growing season. Charley's offers several sizes and styles with an optional automatic, self-venting system that opens on warm days. For colder climates, you might want to include a soil heating cable.

Unless that gardener has installed an irrigation system, gardening hoses make suitable gifts. Available in 15 and 25 foot lengths, Charley's Hose and Wand Set has solid brass, leak proof couplings. Lightweight and easy to use, this features an excellent recoiling memory that enables the coils to spring back for easy storage. It is made to resist kinks, sunlight, and extreme changes in temperature.

Charley's Electronic Soil Analyzer is an ideal gardening gift. This four-way meter takes the guesswork out of gardening outdoors and indoors. With this invaluable aid, gardeners can test their soil pH level, and see whether they need to add fertilizer or water. Permanently calibrated and easy to use, this has three probes that read the soil and provide instant readings. Just move the switch to light meter mode for light readings.

A gift certificate from Territorial Seed Company would enable that gardener to buy whatever he/she needs. Despite the name, this company also sells plants, bulbs, and gardening/farming supplies. Unlike most mail-order companies, they issue two catalogs a year – one in the Spring and one in the Fall. Its specialties are non-genetically engineered seeds, certified organic seeds, and seeds of heirlooms. In addition, Territorial also sells traditionally bred varieties. The catalog features seeds of flowers, vegetables, herbs, and cover crops along with fruit plants, and vegetable plants. Since the company has its own organic trial gardens, it can identify and recommend the best performing varieties.

Bee gardeners will also appreciate the fact that Territorial has a complete line of beneficial insects, such as ladybugs, and praying mantis egg cases. Among their gardening supplies are seed starting aids, cold frames, row covers, and special plastic mulches.

When it comes to plants for the bee garden, nothing can match the Proven Winners line. Over the years, this has become America's leading, premium brand of plants. Among these are the Proven Winners annuals, Proven Selections perennials, which include herbs, and ground covers, and ColorChoice shrubs. These are available at garden centers, nurseries, and other retail stores. Sold in clearly marked Proven Winners pots, they're easily recognized. In the Spring of 2006, I received trial plants of some new 2007 varieties to try in advance. I can highly recommend the following ones as gifts for bee gardeners.

Proven Winners Senorita Rosalita Cleome or spider flower is a wonderful annual that blooms from late spring until frost. It reaches about three feet in height. In comparison to seed-grown cleomes, this improved variety has numerous, strong, upright stems and attractive, dark colored foliage. Flowering freely, Senorita Rosalita brought masses of vivid pink blossoms. Like all cleomes, this proved to be a favorite with the bees.

Among the new Proven Winners ColorChoice shrubs of interest is the floriferous Golden Anniversary abelia (*Abelix x grandiflora* Panache). Suitable for bee gardens, this dwarf shrub only reaches two feet or so in height. The vivid foliage has irregular splashes of gold among the green. Golden Anniversary is well suited to mixed borders, flower beds, and containers. In addition, it would be suitable for foundation plantings and as a ground cover. This nectar/pollen plant is hardy to USDA zone six.

In addition, Proven Winners is also introducing My Monet weigela, which happens to be a great bee plant. Noted for its petite size, this grows to about 1½ feet in height with an equal spread. Small enough to grow in tubs and planters, it is also suitable for perennial beds and borders, and confined spaces. Mine was covered with pinkish-purple, tubular blossoms for about six weeks during the late Spring. My Monet has gorgeous, variegated foliage with white along the edges. Pinkish tinges appear on the new growth. This shrub is hardy to zone four.

Books remain one of the most popular garden gifts. Readily available, these are affordably priced with titles to suit every interest. Of all the gardening books on the

Continued on Page 39

Thoughts Of A New Beekeeper

Jory Shepherd

This is my tale of how a queen, 60,000 bees and a Beekeeper *Extraordinaire* changed my outlook on life.

Like so many others experiencing divorce, I was "*living*", but in a fog. Author Sue Hubbell described it as being "out to lunch" in her book, *A Country Year.* I know exactly how she felt, even though I wanted *my* divorce more than anything. My life was steeped in depression and anxiety. I truly believe that my family and friends were beginning to give up on me. I was scared to be alone because I wasn't sure what I was going to do next. I felt like I would never smile again.

Then I saw an ad in the local newspaper which told of a Beginner's Beekeeping Course offered by the local beekeepers. Before I could stop myself I called and registered. As the night of the first meeting got closer my nervousness began to grow. I can't describe how nervous I was when I walked into a room full of strangers at the County Extension Office to take the Beekeeper Course! I have always been interested in honey bees and wanted to "keep" bees, but I get nervous among strangers. I looked around the crowd for a friendly face and then I spotted Howard. He looked up and caught my eye and smiled, but just a little. I secretly called him the Bee Master (you'll have to read the *Keeper of the Bees* by Gene Stratton Porter to understand that one!). I think it was his white hair that got to me.

My Mentor

I made up my mind to get my North Carolina Certified Beekeeper's License, get my *own* bees and "get out of there!" I didn't really want to hook up with any of the beekeepers. I'm a single mom; work full-time and I just don't have time for meetings and such. But before I knew what was happening, I was a certified beekeeper; Howard was my personal mentor and even better than that...my dear friend. Howard is one of North Carolina's few "Master Craftsman" Beekeepers, so I am very privileged to learn from him.

The day we were to enter a hive for the first time, it rained (of course). Instead we cleaned about a million of Howard's honey frames, maybe more. I learned really quickly that when he calls and asks what I'm doing to "beat around the bush" until he says what he wants, just in case it's something I don't want to do. While we were cleaning these honey frames something interesting happened. I found out our 44-year age difference doesn't matter because we can talk about anything. I found Howard's been divorced too, so there was a lot to talk about there. I felt like a little old man sitting in his barn cleaning honey frames in the rain, seeing who could out talk the other. I was finally beginning to live again and I still wonder how this man reached me when no one else could. I believe it was a combination of his understanding spirit and the magic of the bees. Here was someone who didn't judge me.

And then there were the wonderful honey bees! I realize now that if I had stuck to my original plan to ditch the beekeepers and try to keep bees on my own I would have already quit. The first time we opened the hives and the bees came out I wanted to high-tail it out of there, but Howard calmed me down. Underneath that sweet exterior, he can be pretty tough when he needs to be. He had to constantly fuss at me to slow down.

Howard gets me into some of the most ridiculous predicaments and I know that if he asks for about an hour of my time to count on it being three. He always has me drive his pickup when we visit one of his bee yards. It wouldn't be so bad except that his truck is a manual transmission! Once he sat on the back of the truck ***on a stool*** with a hive of bees, while I drove. I can only imagine how we looked going down the road, with Howard sitting on a stool on the back of the truck with a bee veil on, while I grinded gears and jerkily drove along with the him hanging on for dear life! I still laugh at the image, but I wasn't laughing at the time. I was too worried about him falling over the side.

Another time I got his truck stuck in a field of mustard greens and he had to get us out. I think it made him feel good when he drove right out of the field without a hitch! Then there was the time we were going to burn a bunch of old equipment infected with American foulbrood. Howard poured gasoline on the whole mess and lit the long wick he had made out of a trail of gas. I turned my back and the next thing I knew old inner covers and supers shot 10 feet in the air and almost gave me a heart attack from the enormous "bang." I can still hear Howard laughing.

Every time I opened my own hive, I found myself thinking of Howard and his situation. He lives alone and has failing eyesight due to complications from diabetes and I find myself constantly worrying about him. Does he want my sympathy? Heck, no! But he *does* want my friendship and my help. I only wish I had more time for him. Every new beekeeper needs a mentor like Howard.

As a new beekeeper I spent a lot of time with my bees learning their habits. I sat by the hive as often as I could just observing and making notes. I read every book I could

find on the subject, and when someone would call and ask for me, my daughter would say, "she's with the bees again!" My friends hated to see me coming, because all I talked about was bees, honey, pollination and anything else connected to beekeeping. I tried to convert everybody to beekeepers including my own mother.

I had been a beekeeper for a little over six months when I began to suspect that my bees had contracted American Foulbrood (from God knows where). I called Howard immediately and he had a friend drive him over and although he wouldn't say for sure, I could tell by his crestfallen expression that I was correct in my diagnosis. Later we found that 20 of Howard's hives were to meet the same fate. That was the day I realized how ferociously Howard loves hisbees. When I found out that I must kill my hive to stop the disease from spreading I had to fight back tears and so did Howard! I didn't realize I had become so attached to *my* bees. Aren't beekeepers supposed to be tough? One of the other beekeepers called me a wimp, because I couldn't get rid of the infected hive and Howard had to do it. But Howard said that's okay, he was proud of me for recognizing the disease in the first place.

So I didn't get to "Winter" my bees. Something I was looking forward to trying because a lot of beekeepers in my area lose their bees over the Winter from starvation or disease and I wanted to try my own luck. Again I was ready to quit before I even really started beekeeping. Howard intervened and I now have two packages on order for the Spring! I figure if Howard can lose 20 hives and come up swinging, surely I can pick myself up and do the same. I'm working on getting my hive stands positioned where Howard said to. He always hated the place I picked for my original stand! On cold days, I sit beside the woodstove in my basement, painting equipment and getting ready to put the bees in their new homes. (Our state has a gas chamber to treat equipment after it's been infected with American Foulbrood, so I'm thankful I don't have to buy everything again.)

As for Howard, the other day I decided to go see him. I didn't even call, I just showed up. I could tell he was pleased to see me. Before I left, he wanted to show me something in his basement and as we passed by his washer and dryer I could tell he wanted to ask for my help, but he hesitated. So I asked if there was something I could do for him. He sheepishly asked if I could sort his socks, because he couldn't see to match them up. While I sorted what seemed like an entire load of socks I asked what he would have done if I hadn't have happened along. He said he guessed he would have worn mismatched socks!

I'm so glad I saw that ad in the newspaper because I may never have met Howard if I hadn't. We're happiest when we're working side by side among the bees. And even though my bees are gone for just a little while, the thrill of being a new beekeeper is still there. And when things are a little slow in the beeyard, I can always sort socks! BC

GIFT IDEAS ... Cont. From Pg. 37

market, I find the following titles to be the most helpful.

"Vegetables, Herbs, and Fruits-An Illustrated Encyclopedia" from Firefly Books is by far the most comprehensive title on the subject. A must-have for those growing edible crops, this is by three leading experts in their respective fields – Matthew Biggs (vegetables), Bob Flowerdew (organic gardening), and Jekka McVicar (herbs). It contains everything gardeners need to know for over 70 vegetables, 100 herbs, and 100 fruits and nuts. This book emphasizes organic and non-toxic means of coping with pests and diseases. It even explains how to choose companion plants.

Easy to use, this unique guide features A-Z entries with an in-depth profile for each crop featuring a brief description, and history with instructions on choosing, growing, propagating, and caring for the plant along with tips on harvesting, and storing. With delightful recipes, the uses range from the culinary to medicinal and cosmetic.

In addition to the plant encyclopedia, this title also contains a section with general gardening information. It has a garden calendar, and details on garden planning, crop rotation, and organic pest and disease control. In addition, this includes a number of sample garden designs complete with planting plans.

Reader's Digest "1001 Hints and Tips for Your Garden-An A-Z Guide for Solving Almost Every Garden Problem" belongs in every gardener's library. This in-depth, user-friendly guide features 1500 color illustrations and over 200 quick and easy charts and checklists. The A-Z dictionary covers all aspects of indoor and outdoor gardening, including plants as well as plant problems, tools and gardening aids, garden structures, and much more. There are also entries for various types of plants, such as annuals and bulbs.

Throughout the book are boxes giving quick tips and lists of recommended plant varieties. The dictionary is cross-referenced for convenience. In addition, there are 12 in-depth chapters devoted to specific gardening topics, such as heirloom vegetables, heirloom roses, wildflower gardens, herbs, color, and fragrance.

An extensive gardening calendar explains what to do when for the various areas of the country. Gardeners will also find a very helpful section on plant problems. This features color photos of 108 plant pests, diseases, and conditions with descriptions of the plant damage and suggested treatments. For the most part, this book emphasizes organic controls and preventive cultural measures.

This sampling should be enough to get holiday shoppers going when it comes time to look for practical gardening gifts. BC

Connie Krochmal is an award winning garden writer and a beekeeper in Black Mountain, South Carolina.

WINTERING WEAK COLONIES

Yet Another Change of Plans

James E. Tew

Why are they weak?

This is the third article in an unintended series of somewhat negative articles in which I have described my battles with colonies that are too light going into the upcoming Winter. Because they began the year as splits or packages and because last spring's nectar flow was minimal, about half of my colonies are dangerously weak. I began to write these pieces for you when I realized that a lot was hanging on my colonies getting a good Fall flow. In retrospect, this past Fall's nectar flow was below average, but at least there was something. My guess is that about 50% of my colonies are okay while the other half are in harm's way. That pretty much brings you up to date. Now, I am wintering weak colonies. How can I be helpful to these stressed colonies at this time of the year?

The feeders

I used top feeders, of various designs, some "quail waterers", and I had planned to use division board feeders. In the November article I stated that I did not intend to open feed. I also said that my efforts to assist should be helpful and not harmful to stressed colonies. My report that follows presents mixed results.

I did put the top feeders on and I did transport corn syrup to the yard, but the process was less than satisfying. I have a variety of top feeders – some beekeeper-made and some commercial-made. The commercial units are made of either wood or plastic or some combination of both. I presented a photo in October of a general collection of feeders. I would like to present the following comments about top feeders.

Plastic hive top feeder.

Hive top feeders

1. Colonies should sit level.

For those of you never having used them, from the outside, top feeders look like a shallow super with a bottom attached. If they are commercially-made of plastic, they look like a strange "thing" atop the colony. Inside the feeder is a partition that runs either the length or the breadth of the unit that allows bees access to the feeder. The black top feeder shown in the figure has the feeder partition running lengthwise.

Beekeepers are instructed, from day one, to position their colonies so the hive leans slightly forward. This angle prevents rain water from accumulating inside the rear of the hive. This angle means that the liquid feed does not touch the feeder screen level all the way across. In the black feeder pictured, this is not a problem because bees can reach the feed at any level, but in feeders having the access running across the feeder, as the syrup level drops beyond the bees' reach, bees cannot completely empty the feeder. The red hive top feeder pictured shows this restricted configuration.

A small amount of feed would be left in red top feeder on the low end. Bees cannot get out into the feeder to gather the remaining feed. This is not a big problem, but I am left with each feeder having a few ounces of feed to be spilled and scattered on me and my truck. But read the next comment.

2. Bees should not be allowed in the hive top feeder body.

Bees should only be allowed in the feeder access and not in the reservoir. If bees are allowed into the feeder reservoir, they seem to have no luck finding their way back into the hive. They die in the feeder reservoir in significant numbers. While the red feeder[1], having an aluminum insert, does require sitting perfectly level, it allows no bees access to the reservoir while the hardware cloth on the black feeder lets bees too many bees by. Many bees died in the feeding process in this type of feeder.

Many years ago, I built about twenty-five hive top feeders and I built them well. However, I encountered the problem with remnants of syrup remaining so I cut a small opening to allow bees to finish up the feeding process in the reservoir. I have had to go back to the woodshop to plug each of these holes to prevent killing so many bees in the feeding process.

3. The hive top feeder MUST be perfectly covered.

Robbing is a serious problem frequently encountered when feeding large populations of hungry bees. As you position feeders and install feed, a robbing frenzy starts that is truly amazing. If robber bees can get under the inner and outer cover into the feeder reservoir, they will enter in great numbers, and they will drown in the feed in great

[1] If anyone knows who manufactures the red top feeder with the aluminum insert shown in the photo, I would appreciate if you would let me know. There is no name on the device.

Horizontal feeder access.

numbers. It results in a mess. An Alabama beekeeper told me he sticks on strips of the dense foam insulation used to weather-strip windows or doors. It's about 3/8" thick and about 1" wide and is sticky only on one side. While I have not used this procedure, it is simple and reasonable. Otherwise, I will need to completely scrape all propolis and wax from the inner cover (or outer cover) in order for the cover to sit completely flush with the hive top feeder at all points.

4. The top feeder must not seep nor leak.

Even if the robbers can't get in, they attack the colony being fed frantically searching for any opening. The leaking/seeping feeder is an attractive beacon that should be avoided.

Robbing – irrational bee behavior?

You don't have to be a gifted beekeeper to know that hungry colonies in the Fall are prime candidates for aggressive robbing behavior. I knew that point before starting this feeding process. With nearly 40 colonies in this yard, how could robbing not be an issue? In fact, it was so great an issue it became a worthless task to open the colonies and remove frames to install division board feeders. I never even took this style feeder from the truck.

The robbing scenario in my apiary

Robbing behavior starts slowly. I can usually work two to three colonies before noticing too many bees that are too curious and trying to enter the hive via any crack or crevice. As I move to subsequent colonies, the number of inquisitive bees grows and become increasingly annoying. They get in the syrup bucket, they get into the feeder reservoir, and they hang around to explore the colony that was just worked. They frantically check any empty hive equipment sitting around and bits of burr comb on a removed queen excluder is like Thanksgiving Day dinner. There are an ever-increasing number of frantic, flying bees. It looks like a swarm is in the air. I don't mean to be dramatic and I don't have good science to support the following comment, but it seems like there is a point where the yard abruptly erupts into an uncontrolled robbing frenzy. Even if I work fast and close entrances, the robbers give me no chance to complete the feeding task before they are exploring the opened colony. *(At this point, I have some concerns about screen bottom boards. Does the openness of these colonies make them more attractive*

Colony being attacked by robbers.

to robbers?) Some colonies are attacked worse than others but all are explored by the busy-body robber bees.

It is unfair to tell most of you that my biggest asset is having a box truck that is very nearly bee-tight. It's a luxury that many of you don't have. If I were using my open truck, I would have had an even greater problem and I would be required to keep all equipment closed while sitting on the truck bed.

As per the instructions in many bee books, during early morning hours of the following day, I put out a large open feeding container and poured five gallons of syrup in it. I had not planned to use the open feeding procedure but neither had I planned for such vicious thieving. In theory, the open feeder should keep the robbers occupied while I work the other colonies.

Open feeding really didn't help and only made things worse. I tried to smoke and disturb all colonies in the yard so that all were defensive rather than some being offensive. That, too, didn't help. Since my yard is accessible to the public, I considered posting a sign notifying joggers and dog walkers to beware, but night was falling the situation seemed to be subsiding.

Even if some colonies were still very light, my feeding efforts were killing more bees and stressing light colonies even more. I can only wait for cooler days when the bees are not so prone to flight and try to feed then. I am not defeated, though this will continue to be a troublesome task. Obviously, if I can pull this feeding project off, you will learn of it in upcoming articles.

Honey and syrup pumps

In the November, 2006, issue of *Bee Culture*, I described a modification of Kelley's gasoline comb filler. Since Kelley no longer makes the machine, it is a moot point for those of you not already having one of the devices. The engine spins a centrifugal pump that sprays empty combs with syrup. I had hoped to modify the comb filler device to pump from syrup drums on the truck directly to the feeders on the colony. This modification may still work, but the excessive robbing behavior made it cumbersome to pull the device around the apiary. Until next spring, this project is on hold.

However electrically powered pumps proved invaluable when pumping syrup from the drums to five-gallon buckets. Several of these pumps are older model gear-driven pumps rather than belt driven pumps. Kelley representatives told me that these gear driven pumps were discontinued in favor of belt-driven pumps due to the ever-increasing costs of the geared wheel. I tell you this because these pumps are commonly available as used beekeeping equipment. If you get a chance to buy a used one, do it. The pump seems to run forever and motors are easy to come by.

I was rushing to get these pumps pumping so I could get to the beeyard. It is a common problem for these devices to be jammed with crystallized honey or syrup. I found that using a heat gun, though a hair dryer would work, to heat the pump re-liquefied crystallized honey and freed the pump up. However, these pumps only have two moving parts inside so opening them up is simple. If you do disassemble them, replace the paper gasket which is available from Kelley. Without these pumps, I don't know how I would have gotten the syrup out of the drums.

Points I wanted to discuss with you, but my space is filled

Screened bottom boards.

On a few colonies having screened bottom boards, I left the metal insert in place during the warm months. Healthy wax moth larva happily lived there on the hive droppings, just out of reach of the colony's housekeepers. How serious is this to the colony?

Silly Fall swarms

I had several little strange swarms this Fall. They didn't act right, didn't appear to have a queen, and certainly were not worth hiving. What was that all about?

Some good colonies and some poor colonies

It's puzzling why some of my new colonies did fine while others were exceptionally poor producers. I can see neither rhyme nor reason, but there is clearly a cause.

For now, that's all

While many of the colonies did make a modest Fall crop, I will have to continue to struggle to keep the light colonies alive through the upcoming winter months. We're supposed to have a mild Winter, which should help. If necessary, I have yet another plan to feed a fondant mixture during winter months to see if that buys me and my colonies some time. Though I have been less than positive in my last three articles, I still am enthralled with beekeeping and will keep trying to keep bees properly. Don't confuse my frustration with discouragement. It's just me complaining. BC

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Those Blueberry Pollination Blues

Larry Connor

While the relationship between the honey bee and the blueberry flower takes some effort to understand, it is an extremely useful and valuable case study of pollination and bee botany. Blueberries are rapidly growing in popularity due to their anti-oxidant properties and as a highly eatable berry. The plants are grown in a number of states in the USA and Canada and there are different species in these regions. Each cultivated type has varieties (cultivars) that are variable in their relationship with different pollinator species.

Native to North America, the blueberry genus *Vaccinium* spp. is commercially represented by highbush, lowbush and rabbit eye species grown in different parts of the continent. In areas like Michigan, New Jersey and adjoining states, the highbush blueberries were selected from two species: *V. australe* and *V. corymbosum*. These berries are sold fresh and for processing. The rabbiteye blueberry is the southern species *V. ashei* and is being planted in an expanding range as growers tap into the early market for the berries. The lowbush blueberries of Maine (and elsewhere) are hybrids of *V. augustifolium* and *V. myrtilloides*, although hybrids of lowbush and highbush blueberries are found as numerous clones throughout the northeastern part of the continent. Most of these berries are used in processing or offered in the frozen food section.

With this wide range of genetic diversity, we would expect a similar diversity in pollinators, but that has not been the case. Bumble bees are identified as the most common native pollinators on the plant, and reflect a strong co-evolutionary relationship between flower and bee. Indeed, other than the introduced honey bee, there are relatively few pollinator visitors to blueberry flowers other than bumble bees. The challenge of using bumble bees, of course, is the difficulty of providing them in large enough numbers for commercial plantations in areas where they do not appear naturally, although low bush blueberry growers in Maine are promoting their natural bumble bee populations. Since bumble bees visit blueberry flowers under cooler, wetter and more overcast conditions than honey bees, there are seasons when a small number of bumble bees are responsible for a significant portion of the pollination activity in the plantings. As a result, some growers rent both honey bee and bumble bee colonies as added protection for crop production.

Blueberry flowers of some varieties set fruit through self-pollination, but the fruit are smaller and very slow to ripen. Certain cultivars are completely or nearly self-sterile, so cross-pollination with another cultivar is essential and economically vital to set a good berry crop. This has resulted in the recommended cultural practice of interplanting different cultivars of blueberries in the same plantation, allowing for increased pollen transfer from one cultivar to another. (Ironically, some early research reported that blueberry flowers were self fertile, and as a result, huge blocks of single cultivar plantings were made in New Jersey and Michigan resulting in chronic low berry yield). This changed when studies like one reported in 1969 showed that berry production and seed yield increased when increased with levels of hive rental on highbush blueberries in Michigan and Indiana (see table below). It dramatically showed the role and advantage of honey bee pollination on the production of this crop. The yield in weight of berries increased by a factor of two, but the number of seeds increased nearly six-fold.

Number of colonies	Berry Weight (ounces)	Seeds per berry
None	160	4.9
2 colonies per acre	290	23
5 colonies per acre	335	28

A well-pollinated blueberry is easily identified by its larger size and the presence of developed tissue inside the ring of seeds. Un- and poorly-pollinated berries do not have a center area of developed tissue, while well pollinated berries have tissue that has developed around the seeds as a result of plant hormone secretion by the developing seeds.

This is just one study showing the benefit of supplemental honey bee colonies in blueberry pollination. In all areas of the continent where blueberries are produced, growers rent honey bee colonies for increased yields using anywhere from five to ten colonies per acre to pollinate unattractive cultivars that require bee visits. Less attractive highbush cultivars include "Weymouth", "Coville" and "Earliblue," but this list is far from complete. Even plantings of attractive cultivars indicate a need for one or two hives per acre as justified by increased berry production.

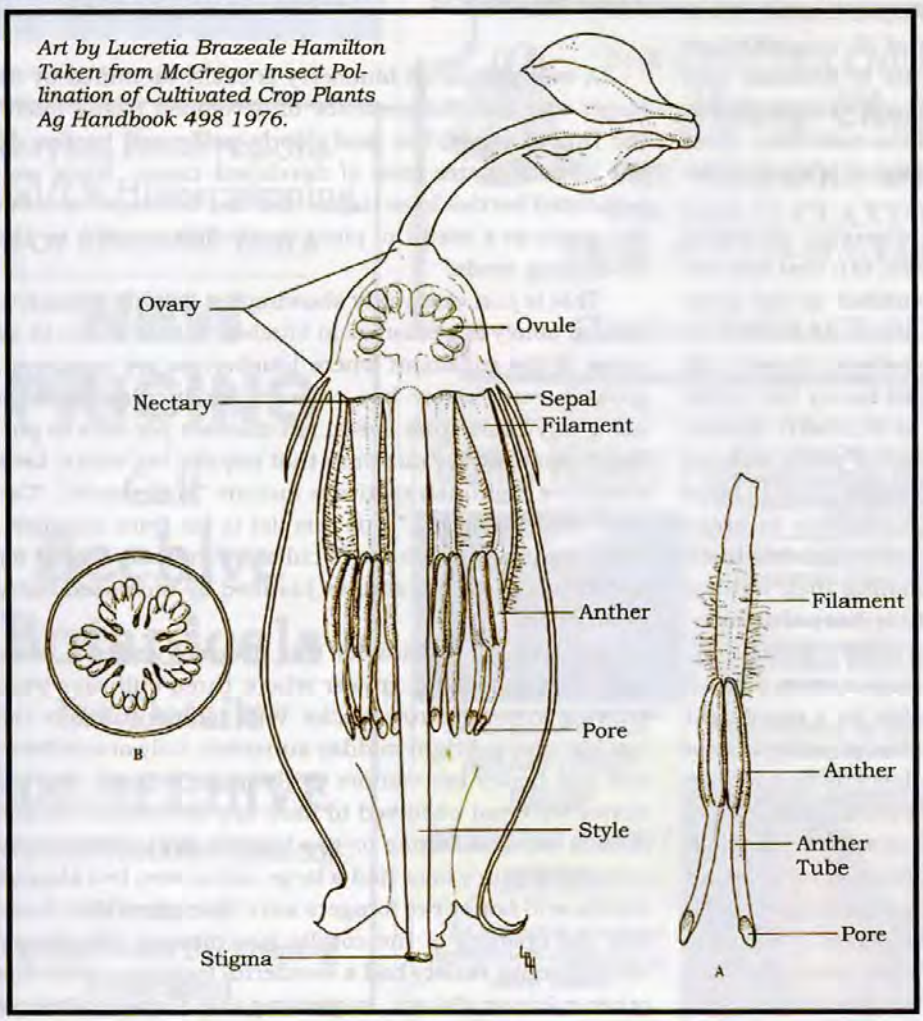
To take the photos for this article I visited a commercial Connecticut grower where three cultivars were growing in parallel row blocks. With temperatures in the low 80s and in bright midday sunshine, only one cultivar had any honey bee visitors working the flowers; two varieties were not observed to have any pollinators on the flowers other than one or two bumble bees. The variety attracting honey bees had a large, attractive, bell shaped corolla and honey bee foragers were able to put their head into the opening of the corolla (see photos). The honey bee attractive variety had a wonderful fragrance while the other cultivars did not, suggesting that there are factors

other than nectar production affecting bee activity. If honey bees did visit the other two cultivars when I was not looking they might have difficulty getting their head into the corolla. This *might or might not* interfere with their ability to collect nectar from the flower. To pollinate these flowers, bees must be supplied in large numbers to saturate the area with foragers, thus increasing the number of flower visit attempts.

Looking at the structure of the blueberry flower we see a remarkable flower form that seems to be designed for a buzz pollinator like the bumble bee. There are eight to 10 stamens with anthers at the end of the filament, each with a long anther tube with an open pore at the bottom. Pollen is not released inside the flower like it might be in apple flowers, but must vibrate or fall down the anther tube and onto the body of a bee clinging to the downward pointing flower. This design is perfect for a bee that vibrates or buzz-pollinates the flower as bumble bees do. Honey bee movement on the flower causes varying amounts of pollen to fall, but in the buzz-pollination scenario, more pollen is vibrated by buzz vibration and falls out of the anther tube and onto the bee's body. This is similar to the bumble bee pollination of tomato flowers (honey bees are not attracted to tomato flowers and do not pollinate them), but in the case with blueberry flowers honey bees are able to collect nectar from the floral nectaries at the base of the corollas by inserting their tongue into the open corolla, even if their head cannot get into the corolla. Blueberry honey is obtained by bees foraging on those selected cultivars that have good sunlight, easy access and few visiting bees. Since not all cultivars produce much nectar, further study might help identify the characteristics that make certain varieties attractive to bees; these traits should be incorporated into blueberry breeding programs.

With some cultivars, honey bees are able to collect a large amount of blueberry pollen, suggesting that there is considerable difference in the amount of pollen released during flower visits as determined by cultivar. Some cultivars are apparently more successful in releasing pollen to honey bee pollinators than others.

The white or pink corolla is bell shaped and may be one-quarter to one-half inch in size. The corolla hangs downward to facilitate vibration/buzz pollination, and once pollinated the flower points upward and is no longer visited by pollinators. A single pistil is as long or slightly longer than the corolla and is positioned away from the opening of the anther tube pore so that self-pollination is unlikely; but the stigma is easily covered by pollen by visiting pollinators. It will remain receptive for five to eight days but is usually pollinated in less than three days. Once pollinated the flower loses its attractiveness to bees, then the fruit take two to four months to mature, and each blueberry has the potential to hold up to 65 seeds. The presence of developing seeds in the blueberry has been shown to increase sugar content of the berry, making it more attractive to human consumers. The advantage to the grower from honey bee pollination is a larger, faster ripening, and sweeter berry crop. In my own limited experience of growing blueberries in my yard, every year I found a few berries that developed slowly, not ripening until October or November. On examination, these berries were small, seedless, and unattractive to taste. The well pollinated berries were harvested in August.



Growers quickly moved to increase colony rental for blueberry pollination in the 1960s after a Michigan State research project showed the benefit of honey bee saturation. To this day, blueberry plantations are provided with five or more colonies per acre when cultivars unattractive to bees are in production. Further horticultural-genetic work is needed to identify the cultivars that are attractive to

bees (due to increased nectar secretion, sugar concentration, floral odor and other factors of floral attractiveness) that would allow growers to inter-plant desirable varieties that fully support pollinator activity.

As in many pollination scenarios, growers frequently blame any failure in crop set on insect damage or frost. This was often the case when there were reduced blueberry crops, but the real factor is the lack of adequate pollinator activity on the flowers, and the lack of a compatible cultivar for cross pollination. In high bush blueberries the percentage of flowers that should be set is close to 100%, and a viable crop is obtained only when 80% or more of the berries develop. Low bush blueberries have traditionally had much lower berry set, perhaps as low as 10%, yet Maine apiarist Tony Jadczak reports that blueberry barren owners (often large timber companies) are investing in the improvement of the barrens by removing large rocks, providing increased plant nutrition, regulating pests, and saturating the area with rental colonies. Each year somewhere between 50,000 and 65,000 colonies of honey bees are moved into Maine blueberries for the pollination peak, which occurs around the end of May.

Beekeepers should recommend to growers who have blocks of unattractive cultivars to move bee colonies in and out of the plantation on a rotational basis during the bloom period (and at an increased fee). This provides the bees with new and unfamiliar forage. The bees must reorient to the new field, but only after they have made many flower visits near the hive. Plus, when large numbers of colonies saturate the area, there is increased competition for forage and worker bees visit fewer attractive flowers. By using a combination of saturation and rotation, the number of bees visiting unattractive flowers will increase, and so will the set of the berry crop.

Over the years there has been strong beekeeper resistance to placing bees on blueberries due to the timing of the placement. They have resisted placing more than one or two colonies per acre because late May and early June is when beekeepers often expect to produce a honey crop. When unattractive cultivars are involved, and over five colonies per acre are required for good pollination, a high pollination fee is needed to justify the number and effort it takes to place bees on blueberry plantations and barrens. If there are attractive pollen- and nectar-producing varieties, this will help maintain colony strength, and perhaps provide a crop of surplus honey, and increase the incentive for the beekeeper. If larger concentrations of colonies are placed into a block of blueberries, the increased pollination speed will increase fruit set; the berries will ripen earlier and command a premium price. This should be encouraged, but with increasing demand for rental colonies in almond pollination in California, migratory pollinating beekeepers must carefully weigh the costs of blueberry pollination with fuel costs, labor, and lost honey production. BC

On the road again, Larry Connor wrote this article in the basement office of Blacklick Ohio retired teacher, retired commercial beekeeper/queen breeder, rare bee book dealer and digitizer, and gentleman Dana Stahlman. Larry sends a huge public thank you to Dana and Mary Stahlman for their considerable hospitality.

Look Ma No Door

John Hoffman

By using a new type of open bottom board system that eliminates the traditional front entrance you can eliminate standard closed bottom boards, hive stands that contain the front ramp, and front entrance reducers and critter guards. You will also reduce the initial/replacement cost of an open bottom board assembly, the cost of equipment maintenance, and the total hive weight and associated transportation/labor costs. Plus, you'll simplify periodic *Varroa* mite drop collection and evaluation, the evaluation of mite control methods, and securing the hive for transportation.

My beekeeping students and I have studied various commercial and prototype open bottom boards for several years. Our location is in South Central Pennsylvania. We recognized three major factors that affect the level of the *Varroa* mite population: Colony health, a method to continually remove existing mites and a sound method for collecting and evaluating the mites that drop off the bees.

Our objective was to find an open bottom board system that would allow the natural or induced drop of *Varroa* mites from the bees to fall outside to the ground where they would perish. Our ideal system would be capable of reducing the mite population to a tolerable level and maintaining that level through all seasons of the year for an indefinite period. The tolerable level is defined as being a mite population level low enough to prevent the mites from significantly interfering with the bee's normal activities and productivity. The system would include a means of collecting the mites and hive debris that drops without either disrupting the bees activities or disturbing the brood chamber and surplus honey storage areas. The monitoring systems must be operational regardless of the season. All of this is to be accomplished with minimum or reduced operational cost and labor for the beekeeper.

We found no such system among those we studied. However, the knowledge we gained showed us design changes that we could utilize to produce such a system. All our prototype units included the front entrance typical of the standard bottom board. Eventually we realized that, when given a choice, the bees definitely prefer using the open bottom board opening as an entrance, rather than the traditional front entrance. Removal of the front entrance would eliminate many of our problems. Our current open bottom board system design meets our criteria.

It does eliminate the front entrance and the protruding front Porch, rendering the standard bottom board obsolete. That factor alone reduces both equipment cost and labor.

Most open bottom board assemblies are designed for use with the standard (closed) bottom board and some form of critter protection. Our open bottom board assembly has a built-in galvanized wire screen with a ½ inch X ½ inch mesh count. The screen covers the entire open portion of the open bottom board and serves to prevent critters (mice, squirrels, etc.) from invading the brood chamber. All mites and other debris easily fall through that screen.

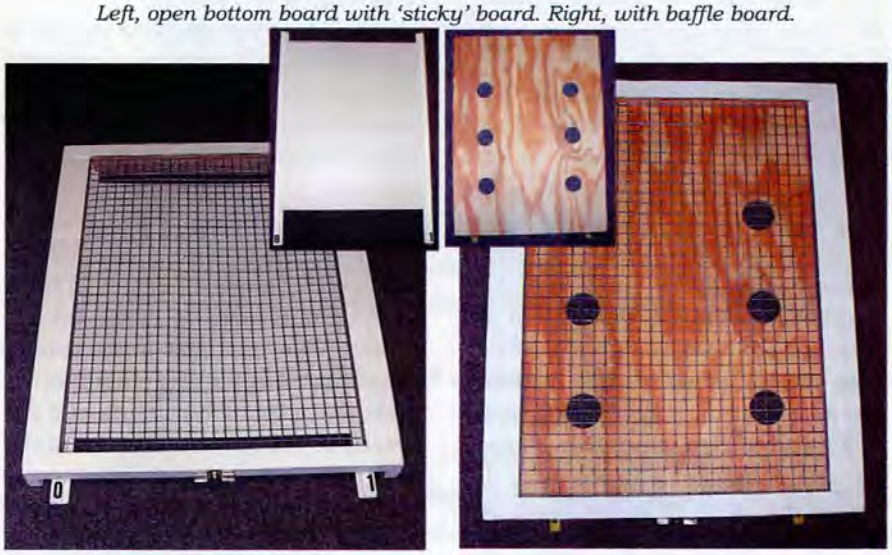
The assembly has a slot that accepts any one of the three accessory panels.

Panel #1 is a washable and reversible panel used to periodically monitor the mite count that occurs within a test period (usually 24 hours). We coat the topside of the panel with a thin layer of petroleum jelly. The panel is inserted into the slot ("sticky" side up) for the specified period and then removed for the mite count. The panel is easily cleaned using hot water and dish detergent. Our current frequency of mite drop collection ranges from one week for colonies with heavy infestation to one month for colonies within the tolerable level.

Panel #2 secures the entire open area of the bottom board to prevent the bees from escaping while in transit. It does have ventilation holes (covered with #7 mesh hardware cloth) to assure proper airflow.

Panel #3 is used to reduce the open area of the bottom boards for protection from the cold and windy conditions typical of the more northern parts of the United States. I have not used this panel during the current south central Pennsylvania Winter and, thus far, have not noticed any obvious effect on the bees. Neither have I created any problems in the

Left, open bottom board with 'sticky' board. Right, with baffle board.



No bottom board, but an upper entrance.

Most open bottom board assemblies are designed for use with the standard (closed) bottom board and some form of critter protection.

past when using other open bottom configurations without restricting the opening. I suspect we may find strong gusty winds to be more of a problem than the cold. We use galvanized wire screen with a ½ X ½ mesh count to cover the ventilation holes in this panel to provide entrance and exit paths for the bees. This panel is also used in the slot when hiving a swarm, installing a package or introducing a new queen.

When using panel #3, the mites and other debris cannot drop to the ground unless they happen to fall on a ventilation hole. The panel will have to be cleaned periodically to remove the debris and prevent the ventilation holes from becoming blocked. To clean, simply remove the panel from the slot, brush the debris off and slide the panel back in the slot. However, the process of removing and eliminating mites that have dropped will not be as effective while this panel is in the slot.

You will need one basic unit (screened frame) for each hive. The number of accessory panels will depend on your situation. (E.g. if you have 100 hives but can only evaluate the mite drop on 10 "sticky panels" in 24 hours then you will need only 20 "sticky panels" – 10 that you are evaluating, plus 10 in the hives collecting mites). The same criteria can be applied to the other two accessory panels. If the maximum shipping lot size you can haul at one time is 10 hives, then you need only 10 shipping panels regardless of how many hives you maintain. The cold weather requirements for the entrance-reducing panel would be one for each hive (up north) and zero (down south). However, consider that this panel should also be used when hiving a swarm, installing a package or introducing a queen. The estimated cost of our open bottom board assembly is less than either the average cost of a new traditional standard closed bottom board, of good quality, or the expense (including your labor time) required to modify an old one.

Our observations also led us to the following changes we employed to improve our system design and operating performance while reducing equipment cost and labor.

1. If you use a hive stand with a front ramp, it can also be eliminated. However, I never set a hive with an open bottom board directly on the ground. The hive assembly should sit on top of supporting pillars so the mites and other hive debris will fall directly to the ground, well out of the bee's traveling path.

2. Equipment maintenance is defined by the exposed surface area of the device – the less area to paint, the lower the cost. The accumulation of dead bees and other debris inside the standard (closed) bottom board (particularly during a cold Winter) is a more insidious problem adversely affecting maintenance and replacement cost. The debris becomes saturated with condensation from within the hive and reduces the airflow through the brood chamber. The reduced airflow compounds the problem by increasing the condensation. Any type of front entrance reducer or critter guard would also contribute to this problem. During the Winter, the debris can be removed only through the front entrance. It is an almost impossible task (especially with the entrance reducer frozen in place). As a result, the debris gets moldy and the adjacent wood contact areas rot. Affected areas include the slatted rack and (if you did not use a slatted rack) the full depth hive body.

3. Shipping, transportation, handling and the associated labor costs are reduced. The approximate weight of our open bottom board (with shipping panel installed) is 4.0 lbs. The approximate weight of the standard (closed) bottom board is approximately 6.0 lbs. Using those values, if you move 1000 hives you will save one-ton transportation expense plus one ton direct handling labor and other associated labor expenses.

(b.) The elimination of the front porch cleaned up the profile of the hive assembly. The hive assembly (w/o a telescoping cover) is now flush on the top, bottom and all four sides. That allows more hive assemblies to be stacked in a specified area.

We have achieved our objective. We will now devote our attention toward improving the methods we use to evaluate the *Varroa* mites and hive debris collected on panel #1. BC

Visiting Ukraine Beekeepers

Bryan Gaglione

Smokers made of artillery shells dating back to World War II, homemade veils, and hives on the backs of trucks, with compartments farther back for extraction. All of these unique items can be found in the Ukraine, where beekeepers have to be inventive in procuring their supplies.

That is just one thing Vin and Jan Gaglione discovered on their tour of the country in the last week of June. They had imagined it would be a larger tour group than just the two of them when they signed up with Dale Morse, but it turned out to be otherwise.

After arranging with their interpreter to visit a number of locations, they started the trip at a beekeeping museum in Kiev, which was, at one time, supported by the Russian government, but is now run strictly on donations. Much of the symbolism inside the museum had largely religious overtones, said the Gagliones. Also noted was that almost all of the articles in the museum were home-produced, like World War II artillery shells turned into smokers. "Some of the extractors were very unique," Vin mentioned.

Next, they went to see a wax factory run by a man named Alex. (Due to their interpreter's skills in English, the last name didn't come through.) Alex makes his living buying wax from various beekeepers and turning it into unwired foundation, with an average size of roughly 10 inches.

A general tour of Kiev followed the wax factory. Having once been the largest city in Europe, it may come as no surprise that over 800 churches sat within the city limits at one time.

While in Kiev, most meals started with borscht, a beet soup which was served with rolls and garlic oil. In other parts of their tour, the Gagliones dined at a number of Ukrainian restaurants. "Surprisingly delicious," was just one of the comments Vin made about the food.

After their stay in Kiev, the Gagliones journeyed through the countryside and had a prime view of why the Ukraine is called the "breadbasket of Europe." On either side of the road, fields of sunflowers, grains, and the occasional linden tree stretched as far as the eye could see.

It was in the countryside that Jan and Vin met and dined with a number of native beekeepers. The Gagliones gave their hosts gifts provided by Mann Lake, Ltd. In return, the Ukrainian beekeepers gifted the tourists with homemade veils. Like these beekeepers, many in the Ukraine can't afford to buy their equipment, so they make it themselves.

A system similar to Scouting exists among the Ukraine beekeepers. Children are raised around hives, and advance in rank – until becoming full beekeepers when they near adulthood – depending upon their knowledge. The Gagliones reported that it was "a pleasure to see boys and girls so interested in a hobby."

Farther north was a group of nomadic beekeepers, whose hives were located on the backs of trucks. They spend the best part of the season living and sleeping with their hives. While the Gagliones visited them, these beekeepers allowed Jan to go through their hives, and gave them freshly-extracted acacia honey and stone oven-cooked bread. They kept black bees, called "step bees," and change the wax in their hives every three years.

The beekeepers made a habit of going through their hives every three or four days. Some of their extraction work was done in screen houses, frame by frame; other times, it was done on the truck, with a rig that can lift an entire box at a time, for the extraction to be done 10 frames at a time. After the season ends, they change their queens; at the time of the Gagliones' visit, there were 300 queens on-hand for the transition.

In the city of Chernivtsi, the Gagliones met several teachers who kept hives to supplement their low wages. Upon entering the residence of one of the teachers, they were asked to remove their shoes. Slippers were provided to wear instead, as is the custom. Once again, they dined with their hosts, enjoying a traditional Ukrainian meal. During this meal, each person made a toast – even the guests, though they were not asked to do so.

Vin and Jan both highly recommend the experience this trip provided for them. BC

Bryan Gaglione is a freshman in college and is Jan and Vin's grandson.

Jan, examining a local colony, using a well made homemade suit and veil.

Vin, far left and Jan, far right visiting with Alex and the children of the local beekeeping scouting organization.

GLEANINGS

DECEMBER, 2006 • ALL THE NEWS THAT FITS

MODEL ORDINANCE

A Shaler, PA ordinance that attempts to keep bees from becoming a nuisance to neighbors will be used as a model for other municipalities to follow, a state Department of Agriculture official says.

As originally drafted, the township's proposed rules to regulate beekeeping caused alarm among local beekeepers and agriculture officials by limiting the number of colonies to one per half-acre.

"If that would've been passed, that would have been onerous," said Jim Stein, 67, of Shaler, who has kept bees for 20 years.

The limitation was removed from the final ordinance after township officials, commissioners, Stein, and a state bee expert discussed the subject, including a visit by commissioners to Stein's hives.

Under the adopted ordinance, beekeepers are required to register with the township zoning officer. They will also have to follow the Department of Agriculture's best management practices, an otherwise voluntary set of guidelines for the keeping of bees that Dennis vanEngelsdorp, a state apiarist with the department, said will be finished in January.

VanEngelsdorp said the guidelines, which cover issues such as providing water, are meant to minimize the risk of bees being problematic to neighbors and reduce the risk of colonies harboring diseases or undesirable traits.

Shaler is the first community to pass a beekeeping ordinance making

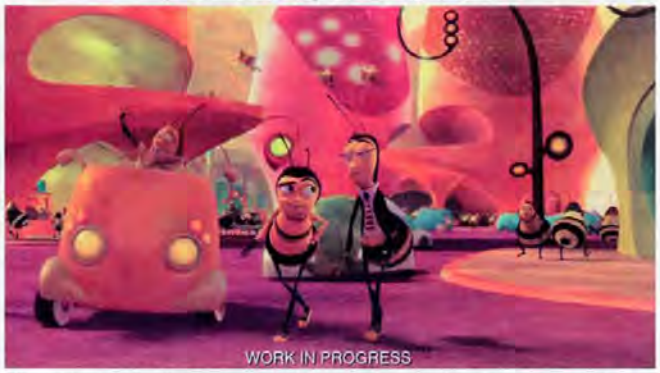
Continued on Next Page

DAVID McFAWN JOINS BRUSHY MOUNTAIN BEE FARM

David MacFawn joined Brushy Mountain Bee Farm as manager effective August 7, 2006. David started in beekeeping more than 45 years ago when his Grandfather gave him a hive of dark German bees. Over the years David has kept Germans, Italians, and Russian bees in Maryland, North Carolina, South Carolina, and Colorado. David is a NC Master Craftsman Beekeeper, he incorporated the SC Beekeepers Association as a 501c3, co-founded the SC Master Beekeeping program, and was awarded the1996 South Carolina Beekeeper of the Year. In addition David has published several beekeeping articles.

David received a BS in Electrical Engineering from NC State and an MBA in operations research and finance from UNC-Greensboro. He spent 12 years in engineering and marketing computer defense equipment positions. For approximately the next 16 years David held senior management and program management positions with Sun Microsystems, NCR, and Intel. For the last 3 years David has held various management positions at Lowes Home Improvement Warehouse. In addition to his degrees David graduated from the UNC-CH Program for Technology Managers, holds a certificated in computer programming, a Project Management Institute program management professional, a Six Sigma Greenbelt, is a licensed SC Department of Insurance Life/Accident/Health producer and completed the Lowes management training program.

BEE MOVIE



"Bee Movie" is the comedic tale of Barry B. Benson, a graduate bee fresh out of college, who is disillusioned with the prospect of having only one career choice – honey. On a chance opportunity to go outside the hive, Barry's life is saved by a woman, Vanessa, a florist in New York. As their relationship blossoms, Barry's eyes are opened to the world of humans and he soon discovers people partake in the mass consumption of honey. Armed with this information, Barry realizes his true calling in life and decides to sue the human race for stealing the bees' honey. As a result, the bee and human communities get involved in ways they never had before, each pointing a finger at the other. Barry gets caught in the middle and finds himself with some very unusual problems.

LAND OF MILK & HONEY HELPS SLEEP

Honey mixed into a glass of milk before bedtime may be the key to improved morning alertness and performance thanks to a milk protein.

Scientists from the Univ. of Maastricht studied groups with and without sleep complaints. Each night snoozers and insomniacs were fed either a lactalbumin enriched or standard meal followed by tests the next morning for alertness and mental function.

The lactalbumin-rich diet improved both sleep and task-related brain activity the next morning.

Lactalbumin, a protein found in milk, is rich in the amino acid tryptophan – which is required in the brain for production of serotonin. Serotonin is a natural sedative linked with mood, alertness and ability to handle stress.

And it seems a natural alternative for the land of nod – warm milk with honey – has some scientific basis. The sugar in honey helps tryptophan enter the brain to boost serotonin activity. *-Alan Harman*

ORDINANCE ... Cont. From Pg. 55

reference to the best management practices, vanEngelsdorp said.

"This is an example of where it worked very well. It was not combative," vanEngelsdorp said. "Mr. Stein did an excellent job of informing the commissioners, who were open to suggestions. I think at the end we had a better product and everybody was happy."

"It's a good balance between wanting to protect the public and protect the bees. They are not mutually exclusive. They are very connected," he said.

Stein thanked the commissioners for the effort they put into the ordinance, which he said will not require him to change anything about how he keeps his bees.

"The ordinance is going to be one the beekeepers in Shaler are going to be able to work with," Stein said.

Commissioner Ed Duss, who initially proposed the ordinance in response to a family's complaint about bees around their pool, cast the only vote against it. He said a requirement for a 6-foot flyway barrier when a colony is within 25 feet of a property line should have had a greater distance.

VanEngelsdorp said cooperation of the kind seen in Shaler could prevent passage of statewide regulations that would trump local controls.

"We're not interested in being heavy handed. We are worried about some areas," he said. "We're trying right now to use this example we had with Shaler to model how we interact with townships."

There were 388 registered bee colonies in Allegheny County in 2005. That's down from 1,180 registered colonies in 1987. The honey bee population has just recently begun to rebound after being decimated by parasites and diseases, vanEngelsdorp said.

Brian C. Rittmeyer can be reached at HYPERLINK "mailto:brittmeyer@tribweb.com"brittmeyer@tribweb.com or (724) 779-7108.

INTRODUCING THE MITE-AWAY™ MIGRATORY LID!

NOD Apiary Products, manufacturer of Mite-Away II™, has developed and tested a new migratory lid design that combines the lid and rim. This allows for the application of Mite Away II™ and the application of any other soft treatment options, as well as for running on the hives year 'round.

When built to specifications it is sturdy, stackable, and will withstand the rigors of transportation. It is a single piece of equipment that replaces and solves the problems created by using a separate rim.

The plans are available, free of charge, as a download from the www.MiteAway.com website, or by phone at 613.398.8422, fax 613.398.0495 or email info@MiteAway.com

In addition, major manufacturers of beekeeping woodenware are adding the MiteAway™ Migratory Lid to their equipment lineup in order for the new design to be available ready made.

TRUCKING AVAILABLE

Of interest to beekeepers, honey producers, pollinators and exporters. Mar deMontigny, a freight brokers agent, specializing in the bee industry, offers freight service hauling live bees, honey and wax, etc. Please contact – Mar deMontigny/FMI Freight Management Inc., 1956-J University Blvd., Ste. 147, Mobile, Alabama 36609; 251.660.2297 or 251.666.2450; fax 251.666.6865 or email fmiagent@yahoo.com.

OBITUARY

Henry Leitner, 96, better known as "Spann" was born in Fairfield County, SC November 24, 1909 to the late Thomas Center and Mary Spann Leitner.

Mr. Leitner was a WWII Army Air Corps veteran having served campaigns in India and Burma. He was well known as owner of Leitner Honey Farms of Winnsboro, SC for over 50 years. Spann left his unique mark on SC beekeeping as an excellent beekeeper, advisor, encourager, friend, advocate and ambassador. Most of his life was spent telling others about the value and importance of honey bees. He often shared how honey bees had provided his livelihood for most of his adult life.

Spann was a long time member and supporter of the SC Beekeepers Assn. He was one of the original founders and the first organized meeting was held at his home in Winnsboro. He was a "Life Member" and was chosen as the "1989 SC Beekeeper of the Year." He was a consistent Blue Ribbon Winner at the SC State Fair in Columbia.

New Stamps Feature

THE BIRDS AND SOME BEES

The nation's capital was abuzz with excitement in October when the U.S. Postal Service unveiled four beautiful *Pollination* stamps. The stamps, which will be released next Summer, consist of four images arranged in two alternate and interlocking patterns. The intricate design of these beautiful stamps emphasizes the ecological relationship between pollinators and plants and suggests the biodiversity necesssary to ensure the viability of that relationship.

The goal of the Pollinator Protection Symposium, where the announcement was made, is to increase awareness of the vital role of pollinators and to provide evidence of the critical need for planning and research to prevent further destruction of pollinators. A proclamation was issued by Secretary of Agriculture Mike Johanns declaring National Pollinator week to be June 24-30, 2007.

BEE DANCE ALGORITHM

An ingenious new mathematical procedure based on the behavior of honey bees is delivering sweet results for industry.

Researchers at Cardiff University's Manufacturing Engineering Centre (MEC) developed the procedure, or algorithm, after observing the "waggle dance" of bees foraging for nectar. The algorithm enables companies to maximise results by changing basic elements of their processes.

When a fee finds a source of nectar, it returns to the hive and performs a dance to show other bees the direction and distance of the flower patch and how plentiful it is. The other workers then decide how many of them will fly off to find the new source, depending on its distance and quality.

The MEC team's Bees Algorithm mimics this behavior. A computer can be set up to calculate the results of different settings on a manufacturing process. More computing power is then devoted to searching around the most successful settings, in the say way as more bees are sent to the most promising flower patches.

The Algorithm has been shown to cope with up to 3,000 variables and is faster than existing calculations. By entering basic data about all or part of a company, or even just one machine, the MEC team can calculate the best outcome for a wide range of business processes. They have already used the Bees Algorithm to work out the most efficient setting son welding systems and for the design of springs.

The Algorithm was unveiled by PhD student Afshin Ghanbarzadeh and his team at the recent internet-based Innovative Production and Machines Conference hosted by MEC as part of its work with the EU-funded Network of Excellence in this field. The team's research was one of 100 papers presented to 4,000 delegates from 73 countries at the conference, held entirely on-line.

NHB GETS NEW ADDRESS

The National Honey Board has moved to:
11409 Business Park Circle, Ste. 210
Firestone, CO 80504-9200
The phone number and fax remain the same.

2006 Year-End Index

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A Holiday Message

As the 2006 Holiday Season approaches, we take great pleasure in extending to you our sincere gratitude and appreciation. It is good friends and customers like you that make our business possible. At this time we humbly reflect on how valuable each of you is to us.

There have been several successful changes this year at The Kelley Co. With the 20-year Kelley Trust now ended and our local Hospital Foundation the sole owner of the company, we are ushering in a new era. We have a new CEO added to our present Management team and we are looking forward to being able to serve you even better than in the past.

As inevitable as change may be for our company and for the industry, our commitment remains the same. We are dedicated to offering you quality products and outstanding service. We wish to thank you for your continued support and look forward to serving you in the many years to come. May this holiday season be filled with joy, spent with those whom you love best, and may the coming year be filled with Good Health and Happiness.

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Display Advertisers

An artist and author named Eric Sloane wrote a book entitled *A Reverence for Wood.* If you haven't read it, find a copy and give it a look. You'll find some interesting facts in it no matter how plasticized you have become. Facts like how the hardwood forests were denuded to make charcoal in the urgent need for steel in our new industrial age. They were even mining wood from the New Jersey bogs to meet the need. Now they mine them for specialty woods. Wood doesn't rot just because it's wet, you know. It deteriorates when a pathogen gets involved. Sailing ships have passed the hundred year mark without rot problems.

It's also one of the strongest (for its weight) and worker-friendly materials there is. One can carve it, layer it, steam and bend it; lathe it, glue it, paint it and stain it; nail it, screw it, pin it, drill it – you get the idea.

I was a die-maker that worked with wood in the early 50s. We used 13/16" maple plywood and worked down to 1/128th of an inch in tolerance. That's the thickness of a piece of tissue paper. I made 20 top-feeders five years ago and used them a lot. Only one leaked and that was fixable. (Find the plans on Beesource.com) I like wood. I could make frames from scratch but store-bought ones are so cheap it's not worth it.

So there I was. After spending about a thousand dollars in gas I finally got to my New Mexico RV retreat (from Connecticut) and settled down. It was time to catch up on my *Bee Culture* reading. I got to what is usually a good page, Kim's "Inner Cover." That's the one in which he opines that plastic frames are better than wood. (It made me sit up and start feeling grumbles.) Then he goes on to list the ways in which they aren't better. (He's a fair guy).

1. They can't be mixed in the same super with wax foundation
2. One can't put a super of plastic below a super of wax.
3. They can't be put on unless in a honey flow.
4. They are routinely produced without enough wax.

Let me add that they are heavier, you can't add a frame here or there within a super of drawn (plastic) comb. If the comb tears the bees will never repair it. *The bees don't like them and will work almost anything else first.*

Beside the above I have a couple of suspicions. In a cold Winter I don't want a slab of plastic in the middle of the cluster. They may have an interfering effect on heat transfer within the cluster.

When bees dance they vibrate the comb. This is part of the language. Since my bees have no ears, I assume they sense these vibes with their feet and extract information from them. It seems like a sure bet that this behavior evolved to be used with wax and not plastic. The lost bee-hours could be significant.

Now I'm not dumb enough to think that this is an even battle. I certainly wouldn't expect any plastic users to change. No one with a need for a large number of frames will consider anything else. But Kim, they aren't better – they're just easier and faster. It seems to me that the further we get from what is normal for the bees, the more problems we can expect. Rectangular, moveable frames in hives five feet high are already a long way from "natural."

Kim, beginners are reading this magazine. I know, I remember being one. Beekeeping is a sort of pastoral pursuit that should be a change of pace from the daily marathon. I want to see them get connected to the history of the art.

Whenever I make and wire a frame I think of how the old-timers did it. It would be a winter job and the family would be involved. For some it was done by lamplight. There's a great scene in "Fifty Years Among the Bees," where the farmwife is crowned champion at folding the basswood boxes for comb honey. Sure it's repetitive, but that's part of the charm.

Our club* has an "equipment day" on a Saturday in Spring. People with new stuff to build, show up with it, and get help from the old guard. It's one of our more popular workshops and it goes for hours. To see a woman, who may never have held a hammer, proudly displaying her first frame is special. I wouldn't miss it.

Making that frame is part of her entry fee. It will mean more each time it is moved. Even if it comes apart, because she had trouble with the 10th nail, it was still worth it. And it can be fixed. Try fixing a plastic frame when you've snapped an ear off.

I don't like wiring either. But... there's something meditative about rote work. While the hands are busy the mind can wander. Who knows what thoughts will come; what decisions will quietly solidify. It's a handy mental therapy. If you don't like something and you do it anyway it's also part of the price one pays to join the 'keepers union. It builds character.

Beekeeping shouldn't be like buying a computer game where you unpack it and plug it in and are entertained. I don't like computer games either. Made of *plastic! Bah!*

**Backyard Beekeepers Assn., Weston, CT.*

Dick Marron

Framing The Question

BOTTOM BOARD