
JUN 2007
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No matter what honey bees do, like these holding on for dear life between top and bottom, or what beekeepers do, like becoming consumed with the ifs and whats and whys of CCD, Varroa *never ever goes away. It's good that we search for the root of the CCD evil, but we can't let researchers seek new targets because the old ones are routine and unglorious; nor must beekeepers become enamored by the media and noise and attention. Don't forget to take care of* Varroa. *Or surely,* Varroa *will take care of your bees.* (This startling photo by Jory Shepherd)

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Subscription Information

U.S., one year, $25; two years, $48. Newsstand price: $4.99. All other countries, (U.S. Currency only), $15.00 per year additional for postage. Send remittance by money order, bank draft, express money order, or check or credit card. Bee Culture (ISSN 1071-3190), June 2007, Volume 135, Issue 6, is published monthly by The A.I. Root Co., 623 W. Liberty Street, Medina, OH 44256. Periodicals Postage Paid at Medina, OH and additional mailing offices.

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POSTMASTER: Send address changes to BEE CULTURE, The A.I. Root Co., 623 W. Liberty St., Medina, OH 44256

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

JUNE 2007 VOLUME 135 NUMBER 6

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A Good Wife

After 27 years of marriage, I thought I had experienced everything an old married woman could experience. Not true. I thought your readers might get a good laugh out of this story:

After hiving five swarms this year, my husband had the new gums on barrels, blocks, anything he could get them on at the time. He constructed a nice new area and rack for the gums and needed my help moving the bees to their new location, across the yard and up the hill. One cold, dark night he came to ask me a "favor." Faithful wife that I am, I complied (somewhat unwillingly I might add!!). I ended up dressing in a long furry housecoat (it was warm and covered me all up in case of an accident), a toboggan as we call it down south (ski hat), red furry gloves and a bike headlamp on top of the hat. It was dark, and no one but the bees could see me! After carefully closing up the outlets, we lifted the heavy gums into a wheelbarrow. My instructions were to hold the gum steady in the wheelbarrow. Across the yard and up the hill behind our house we went (in the dark) to the bee's new home. What a site we were, but we made it safely. Every step we took brought fear to my heart that we would fall and the gum would fall and bees would cover us both.

The bees are now safely in their new home and my "favor" is complete. I was glad to get back inside!

L. Crump

CCD & Cell Phones

Franklin D. Roosevelt's first inaugural speech contained the infamous quote ". . . the only thing we have to fear is fear itself . . ." Its stark, self contained wisdom has neatly traversed through the decades and is as relevant today when applied to colony collapse disorder (CCD) as then to the great depression.

I am a small hobby beekeeper: a household that does not depend on my backyard apiary to place food on the table, or pay the bills. So the quote above may ring hollow in the ears of those who do, but I caution all to be wary. With fear will bread panic and the inability to clearly THINK our way out of the current shadow on apiculture. Here is a current example from the UK newspaper The Independent entitled 'Are mobile phones wiping out our bees?': http://news.independent.co.uk/environment/wildlife/article2449968.ece

Hopefully this will at least bring a smile to the faces looking at a long hard year.

Shane McGovern
Salem, OR

Senate Letter To USDA

America's beekeepers and their bees are an indispensable pillar of U.S. agriculture. Our nation's beekeepers provide essential pollination services for over 90 different food, seed and fiber crops, contributing over $14 billion of added agricultural value as documented by a Cornell University study in 2000. Crops that depend upon or benefit from honey bee pollination include alfalfa, almonds, apples, avocados, blueberries, cantaloupes, carrots, cherries, citrus, cotton, cranberries, kiwis, plums, pumpkins, seed crops, soybeans, squash, sunflowers and watermelons.

As you are no doubt aware, a new and unexplained condition known as Colony Collapse Disorder (CCD) is destroying bee colonies across the United States. CCD is causing some beekeepers to lose upwards of 30 percent of their bee colonies, and is causing serious reductions in the supplies of bees for essential commercial pollination. These severe losses are in addition to other problems such as higher production costs, mite infestations and unfairly traded imports that have been making it very difficult for beekeepers to operate profitably. If these alarming trends are allowed to continue, they will place at risk in excess of $14 billion in annual U.S. farm output that depends on bee pollination. Ultimately, the shortage of pollination services could impact the supply of healthful and affordable food for U.S. consumers.

We are writing on an urgent basis to ask that you provide us with an expedited report on the immediate steps that the Department is and will be taking to determine the causes of CCD, and to develop appropriate countermeasures for this serious disorder. In particular, we ask for a specific explanation of how the Department plans to utilize its existing resources and capabilities, including its four Agricultural Research Service honey

bee research labs, and to work with other public and private sector enterprises in combating CCD. We also request that the Department identify any additional resources and capabilities that would be necessary or useful in its efforts to stop the spread of CCD.

In addition, we would also ask that you outline the Department's long-term plans to help restore the health of the U.S. beekeeping industry, including implementation of a crop insurance program for beekeepers that Congress authorized in 2000.

We look forward to receiving your report and any recommendations on this urgent matter for U.S. agricultural producers and American consumers.

(The letter was signed by the following Senators): Baucus, Conrad, Boxer, Grassley, Clinton, Salazar, Hatch, Craig, Dorgan, Brownback, Brown, Feinstein, Coleman, Cochran, Stabenow, Tester, Casey, Wyden, Harkin, Feingold, Sanders, Crapo, Specter, Allard, Lautenberg, Smith, Chambliss, Byrd, Roberts, Ben nelson, Isakson (was unable to sign because office was closed), Inouye, Collins, Lincoln, Snow, Thune, Schumer, Landrieu, Bill Nelson, Murray, Cantwell, Klobuchar, Menendez and Pryor.

***Note**: On April 23, 24, USDA sponsored workshops in Washington, DC attended by over 60 scientists and industry representatives. The outcome was a list of research priorities and possible funding sources. This information will be shared with these Senators, and the appropriate Senate committees with requests of some type of action and support. More detail on this is spelled out in other articles in this issue.*

INNER COVER

Our most recent reader survey has just been completed and analyzed. It had 75 questions, with 265 parts to all those questions. We randomly selected 10% of our readers and sent them this massive questionaire and over 40% filled it out and sent it back. We are quite pleased with that.

We asked about your life, your beekeeping and who, and how you use our magazine. The results have changed some since our last survey three years ago.

So . . . who are we?

For starters, we're getting a little older. 9% are under 40, compared to 11% three years ago. 60% are between 40 and 65, before it was 57%. 33% are over 65. Before it was 29%. We're edging up there, aren't we.

An impressive 51% have a college degree, the same as before. But 85% now use computers, up from 70% just three years ago, with the most popular uses being purchasing beekeeping supplies, 52%; beekeeping research 59%, email 84%, and correspondence 56%.

20% of us are retired, but 33% are over 65. We don't like to quit I guess. 68% make some or all of our own equipment, and 27% have children at home. 70% sell liquid honey, 29% sell comb honey, 28% sell beeswax in some form and 12% pollinate.

Here's one that I wanted to know. Our magazine is printed on what's called offset paper. It is opaque enough to keep the ink on one side from bleeding through to the other side, and it is quite bright. Compare it to any other magazine you get and see. What it doesn't do is give reflected glare from overhead lights, making it hard to read for older eyes (see above). I hate that glare, and I like our paper. So do 80% of our respondants.

We gathered a lot of information and for those of you who helped out know that we appreciate your efforts. By measuring what you tell us we continue to make improvements to your magazine, your web page.

•

Food safety continues to be in the news and almost all of the news isn't good. The recent pet food scare, with deliberately tainted ingredients sent here from China a case in point. FDA officials easily found the chemical in question, but missed the fact that what was supposed to be wheat gluten, was, in fact wheat flour with a nitrogen-containing poisonous chemical added to make it appear as gluten. Oops. Cats and dogs died, and cows, pigs, chickens and you ate some of it. Aren't you glad?

Here's another. Monsanto recently went after the FDA to make them make the milk producers who are *not* sticking their cows full of hormones to produce more milk, to *stop* labeling their product as rbGH free. Monsanto claims that by labeling their products as hormone free, it "disparages milk, and denies farmers a choice in using approved technologies." If they win the consumer doesn't get a choice. Period.

This begs the question, you know, that if this comes to pass will you no longer be allowed to claim anything on a honey label, in light of the fact that by doing so you 'disparage' other honey? Does 'Product Of The U.S.' suggest foreign honey is inferior, even if it's approved? Will 'Raw' honey be banned because it insinuates that other, legally cooked, filtered, and strained honey is 'disparaged, and denies honey packers a choice in using approved technologies'?

Monsanto believes that saying milk is hormone free is deceptive advertising and misleads the public. That's how dumb Monsanto and the FDA think we are.

•

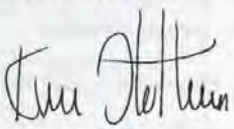
The CCD story continues to have legs, even though little has changed. Bees have died, scientists don't know why, food is threatened, there's panic in the streets. Well, some streets. If you're following this you've read story after story after story . . . oh, it's the same story.

Tell you what. We got our reporters, writers and others following this, but they know the sources and the scientists and the researchers, so their reports aren't the same one's you read in your local newspaper. Check out anything that's new on our web page (www.beeculture.com) . . . Malcolm Sanford's articles, a new one from MAAREC, a piece by Dave Hackenberg . . . stay tuned for more, too. And while you're there, look at the forklift rodeo videos, the Cornell Pollination study that everybody quotes, but nobody references, and the updated State Apiarist Directory. Yup, this was a commercial.

•

And here's something that ties it all together. Sean Brodrick, an investment counselor who has a newsletter and web page and special reports and books, and lots of money, is advising his clients, in light of the massive loss of bees, to invest in Monsanto because they make genetically modified plants that won't need bees; and Archer Daniels Midland, that owns all the corn that they make HFCS out of – a sweet replacement for honey.

Don't ya just love the irony.



Who We Are And What We Do

Tracking A Serial Killer

Jim Fischer

"The skilled experts who support beekeeping have been victims of a 'Disappearing Disease' of their own. The cause of this disease is clear - no one gave a damn about bees."

Sherlock Holmes was a fictional character, and he only wanted to keep bees when he retired. He never had any cases involving bees.

But we have a mystery here, and Sherlock Holmes would be welcome. Colony Collapse Disorder (CCD) is a killer of hives that leaves taunting clues, but remains unidentified. The shape of stings to come is still uncertain, even after months of hard work.

Few realize that what we now call "CCD" has struck before. In classic serial-killer fashion, it sporadically appeared without warning, turning significant beekeeping operations into little more than abandoned piles of scrap lumber. As early as 1898, "Disappearing Disease" was described with symptoms eerily similar to CCD. It also struck in the 1960s and again in the mid-1970s. Each time, it devastated many hives, caused uproar among beekeepers but eluded identification. Still faceless, it vanished, not to emerge again for decades. Now it's back to kill again. This murderer seems to have vampire-like immortality, outliving all who have tried to put a stake through its heart, sleeping in a coffin no one can find.

A great assemblage of bee research talent gathered at USDA headquarters on April 23rd and 24th, 2007, but three crucial people were missing. First, they had no leader, being provided instead with a meeting facilitator, flustered and bemused at the wandering discussions and the spirited debate over minutiae.

Second, there were no famous detectives in attendance, fictional or real. But most painful of all, with bees dropping like flies, there was no honey bee toxicologist, the last one having retired years ago, but never replaced due to the ever-shrinking budgets allocated to bee science.

The original "CCD Working Group" that met in Stuart, FL in Florida was outnumbered by newcomers to the problem. Some were invited for their expertise. Others because they represented groups that could add value to the discussion, like APHIS (The Animal and Plant Health Inspection Service). Many were likely attracted by the lure of funding from the $75 million requested for CCD in a new Congressional bill.

Perhaps others were attracted by the prospect of media attention, or the sheer thrill of the chase. A dozen or so attended via telephone conference.

The media was also out in force. Science magazine, the New York Times, Cox Newspapers, and Reuters all sent reporters. Initially refused invitations due to the wildly sensational reporting and highly speculative theories about CCD promulgated by most news outlets, they demanded access under the "Government in the Sunshine Act of 1976."

(*Bee Culture* was invited up front without any citing of federal statutes in threatening tones, but we tend to ask more informed questions, being beekeepers ourselves.)

Ironically, after decades of being so completely ignored by the press and general public that researchers had to constantly stress that honey bees are *beneficial* insects rather than scary bugs to be feared and loathed, there was now talk of "media relations," and complaints about "the press" taking up everyone's time.

The focus of discussion was not the bee diseases, pests, or pesticides that could cause CCD, but instead, money. A dizzying array of acronyms for existing federal and state programs that might fund part of the investigation, or who have needed resources and facilities flew about like spitballs in an unruly classroom.

While some money was provided by the National Honey Board and a few groups accepting beekeeper donations, the bulk of that money was spent in the initial field work, on the assumption that the cause of CCD would be simple and obvious.

But the cause appears neither simple nor obvious. The much larger dollar amounts needed to fund a thorough investigation will be some time in coming, even if care is taken to avoid the more tedious approaches to converting "allocated funding" into tangible dollars for actual investigation.

There was one encouraging note. Bayer CropScience offered to provide their standard analytical samples of metabolite chemistry, the chemicals that result from plants metabolizing Imradaclopid. This systemic pesticide, made by Bayer, has been mentioned as a suspect often. Bayer seems confident enough that CCD is not caused by their products to provide the rope that could be used to hang them.

In contrast, the pet food contaminant recently found to be killing dogs and cats was quickly identified by the FDA, and traced back to a raw ingredient. It was then tracked through the entire U.S. pet food business to result in pet food recalls and even criminal search warrants. Clearly, the FDA is much better funded, staffed, and equipped for such forensics than the combined resources of all of "bee science." The resources are already in place at FDA, ready to quickly address such problems, even problems that have no impact on human health or human food at all.

Too bad the same level of resources can't be focused on CCD. It seems that bees don't matter as much as pets do when it comes to funding science to investigate unexplained deaths of useful animals. If bee research needs as much as a single toxicologist, we will have to put an ad in the paper, and beg for money we don't yet have to pay the person we haven't yet hired.

Continued on Page 44

JUNE – REGIONAL HONEY PRICE REPORT

The Best Laid Plans

We surveyed our reporters this month and asked what they planned to do this season. We're going to go back to them later this year to see how their plans worked out, and if they didn't, why not.

Crops They Plan To Produce This Season

Not surprisingly, 98% plan on producing liquid honey as one of the crops they will produce. Of these 17% will produce only liquid honey. 56% plan on producing comb honey, and 19% will harvest some pollen for sale. 10% will sell some form of propolis and 26% plan on making, and selling cremed honey. 29% are selling nucs this year, and 13% will be raising queens. 20% plan on producing and selling varietal honey (that's up from zero seven years ago), and 4% will be selling things like candles and wax.

Raise Prices?

Close to a split, but not quite. 47% say yes, prices will rise, but 53% say no, they'll stay where they are.

Am I Increasing Colonies This Summer, And By How Much?

It's been a sobering season this year, and fully 49% have no intent on expanding their operations. 39% plan to increase some – up to 50%, but only 12% are looking to grow past that.

Raising Queens?

Besides selling queens this year (13%), 42% plan on raising queens. This has almost doubled in a decade which is promising. But 58% won't be.

I'm Going To Monitor For Mites All Season Long . . .

Well, 48% say they will. 31% say they will if they can – which is promising, at least this early. 17% say nope. Let's wish them luck.

Attending Meetings?

Will they attend at least one meeting at a level above their local group. Fully 55% plan to head up stream and try a state, regional or national meeting this year. That is indeed encouraging 31% won't be able to make it, and 14% don't have even a local group to attend.

We'll come back to these same questions later this year to see if the *Best Laid Plans* worked out.

	REPORTING REGIONS												SUMMARY		History	
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.02	1.25	1.02	1.14	0.90	1.00	1.06	1.02	0.82	0.91	1.02	1.17	0.82-1.25	1.03	1.05	0.97
55 Gal. Drum, Ambr	0.93	1.08	0.93	1.18	0.81	1.00	0.95	0.93	0.72	0.93	0.94	1.00	0.72-1.18	0.95	0.95	0.96
60# Light (retail)	105.00	109.00	120.00	101.50	105.00	105.00	108.86	110.00	120.00	117.93	121.05	124.33	101.50-124.33	112.31	106.88	107.87
60# Amber (retail)	105.00	102.00	120.00	100.38	105.00	99.25	101.50	105.00	110.00	114.19	118.60	133.33	99.25-133.33	109.52	104.80	104.01
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	46.08	39.98	40.80	40.30	48.74	54.00	42.86	48.74	48.74	45.75	40.20	63.50	39.98-63.50	46.64	47.68	43.13
1# 24/case	61.68	59.58	67.20	64.45	60.00	69.00	64.27	76.33	59.95	77.76	61.83	83.52	59.58-83.52	67.13	65.76	65.48
2# 12/case	62.56	56.32	61.80	54.23	54.00	58.50	57.37	57.30	49.25	57.84	51.00	73.24	49.25-73.24	57.78	59.54	56.88
12.oz. Plas. 24/cs	58.56	53.28	49.80	59.72	48.00	69.00	51.12	62.40	42.50	47.28	60.00	62.00	42.50-69.00	55.30	52.58	55.05
5# 6/case	66.75	63.29	71.25	58.50	63.90	63.90	64.32	63.00	59.50	61.86	63.75	79.00	58.50-79.00	64.92	66.64	62.02
Quarts 12/case	85.52	100.35	112.20	87.63	76.00	80.75	83.98	76.40	96.00	110.88	81.10	109.00	76.00-112.20	91.65	87.50	82.73
Pints 12/case	55.96	49.95	65.20	57.60	56.00	50.00	50.40	53.25	55.95	60.00	49.33	59.33	49.33-65.20	55.25	53.91	50.72
RETAIL SHELF PRICES																
1/2#	2.75	2.28	2.41	2.91	3.73	2.33	2.67	3.60	2.47	2.46	2.84	4.25	2.28-3.73	2.72	2.56	2.40
12 oz. Plastic	3.00	3.02	3.09	3.36	3.00	3.10	3.35	3.41	3.11	2.81	3.39	3.98	2.81-3.98	3.22	3.25	3.15
1# Glass/Plastic	3.92	3.47	3.79	4.23	4.50	3.80	3.94	3.97	4.13	3.68	4.09	5.20	3.47-5.20	4.06	3.99	3.82
2# Glass/Plastic	7.50	6.37	6.80	6.41	6.50	5.65	6.35	6.13	6.21	6.38	6.90	9.20	5.65-9.20	6.70	6.60	6.39
Pint	6.55	7.38	6.50	5.88	5.75	4.39	5.77	6.11	6.33	6.99	5.40	8.50	4.39-8.50	6.29	6.08	5.51
Quart	11.18	8.98	11.00	8.31	7.75	7.55	9.81	8.32	9.50	13.09	9.46	11.95	7.55-13.09	9.74	9.91	8.92
5# Glass/Plastic	13.00	13.46	15.65	12.83	15.96	15.96	14.82	15.00	13.85	14.44	16.09	19.33	12.83-19.33	15.03	14.66	13.94
1# Cream	4.75	4.38	4.44	4.51	7.87	4.00	5.48	6.95	7.87	5.25	4.80	5.75	4.00-7.87	5.50	4.97	4.52
1# Cut Comb	4.00	4.46	5.19	4.74	7.20	4.00	6.45	5.70	7.20	7.00	5.98	9.16	4.00-9.16	5.92	6.00	5.07
Ross Round	5.92	3.98	4.85	5.00	5.92	5.92	5.00	5.00	5.92	5.92	5.99	5.85	3.98-5.99	5.44	5.46	5.04
Wholesale Wax (Lt)	2.25	2.53	2.20	2.07	1.90	2.00	2.78	2.71	1.95	2.71	1.99	2.17	1.90-2.78	2.27	2.49	2.13
Wholesale Wax (Dk)	1.88	1.85	1.50	1.87	1.70	1.00	1.91	1.88	1.40	2.40	1.95	1.40	1.00-2.40	1.73	2.14	2.06
Pollination Fee/Col.	50.00	91.00	52.50	42.00	42.00	84.99	48.13	60.00	84.99	84.99	111.00	81.67	42.00-111.00	69.44	79.67	61.04

Malcolm T. Sanford

Insecticides And CCD, Part I

"Do these ag chemicals play a role?"

With the recent flap about CCD, insecticides have inevitably been identified as one of the possible causes of larger-than-normal bee loss. The history of the relationship between beekeeping and insecticide application goes back a long way. In the 1950s it took some sleuthing to finally figure out that arsenic dust was being collected by bees in the field as pollen to both their and their colony's detriment. Given the advantages of hindsight, who now could possibly argue that dusting with this extremely toxic substance does not affect honey bees. This even includes the active material in treated wood.[1] Another situation arose with the use of microencapsulated pesticides in the 1970s, especially a product called PennCap-M®.[2] The capsules were like pollen-grain-size and were a time bomb in colonies because they could be brought back without harm to the forager and only became a problem when consumed by young bees in an effort to feed larvae.

Insecticides were such a problem to beekeepers in the late1970s that congress authorized the beekeeper indemnity program, which provided payments to beekeepers from colonies lost to chemical application in both agricultural and urban (mosquito control) situations.[3] However, this program became unwieldy because it was difficult to tell the difference between legitimate and falsely reported claims, and was finally discontinued. This era brought into use the current information on the effects of pesticides on honey bees, pioneered by Dr. Larry Atkins at the University of California, Riverside for which most extension publications continue to draw their information.[4] This was based on topical exposure to workers in small cages (LD50), however, there is evidence that bees may be exposed through other routes, including contaminated nectar, and that measurement of toxicity (LC50) might be significantly different.[5] In Florida, this became a hot issue with a material called Temik® used in citrus groves.[6] The active ingredient in this material, aldicarb, is a systemic insecticide and was thought to translocate into the blooms contaminating nectar. And although the active ingredient is certainly harmful to honey bees, there is evidence that the metabolites (break down products) of this material are even more toxic than the parent substance.

U.S. beekeepers crossed the Rubicon of pesticide application when *Varroa* mites were introduced in the late 1980s. They literally "tore down the fence," as one wag put it, quickly transforming themselves from anti-pesticide fundamentalists into willing pesticide applicators.[7] Thus, beekeepers became much like those other agriculturalists that in the past they had reviled for "poisoning their bees," the result of what one writer characterized as the "alchemy of greed."[8] This led to several potential effects, including contamination of the world's beeswax supply via "biomagnification" of pesticides in the comb.[9] Because of this, one large-scale beekeeper in Florida did away with all his natural comb and moved to plastic, which he believed would provide a reduced-pesticide environment for his bees.

The use of pesticides inside colonies to control *Varroa* mites inevitably brought more direct exposure to chemical pesticides. The candidates used to control *Varroa* mites on any scale also became more toxic as time went on. Treatments began with the rather benign fluvalinate, a synthetic pyrethroid, (Mavrik®) first soaked into wooden strips with an "emergency" Section 18 label,[10] quickly replaced by a formulation on a plastic strip (Apistan®) with a broader use (Section 3) label. Beekeepers got 10 years use out of this material until mites became generally resistant due to lack of resistance management in many cases.[11]

The next material to receive a label was called Bayer Bee Strips®, later formulated as CheckMite +®. The active ingredient is coumaphos in the class of pesticides known as organophosphates. When this material first became available, I wrote the following, "Coumaphos is in a class of highly toxic materials known as organophosphates (OPs). It is a cholinesterase inhibitor, which attacks the nervous system. Developments of this insecticide type were associated with German studies on related compounds, the so-called "nerve gases" (sarin, soman and tabun). Suffice it to say OPs are among the most toxic of insecticides. The LD50 of coumaphos for absorption through the skin (dermal), for example, is 860 milligrams per kilogram of body weight in rats. It is, therefore, much less benign than fluvalinate, the active ingredient in Apistan®, a synthetic pyrethroid, with a dermal LD50 in rats of 20,000 milligrams per kilogram of body weight.[12] Organophosphates are the basis of many commonly used insecticides (malathion, Diazinon®, parathion, Dibrom®)."[13]

In localized areas coumaphos resistance has already shown up in *Varroa*. This leaves beekeepers with no hard pesticides at present that are as effective controls, the so-called "magic bullets" of *Varroa* mite control. Thus, so-called "soft" pesticides like formic and oxalic acids and essential oils (thymol based Apiguard® and Api-Life Var® and Hivestan®) are being scrutinized. These, in combination with other techniques such as open bottom boards, drone trapping, the sugar shake and breeding (Russian bees and *Varroa*-sensitive hygienic stock), are leading the beekeeping community into a more integrated control technology for *Varroa* mites. However, even the soft chemicals can be hard on bees, and cannot be discounted when it comes to additive effects of chemicals on colonies already under stress by increased manipulation and management.

The above discussion was to provide U.S. readers with an idea of the pesticide (chemical) load (influence) that has been put on honey bees over

the last two decades since *Varroa* mites were introduced. In summary, although historically honey bees have been challenged by insecticides used in production agriculture and urban pest management (mosquito control), the ante was upped considerably when beekeepers began to employ them inside living colonies to control *Varroa* mites. It is no wonder that many are looking at this as at least contributory to colony collapse disorder or CCD.

In a way, the beekeeping experience has mirrored other production agriculture, which also continues to search for effective insecticides as more and more resistance by pests (insects) emerges. Fortunately a new tool has emerged that appears to have incredible promise. Predictably it is another class of pesticides, the neonicotinoids.

In a review of this subject, Motohiro Tomizawa and John E. Casida state, "The neonicotinoids are the most important new class of synthetic insecticides of the past three decades. Although related to nicotine in action, and partially in structure, the neonicotinoids originated instead from screening novel synthetic chemicals to discover a lead compound. Once optimized to imidacloprid (IMI) and analogs, the neonicotinoids joined the earlier chlorinated hydrocarbons, organophosphorus compounds, methylcarbamates, and pyrethroids to constitute the five principal types of active ingredients, all of which are neuroactive insecticides.

"Neonicotinoids are increasingly used for systemic control of plant-sucking insects, replacing the organophosphorus compounds and methylcarbamates, which have decreased effectiveness because of resistance or increased restrictions due to toxicological considerations. Neonicotinoids are also important in animal health care (i.e. flea control). These developments were possible because of the selective toxicity of the neonicotinoids, which is attributable to the specificity of insect and mammalian nicotinic receptors as reviewed here. Neonicotinoids are more toxic to aphids, leafhoppers, and other sensitive insects than to mammals. The physicochemical properties of the neonicotinoids played an important role in their development. The principal target pests are aphids, leafhoppers, whiteflies, and other sucking insects due to the excellent plant-mo*bile* (systemic) property conferred by the moderate water solubility."

"About 90% of the synthetic organic insecticides and acaricides, by market share, are nerve poisons acting on only four targets: acetylcholinesterase (AChE) for organophosphorus compounds and methylcarbamates, the voltage-dependent sodium ion channel for DDT and pyrethroids, nAChR for the botanical nicotine and most recently synthetic neonicotinoids, and the ā-aminobutyric acid (GABA)-gated chloride channel for polychlorocycloalkanes and fipronil. From 1987 to 1997, the use of compounds acting at the cholinergic nAChR shifted from sixth to third in overall ranking, in the most part replacing AChE inhibitors, and this trend is expected to continue.

"The long-term future of neonicotinoids will depend on continued evidence for the human and environmental safety of current compounds, including low toxicity to predators, parasites, and pollinators, no adverse environmental distribution, and fate. It will be enhanced by the discovery of new compounds with a broader spectrum of useful properties including control of lepidopterous larvae and pest strains resistant to earlier analogs. These biological features must be combined with suitable hydrophilicity for transport in plants, hydrophobicity for contact activity, and photostability for residual efficacy. Much has been learned about neonicotinoids in the first decade of their use and about the nicotinic receptor as a target for selective toxicity between insects and mammals. The benefits of neonicotinoids in crop protection and animal health can be enjoyed for many decades ahead with attention to their proper use in pest management systems that delay or circumvent the development of resistance in pest insects."

I have purposefully left intact the quotes above so readers can begin to understand some of the complexity of insecticides in general and neonicotinoids specifically. Nevertheless, it is worth summarizing some of the points made:

1. The reference material for neonicotinoids is imidacloprid (many products will have this as the active ingredient).
2. The benefits of the neonicotinoids include:
   A. High toxicity to insects (especially sucking insects like aphids, leafhoppers, fleas) and low toxicity to mammals (humans, dogs, cats)
   B. Water solubility so plants can use the materials in their vascular systems (systemic insecticides)
   C. Different than other classes meaning insects will have to start over in developing resistance so they should be effective for a long period.
3. A 15% world market share and third ranking for the neonicotinoids by 2005 appears to be continuing.

Just how ubiquitous these products are becomes clear from one post to the Bee-L discussion list: "Imidacloprid is found in granules for controlling lawn grubs, liquid for tree and shrub pest control, and even in some potting soil mixes and fertilizers. Available at every Walmart in the country, I bet!"

In the southeast, we look to imidacloprid as truly a "miracle" substance for relief from one the region's most irritating insects for humans and their pets. A pest control conference participant in a seminar confirmed for me that "flea jobs" had disappeared in the 1990s. BC

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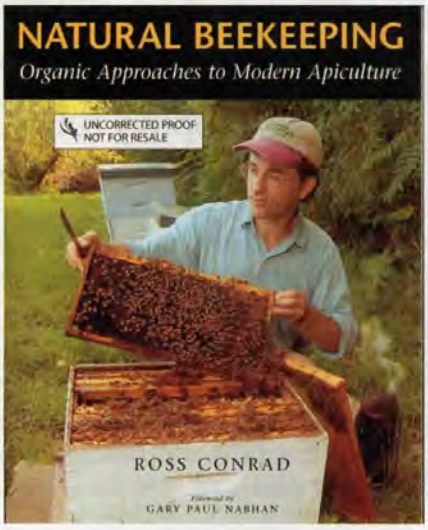
New Read For 2007



Natural Beekeeping, Organic Approahces To Modern Apiculture. Ross Conrad, 272 pages. 8" x 10" b&W, soft cover. Published by Chelsea Green Publishing. ISBN - 9781933392080. $35.

This is not a beginning beekeeping book. You have to know something before you can use this book. Mostly, you have to know that the way we've been keeping bees isn't working, and there's got to be a better way. Ross has a better way.

Ross has the concept of organic beekeeping in mind, though he's aware of the difficulty involved. I'd say with comfort what he accomplishes is beekeeping organically – a fine line perhaps, but an important one. In any event, you won't be using harsh chemicals anymore, you'll be using locally raised queens, wintering better (Ross is from Vermont, so he knows Winter!), and antibiotics are history.

Diseases, and then management are discussed, along with other pests, and management techniques to deal with them, rather than relying on chemicles. Harvesting and processing honey are discussed using an organic-minded process necessary for sure. And there's a long discussion on the USDA Organic Certification process, and its drawbacks.

This is worth the read. It's the first book I know of that gathers all the right ways to keep bees.

I was asked for a 'blurb' to put on the back cover, and I said, "Ross Conrad keeps bees the way bees should be kept." He's not the only one, but he's put it all in one place. – *Kim Flottum*

RESEARCH REVIEWED

The Latest In Honey Bee Research

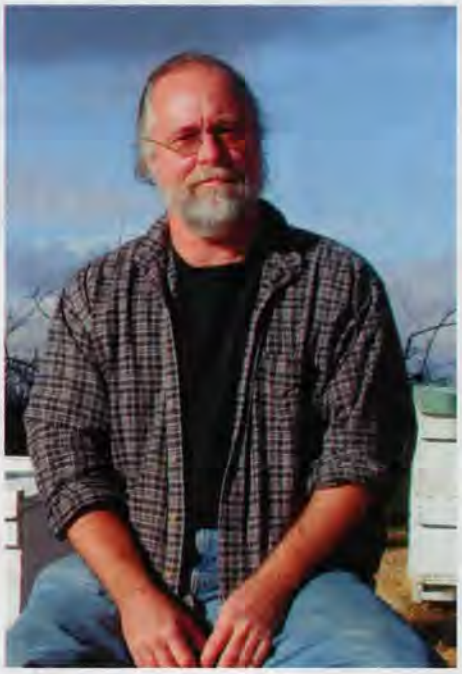
Steve Sheppard

"There goes the neighborhood."

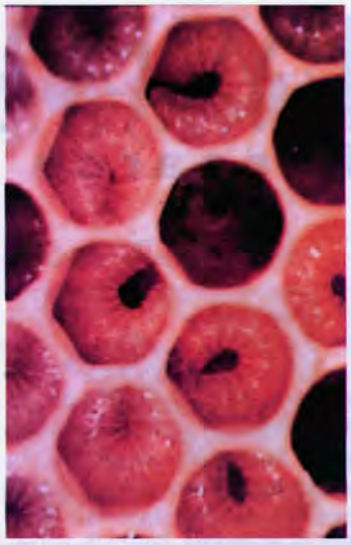
It is sometimes said that people can be judged by the company they keep. In the case of honey bees, European researchers have recently shown that this statement also has serious implications relevant to the distribution of disease (Belloy et al 2007). In research that took place in Switzerland, Belloy and colleagues studied the distribution of the causative agent of European foulbrood, *Melissococcus plutonius* (previously known as *Melissococcus pluton*) within and among apiaries located both in areas where European foulbrood (EFB) was present and an area where it was previously unknown. They found that the causative agent was considerably more widely distributed than could be predicted by examination of colonies for EFB and further, that there was a spatial component to the distribution that is of importance to beekeepers.

The researchers sampled a total of 128 colonies from two areas of Switzerland. These included 64 colonies from two apiaries from an area that was EFB "free" (no prior history of EFB in the region). From another area, where EFB was known to occur, they collected bees of 64 colonies from 11 apiaries as follows: 32 colonies were sampled from six apiaries where at least some colonies had been diagnosed with clinical symptoms of EFB and 32 colonies were collected from five apiaries where no EFB symptoms were present. Samples of bees were taken from the hive entrance and also from the brood nest. Belloy and colleagues used a laboratory method called polymerase chain reaction (PCR) to detect the presence of DNA belonging to the causative EFB bacterium (*M. plutonius*) in samples of 25 bees collected from each colony. Using this method, they could detect when a colony harbored *M. plutonius*, regardless of whether the colony was actually showing the clinical symptoms that we know as European Foulbrood.

The results of the study indicated that the spatial distribution of infected colonies (those showing EFB symptoms) had a clear influence on the occurrence of *M. plutonius* in other colonies within the apiary. That is, in the area where EFB was known to occur, the proportion of non-symptomatic colonies that harbored *M. plutonius* (11 out of 12) was significantly higher in the apiaries where EFB was present, than in apiaries where no EFB symptoms were found (10 out of 32). In colonies from the apiaries located in the EFB-free areas, none of the 32 colonies were found to have *M. plutonius* in adult bee samples. In the 20 colonies with clinical symptoms of EFB, the bacterium could be detected from adult bee samples collected from both the brood nest and the hive entrance. In the 12 colonies without clinical symptoms, but located in apiaries with EFB symptoms, the bacterium was found in 11 of 12 brood nest samples and nine of 12 samples collected from the entrance. In the five apiaries without clinical EFB symptoms located within the EFB area, brood nest samples from 10 colonies were found to have *M. plutonius*, while 7 entrance samples showed the bacterium. Only one out of these five apiaries without clinical symptoms (located within the EFB area) was found to be completely free of *M. plutonius*.



In their discussion, the researchers point out that the results of this study clearly showed that the bacterium can be present in colonies that do not show symptoms. In fact, in apiaries where EFB symptoms were found in some colonies, over 90% of the remaining colonies could be considered "carriers" of *M. plutonius*. In nearby apiaries without clinical symptoms of EFB (1/3 – 2/3 miles away) 39% of the colonies were carriers of the bacterium as measured in the adult bees. The authors go on to discuss the potential for transmission of diseases in bees based on both the density of colonies in an apiary and the spatial arrangement of apiaries (density of apiaries) in an area. Clearly, this research has implications for the potential transmission of EFB, but we can speculate that it likely also reflects what might happen with disease pathogens such as *Paenibacillus larvae* (AHB) and others. Another implication of this research is that some honey bees appeared to express inherent resistance to disease even in the presence of pathogens. For example, of the colonies that did not "show" EFB symptoms within the EHB "area", 2/3 of them had the



European foulbrood.

bacterium present in adult bees.

In contrast to Switzerland, the widespread movement of honey bees for pollination and honey production in the U.S. accounts for considerable contact between colonies. Therefore, at least a considerable segment of our overall honey bee population shares "exposure" to a common pool of pathogens and parasites. Considering this aspect of the U.S. beekeeping reality, together with the findings of Belloy and colleagues, suggests that taking advantage of the natural ability of bees to resist diseases and further amplifying this trait in our honey bee populations through selective breeding is probably a more practical approach, than trying to develop or maintain pathogen "free' areas in which to keep bees. BC

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The Honey Bee Odor-Search Hypothesis

Adrian Wenner

Is it conceivable that honey bees **do not** have a symbolic "language?" Judging from letters and articles in bee magazines (including items in recent issues of ***Bee Culture*** and the ***American Bee Journal***), it appears that some people, when pressed, would still reply, "No, that is not conceivable," indicating that their "belief system" remains intact.

We can expect such a ready answer, because "bee language" has now been treated as "fact" in innumerable publications and other media outlets for half a century. Even respectable scientists confuse hypothesis (interpretation) and fact when it comes to "bee language." The waggle dance is observable fact; the suggestion that attendant bees can **use** the quite inaccurate distance and direction information present in that dance remains an unproven hypothesis. That is true, despite many claims to the contrary, including claims by those who conducted the radar tracking experiments (see beesource.com/pov/wenner/radar.htm).

Let us backtrack. For more than 2000 years people have wondered how hivemates of successful foraging honey bees manage to find the same source of food in the field (see beesource.com/POV/wenner/abjdec1992.htm). A somewhat obscure passage in Aristotle's writings (330 B.C.) suggests that he believed potential recruits may have followed the forager back out to the same food source. Virgil later used the words, "Some lead their youth abroad," presumably with the same meaning intended.

In 1901 Maeterlinck pondered two hypotheses, as follows:

"Do the comrades who flock to the treasure only follow the bee that first made the discovery, or have they been sent on by her, and do they find it through following her indications, her description of the place where it lies? Between these two hypotheses, that refer directly to the extent and working of the bee's intellect, there is obviously an enormous difference."

We can think of those two possibilities as:

1) A "following" hypothesis, as one might expect from other insect behavior studies.

2) A "language" hypothesis (an anthropomorphic explanation), something akin to what we would expect among so-called "higher" life forms, such as Julien Francon proposed in 1939 and von Frisch gained supportive evidence for less than a decade later.

Maeterlinck did not consider a third possibility:

3) An "odor-search" hypothesis, such as one insisted upon by von Frisch in the late 1930s. (See beesource.com/POV/wenner/bw1993.htm and beesource.com/POV/wenner/frisch1943.htm).

By 1940 we thus had three competing hypotheses – a situation ripe for exploitation by a "multiple inference" scientific approach to the problem, as eloquently proposed by Thomas Chrowder Chamberlin in 1890. However, instead of keeping all options open, bee researchers after the mid-1940s (including me, at first) sought to substantiate and refine the new language hypothesis proposed by von Frisch in 1946. Chamberlin had recognized the

shortcoming of that traditional approach (one subject to "confirmation bias"), as follows:

"Briefly summed up, the evolution is this: a premature explanation passes into tentative theory, then into an adopted theory, and then into ruling theory."

"There is an unconscious selection and magnifying of the phenomena that fall into harmony with the theory and support it, and an unconscious neglect of those that fail of coincidence. The mind lingers with pleasure upon the facts that fall happily into the embrace of the theory, and feels a natural coldness toward those that seem [not compatible with the theory]. Instinctively there is a special searching-out of phenomena that support it, for the mind is led by its desires. There springs up, also, an unconscious pressing of the theory to make it fit the facts to make them fit the theory."

Instead, Chamberlin had advocated a working hypothesis approach:

"The working hypothesis differs from the ruling theory in that it is used as a means of determining facts, and has for its chief function the suggestion of lines of inquiry; the inquiry being made, not for the sake of the hypothesis, but for the sake of facts."

Although the stage was thus set for some serious scientific tests of competing hypotheses (each hypothesis against the other two) by bee researchers, WWII complicated matters. It was during that period that von Frisch had discovered the intriguing correlations between elements of the by-now-famed "waggle dance" and the direction and distance of food sources visited by foraging honey bees in the field. He had concluded, after gaining supportive evidence, that potential recruits had interpreted the information contained in those dances and had "flown directly out" (his words) to the same food source. In so doing, he prematurely abandoned his earlier odor-search hypothesis.

At the end of that war, prominent scientists in England and the United States strove to help German scientists become re-established in the world community. Among other projects, the honey bee waggle dance "language" hypothesis had special appeal (the exotic "sells" in science as well as elsewhere). Very soon the dance language hypothesis became elevated to a "ruling theory" (as in Chamberlin, above). The competing hypotheses ("following" hypothesis and "odor-search" hypothesis) no longer received consideration.

By the 1960s the ruling theory had thus become "fact" in the minds of most scientists (including me) and the lay public. Instead of the "dance language **hypothesis**" we had "**the dance language**" (considered as "fact") and "**their language**" (interpretation considered as "fact"). ➢

Thus, the scientific distinction between interpretation and fact had disappeared. Evidence that didn't fit that ruling theory became unacceptable – a dismissal practice that largely continues to this day.

However, no one has yet come up with the "extraordinary evidence required" for the "extraordinary" hypothesis (as in Carl Sagan's famous statement to that effect) for bee language. Equally important: Anyone who wants a particular outcome should not be the person to conduct the relevant experiment. Either that, or such a person should take extraordinary measures to counter confirmation bias (as for example, by use of blind, double blind, and strong inference experimental design – cautions sadly lacking in most confirmation experiments).

We have had three generations of citizens and fledgling scientists exposed to the bee language ruling theory as fact from cradle to grave (children's books up through advanced biology textbooks and encyclopedia entries).

However, hypotheses do not become facts but always remain hypotheses. New evidence emerged in the 1960s and 1970s that countered expectations of the language hypothesis and supported the von Frisch odor-search hypothesis of the 1930s. Searching bees did not "fly directly out" to the "intended" food location. Most that left the hive failed to find the food source. Searching bees that succeeded took far too long in flight. (For access to much of that body of counter evidence, see: beesource.com/pov/wenner/index.htm).

In simple experiments (a design that any objective beekeeper or researcher can conduct with help from a body of student volunteers), that pitted odor against dance maneuver information, searching recruits had ended up where the odor was present and had obviously ignored the direction and distance information present in the waggle dance. See: beesource.com/pov/wenner/sci1969.htm for details. In that experiment the search behavior of more than 2000 bees were monitored with use of a blind experimental design. Those unwelcome odor-search results were then either dismissed or ignored by proponents of the ruling theory – as Chamberlin had emphasized, they apparently felt "a natural coldness toward [results] that seem refactory."

A further complication emerged. Experiments revealed that searching bees do not find food that has no scent, even when regular foragers imbibe and return to the hive with their loads of pure sucrose solution (which has a vapor pressure of zero – hence no odor). Von Frisch had come to the same conclusion, as in the following passage (see beesource.com/POV/wenner/bw1993.htm):

> *"In performing this experiment, I succeeded with all kinds of flowers with the exception of flowers without any scent. And so it is not difficult to find out the manner of communication. When the collecting bee alights on the scented flowers to suck up the food, the scent of the flower is taken up by its body-surface and hairs, and when it dances after homing the interested bees following the movements of the dancer bee, and holding their antennae against its body, perceive the specific scent on its body and know what kind of scent must be sought to find the good feeding-place announced by the dancing bee. That this view is correct can be proved easily."*

A dilemma then arises; to have recruitment, one must use odor in or near the target food source (any odor will suffice – even incidental odors, such as use of sun tan lotion by assistants – can influence results). But, if some odor is necessary for success, then one can never be sure that successful searchers had not used odor alone rather than any direction or distance information obtained from waggle dances.

The recruitment controversy has now existed for nearly half a century, with a quite specific starting point (see: beesource.com/pov/wenner/aoac.htm – excursus SI). Millions have now been spent by those locked into their belief system, in repeated efforts to "prove" the "reality" of the "instinctual signaling system" (as it had come to be known). Language advocates seem unaware that each such attempt at proof constitutes an inherent admission that all previous such attempts had failed (see: beesource.com/pov/wenner/jib2002.htm). Either that, or such attempts have failed to come up with the necessary "extraordinary" evidence for supposed final "proof."

The latest development in the controversy emerges from the genome sequencing of the DNA in honey bees. A total of 170 odorant receptor genes were found, indicating "a remarkable range of odorant capabilities." By contrast, the DNA sequencing study found no unique cluster of genes that would indicate that searching recruits could use direction and distance information found in waggle dances. Such evidence of extensive odor reception capability constitutes a powerful endorsement of the odor-search hypothesis.

Does this all mean that many bee researchers will now conduct research with odor-search as a primary working hypothesis? Can they break free of the restrictions imposed by the ruling theory (bee language) so long adhered to? That is, can they now alter their approach and no longer conduct experiments "for the sake of the hypothesis but [instead strive] for the sake of facts")? An overriding question also emerges: Is it even possible for scientists and others to abandon their allegiance to the honey bee dance language hypothesis. (Sociologists who study the process of science have found that scientists are the last to abandon a favored hypothesis.)

Whereas the language hypothesis has not proved of practical benefit for beekeepers in its half century of existence, I see great potential for beekeeping advances in future studies of the importance of odor during recruitment to crops. While some have accused me of being stubborn, I simply trust what I have seen from the "unmolested" behavior of thousands of searching bees – rather than rely on what theory might dictate.

Let us hope that serious bee researchers will now turn their attention to the promise of studying odor use by bees and its great potential for improving crop pollination and understanding colony foraging patterns. A decade ago I provided some leads toward that end in a series in the ***American Bee Journal***, now readily available as follows:

beesource.com/pov/wenner/abjoct1998a.htm
beesource.com/pov/wenner/abjnov1998b.htm
beesource.com/pov/wenner/abjdec1998c.htm

For a few years, we can expect writers of popular literature and authors of reviews to continue to extol the "remarkable bee language" in their publications for decades to come – focusing on confirmatory evidence instead of focusing on the beauty of this example about how science is a process and not a search for absolute truth. BC

Acknowledgement

Many thanks to Barry Birkey, who provided a platform for results and ideas so long suppressed.

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Bee Culture Magazine
Volume 135, Number 6
June, 2007

Original Article

Acceptance of Mated Queens and Queen Cells in Colonies of Russian and Italian Honey Bees

Robin A. Cargel[1] and Thomas E. Rinderer[1]

Summary: Requeening colonies is a standard beekeeping practice with both mated queens and queen cells. More beekeepers are requeening with Russian honey bee queens because of their significantly higher resistance to *Varroa* and tracheal mites, their good honey production and their overwintering abilities. However, some beekeepers report difficulties when attempting to requeen colonies with Russian queens. This experiment investigated the scope of that problem. In an experiment having 120 requeening attempts, no differences were found between requeening with Russian or Italian queens. Similar results were obtained when requeening with Russian or Italian queen cells.

Introduction

Queen honey bees (*Apis mellifera*) may live for a year or more (Seeley, 1978) but more often are replaced by colonies after a few months (Sugden and Furgala, 1982). Colonies naturally rear new queens in colonies when old queens are failing or lost (supersedure) and prior to swarming. These events are regulated by a variety of circumstances such as reduced levels of pheromones and broodnest crowding (Velthuis, 1970).

Beekeepers have taken advantage of the natural processes of queen replacement and developed methods to produce queens at will, allowing them to put a queen of their choosing into a colony. Periodic queen replacement is an important beekeeping practice (Guzman-Nova et al., 1998). Beekeepers replace queens in colonies to assure that colonies will have vigorous queens that are less likely to fail at a critical time in the annual colony cycle (Furgala and McCutcheon, 1992) or to improve the genetic stock. Beekeepers also introduce queens to queenless colonies they have made by dividing existing colonies to increase the number of colonies they own. Generally, new queens are placed in colonies either as mated adult queens or as queen cells that contain pupae almost old enough to emerge.

Russian honey bees are resistant to *Varroa* mites (Rinderer et al. 2001a, Harris and Rinderer, 2004), tracheal mites (de Guzman et al., 2002), overwinter well (de Guzman et al., 2006) and are good honey producers (Rinderer et al., 2001b). Many beekeepers have purchased or produced Russian queens to change the stock in their colonies. However, some of these beekeepers have reported difficulties when attempting to introduce Russian queens to Italian colonies. We conducted comparative experiments with both mated queens and queen cells to identify the magnitude and source of these queen introduction problems.

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Materials and Methods

Experiment 1. Acceptance of Introduced Queens

Thirty Russian and 30 Italian colonies were made as divides of established colonies. These divides were composed of three to four frames of brood (Langstroth frames 16.8 cm deep) with 1.4-1.6 kg of worker bees. The divides were arranged randomly in a single apiary.

Two days later, mated Russian and Italian queens were introduced into the colonies. For each colony the type of queen (Russian or Italian) was randomized. Seventeen Russian and 13 Italian queens were randomly introduced to the 30 Russian colonies; 17 Russian queens and 13 Italian queens were introduced to the 30 Italian colonies on May 24, 2004.

Unattended paint-marked queens in plastic queen cages were placed between brood frames near the top bars of the frames. The tubes of the cages were capped. Brood frames were inspected and any queen cells found were destroyed. Five days after the queens were placed in the colonies, they were hand released into the colonies from the cages. Seven days and 24 days (four weeks) after the queens were hand released the colonies were inspected. The presence of a marked queen, eggs, and all stages of larvae were interpreted as evidence of a successful queen introduction.

A second replication of the queen introduction experiment was conducted with the same colonies. When introduction success in the first replication of the experiment was determined, the queens were removed and placed in a populous queenless colony for storage. Likewise, frames with unsealed brood were removed from the colonies, randomly mixed within the stock groups and returned to colonies. Russian colonies received equal numbers of frames of Russian brood and Italian colonies received equal numbers of Italian brood frames.

Two days later, queens were introduced to the colonies. The type of queen (Russian or Italian) for each colony was randomized without reference to the first replication. Introduction and evaluation procedures were the same as they were for the first replication.

Data concerning the initial acceptance of the introduced queens and their continued presence were analyzed by Fisher's exact tests.

Experiment 2. Acceptance of Queen Cells

We also compared rates of acceptance of queen cells between Russian and Italian colonies. Thirty-three queenless Russian and 30 queenless Italian divisions were made. The divides were composed of five to seven frames of brood, two to 2.3 kg of worker bees and one frame of honey (Langstroth frames 16.8 cm deep). Making divisions was done when queen cells we produced contained pupae that were expected to emerge within two to three days.

Both Russian and Italian queen cells were produced. The 33 Russian divisions were given Italian cells and the 30 Italian divisions were given Russian cells. The cells were introduced the day after divisions were made by pressing plastic cell bases into comb just above the brood. Cell protectors were not used.

Colonies were inspected two to three days after cell introduction. Virgins were paint marked. Colonies were again inspected at nine to 10 days and then 15 days after cell introductions for the presence of marked queens and brood. A final colony evaluation was made 6 weeks later.

The presence of virgin queens was used to indicate that cells were accepted. Continued acceptance through time was based on the presence of the marked queen with a brood nest having all stages of brood. Data were analyzed by Fisher Exact Tests.

Colonies in which the first cell did not apparently produce an accepted virgin queen were given a second cell of the same type two to three days after the colonies were determined to be queenless. The success of these "secondary" introductions was monitored and evaluated by the same methods and criteria used for the "primary" introduction group of introductions.

Results

Experiment 1. Acceptance of Introduced Queens

By week four all colonies that accepted introduced queens had brood nests with all stages of brood. Overall, 80% of the colonies retained the original introduced queen: 82% for Russian colonies and 78% for Italian colonies. Additionally, each replication of the experiment produced similar results for Russian and Italian colonies. Differences between colony types for each replication and the combined replications were not significant (Table 1).

Similar results were obtained when acceptance was classified by queen type. About 78% of the Russian queens remained in their colonies while 82% of the Italian queens remained. This overall difference between queen types was not significant nor were differences between queen types for each replication (Table 1).

Results differed significantly between the two replications ($P = 0.003$). The replication that began in May (Replication 1) had 92% of the queens after three weeks while the replication that began in June (Replication 2) had 68% of the queens surviving.

Experiment 2. Acceptance of Queen Cells

Cell introductions were equally successful (Table 2). For the "primary" introductions, numerically fewer Russian cells produced queens that remained in Italian colonies 14 weeks later but this difference was not significant ($P = 0.13$). The "secondary" introductions provided similar non-significant results ($P = 0.57$).

The success rate (23%) of the secondary introductions was about a third of the success rate of the primary introductions after 14 weeks (Table 2). This difference was significant ($P = 0.01$) even though only 13 secondary introductions were monitored.

Discussion

We conclude that re-queening success does not depend on the stock of the colony.

Overall, no evidence was found which indicated that either Russian queens or Russian queen cells were more difficult to introduce to either Russian or Italian colonies. There was an early minor suggestion of Russian colonies

Table 1. Acceptance of Russian and Italian queens in Russian and Italian colonies for two replications of introductions.

Replication	Colony Type	Queen Type	Number Introduced	Number Released (5 days)	Percentage Released	Initial Acceptance (12 days)	Percentage Accepted	Week 4* Acceptance	Percentage Acceptance
1	Russian	Russian	17	16(1)	94	15(2)	88	13(4)	76
		Italian	13	13(0)	100	13(0)	100	13(0)	100
	Italian	Russian	17	17(0)	100	17(0)	100	16(1)	94
		Italian	13	13(0)	100	13(0)	100	13(0)	100
	Difference between colony types:			$P = 1.00$, NS		$P = 0.49$, NS		$P = 0.35$, NS	
	Difference between queen types:			$P = 1.00$, NS		$P = 0.49$, NS		$P = 0.35$, NS	
2	Russian	Russian	14	12(2)	85	11(4)	78	10(4)	71
		Italian	16	11(5)	68	11(5)	68	10(6)	62
	Italian	Russian	15	14(1)	93	14(1)	93	10(5)	66
		Italian	15	14(1)	93	13(2)	86	11(4)	73
	Difference between colony types:			$P = 0.15$, NS		$P = 0.18$, NS		$P = 1.00$, NS	
	Difference between queen types:			$P = 0.47$, NS		$P = 1.00$, NS		$P = 1.00$, NS	
1 & 2	Russian	Russian	31	28(3)	90	26(5)	83	23(8)	74
		Italian	29	24(5)	83	24(5)	82	23(6)	83
	Italian	Russian	32	31(1)	93	31(1)	97	26(6)	81
		Italian	28	27(1)	96	26(2)	93	24(4)	86
	Difference between colony types:			$P = 0.09$		$P = 0.07$		$P = 0.49$, NS	
	Difference between queen types:			$P = 0.74$		$P = 0.77$		$P = 0.63$, NS	
	Difference between replications:			$P = 0.008$**		$P = 0.008$**		$P = 0.003$**	

Introduction Group	Colony Type	Cell Type	Number Introduced	Number Accepted (Day 3)	Percentage (Day 3)	Number Accepted (Week 14)	Percentage (Week 14)
Primary	Russian	Italian	33	26	70	24	73
	Italian	Russian	30	24	80	16	53
	Difference between Colony/Cell Combinations			$P = 1.00$, NS		$P = 0.13$, NS	
Secondary	Russian	Italian	7	6	86	1	14
	Italian	Russian	6	3	50	2	33
	Difference between Colony/Cell Combinations			$P = 0.28$, NS		$P = 0.56$, NS	
	Difference between Primary and Secondary Acceptance			$P = 0.76$, NS		$P = 0.01$**	

Table 2. Rates of successful introductions of Russian queen cells into Italian colonies. For colonies that failed to accept cells in the first (primary introduction group) introduction second cells were introduced (secondary introduction group).

being generally more difficult to re-queen from day 12 data ($P = 0.07$). However, this proved not to be the case by week four. We found no evidence that Italian colonies were less accepting of Russian queens.

There were differences between the rates of queen acceptance between the two replications. The second replication had 68% acceptance while the first replication had 92% acceptance. A variety of seasonal and other environmental causes may have caused this difference, including the intense colony management we used to accomplish a second replication. However, the difference was not the result of either the stock of the queens or the stock of the colonies. Likely, the conditions that resulted in lower acceptance rates in the second replication should have created conditions for subtle stock differences to become more apparent. That there were no differences between stocks even in the more difficult conditions of the second replication further suggests that there are no differences in the acceptance rates of Russian or Italian queens in Russian or Italian colonies.

In a study involving larger numbers of colonies in many different environments and using different queen introduction procedures, packages of Italian bees were slightly less able (7%) to accept Russian queens (Tarpy, personal communication). Although we did not detect problems in our study and only a small difference was detected by Tarpy, it is possible that some larger problems of requeening with Russian queens may occasionally occur. It may be that some Italian stocks, at least under some conditions, have difficulty accepting Russian queens. However, such difficulties are not common. The difference detected by Tarpy, while statistically significant, is small and probably for most beekeepers is acceptable when balanced with having mite resistant stock.

Re-queening with cells was also equally successful for Russian and Italian colonies. However, there was a large difference between primary and secondary introductions. The colonies were reasonably large splits that had not been queenless long enough to have laying workers (Page and Erickson, 1988). There was no apparent reason why they rejected queen cells or would not accept a second cell. However, having failed once to accept a cell appears to be an excellent indication that a colony is unlikely to accept a second cell.

Overall, there is no evidence suggesting that it is more difficult to introduce Russian queens or cells to colonies. However, it may be that problems do exist which are probably infrequent and minor. The economic advantage of having colonies with mite resistant stock is considerable. These advantages certainly outweigh minor and infrequent queen introduction problems encountered with changing stock. BC

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Dan Cummings Joins Almond Board

An Active Almond Grower & Pollinator

Dan Cummings grows almonds and is half owner of Olivarez Honey Bees.

Dan Cummings' earliest memories are of "picking Peerless." As a boy growing up on his father's almond ranch near Chico, he stood at the sorting belt at harvest "picking out stick-tights and any foreign material before we shipped the nuts to Blue Diamond."

"We've always shipped to Blue Diamond," says the new Blue Diamond director from District 1. "We wanted the secure, competitive returns."

Cummings stuck with Blue Diamond even when returns were not as competitive, "because over the long haul I believe in the cooperative business model and Blue Diamond's importance to the industry." Now that Blue Diamond is back to a competitive position, "it's fantastic, and it's real gratifying to have stayed the course and helped make these good times possible."

Dan's grandfather grew almonds near Oakdale before moving the family operation to the Chico-area, where Dan's father continued the business.

Cummings has been involved with almonds all of his life as a grower and as a leader in Blue Diamond and the Almond Board of California. Last November he was elected to the Blue Diamond Board to replace Howard Isom who had announced he would retire from the board at the annual member meeting in Modesto.

"I feel honored to follow Howard in this role," Cummings says. "He was the right man at the right time for Blue Diamond. He was instrumental in redirecting our cooperative into its current competitive and industry leadership position. I will work to keep us moving forward and becoming even more competitive in the years ahead."

Cummings brings a wealth of not only practical farm and almond industry experience but also academic insights to the board. He earned a degree in economics at Stanford, bought some land with his father and farmed it for three years, then left for Harvard University to earn a MBA. While in Boston, he made many trips back to Chico to help manage his and the family's farms. After his father died, Dan managed the family properties and started a farm management business with another Blue Diamond grower, Paul Violich, which he continues to operate. When the family farm was sold, Dan reinvested his share in additional farm properties of his own and bought a half interest in Olivarez Honey Bees.

For the past 15 years, Dan has taken an active role in Blue Diamond and the Almond Board of California. He was in the first Leadership Program class and was an elected member of the District 1 Grower Liaison Committee for three years and of the Grower Advisory Committee. He continued as an ex officio member while serving on various Almond Board of California (ABC) committees and board. His ABC service includes three years as vice chairman; chairman of the International, PR and Advertising, and Reserve committees; member of the Administration and Finance Committee, and chairman of the Bee Task Force. He was also a co-chair of a strategic planning task force.

Cummings feels that this extensive service provides him with comprehensive knowledge of the industry that will be useful in his work with the Blue Diamond board.

"I'm very excited about my new role as a board member," he says. He looks forward to helping implement the member-approved expansion of the board by two outside members, expanding the consumer business and continuing to invest in improved processing opportunities. "But, as the new member of the board, I will be doing a lot of listening and learning," he adds.

Like everyone else, Cummings has his eye on continued growth in almond acreage and production. He is leading an ABC task force which is developing a global demand model for the next five years "to determine where the ABC should direct its efforts," he says. "We've had a good look at it and good input from Blue Diamond staff and other handlers. These insights should help me in my work with the Blue Diamond board as well."

To meet the challenges at the ABC Board that will come with bigger crops, Cummings believes, "Working together through consensus is what will benefit the industry. That's where we've been during our most effective years and where we need to be now and in the future."

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All The Buzzz in...

Hello Friends,

To celebrate the summer and the honey harvest, send us your favorite ways to use honey.

Bee B. Queen

Recipes

Gifts

Cadence, age 10, Vero Beach, FL. "I was helping my dog, Crockett, who got a thorn in his paw, while I was working my bees."

Rya

A paper bee by Nicolas, age 6, Round

Life Cycle Celebration

Science Scramble Puzzle

Unscramble each of the clue words. Copy the letters in the numbered cells to other cells with the same number. After you have finished the puzzle, write the LETTER of the matching photo in the blank at the beginning of each word.

___ NUEQE

___ RENDO

___ GEG

___ LUDTA

___ PAPU

___ VEALAR

___ KEORRW

M				M				H		S	I	S	
1	2	3		4	5	6		7					

A.

B.

C.

E.

D.

F.

This is the word for the life development that insects go through. The photos, in the order of development, are A, B, C and D.

G.

Photo credits: A, B, C, from Scanning Electron Microscope Atlas of the Honey Bee, by Eric Erickson. E, D, G by Kim

... Bee kid's corner

Produced by Kim Lehman -www.beeladyprograms.com
May 2007

You Ask?

Rickey from Portsmouth, Ohio asks, *"When a queen bee dies, can a worker bee repopulate the hive?"*

The bees in a hive are very unhappy when a queen dies. Worker bees begin to make a new queen by feeding selected larvae loads of royal jelly. A worker may begin to lay eggs. They are unfertilized so all the eggs layed will develop into drone bees. A worker bee can not repopulate a hive since there need to be loads of worker bees for a hive to survive.

It takes 21 days for a worker bee to develop, 24 days for a drone and 16 days for the queen.

Bee Cooking

The worker bees feed the larvae "bee bread" which is pollen, honey and bee gland secretions.

Dipity Do It Yourself Cooking

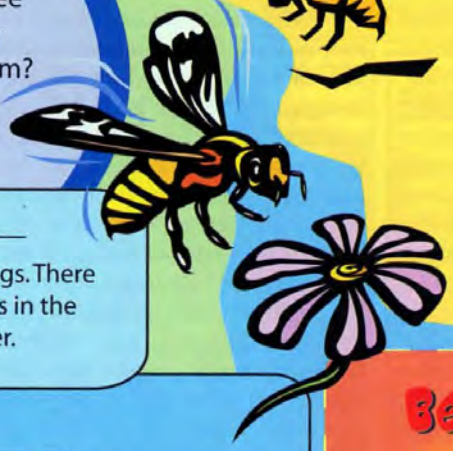
Make this tasty treat for a summer snack.

1. Smash up graham crackers using a rolling pin or a sideways jar.
2. Peel a banana.
3. Using a butter knife, cut the banana into bite size pieces.
4. Dip each piece in honey.
5. Then dip each piece into the graham cracker crumbs.
6. Try dipping the pieces into Corn Flakes, Rice Krispies, raisins, chopped nuts or chocolate covered ants.....Just kidding about the ants.

A bee egg is about half the size of a grain of rice.

Bees in Threes

In the hive there are three different kinds of honey bees. Can you name them? Write the names in the blanks.



_ _ _ _ _

Hints: She lays all the eggs. There is only one of these bees in the hive. Other bees feed her.

_ _ _ _ _ _ _

ese bees have many jobs in the hive including feeding making honey, producing wax, cooling the hive, gathering nectar and water, guarding the hive, building the comb, and and taking care of the queen and drones.

_ _ _ _ _ _

Hint: These male bees help the queen to lay fertilized eggs. There are only a few of these bees in the hive. These bees come from unfertilized eggs.

www.beeculture.com

Beecome a Bee Buddy

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

Name: _____

Address: _____

City, State, Zip code _____

Age: _____ Birthday: _____

E-mail (optional) _____

Order for the puzzle: E. queen, G. drone, A.egg, D. adult (could also be number F) C. pupa, B.larvae, F. worker (could also be number D).

MEET DEAN BURROUGHS At EAS 2007

From A Hobby To A Sideline Business

Dewey Caron

Each year the EAS conference – this year August 6-10 at the University of Delaware – features top researchers and practioners of bee culture. One beekeeping expert speaking on the program this year will be Maryland serious sideliner Dean Burroughs. Dean will discuss his retirement transition from hobbyist to serious sideliner.

After 31 years as Associate Professor in the Department of PE, Health and Human Performance and varsity tennis coach at Salisbury State (now University) on the Delmarva Peninsula, Dean developed a plan to expand his beekeeping from hobbyist to serious sideliner. Dean expected that the bees would help provide a retirement income cushion. So upon retirement in 2003, he expanded from 30 to 98 hives and then to 225 colonies in 2004, using a mixture of packages and splits. He lost money that first year but has had modest gains the last two years and he now has stabilized management around 200 colonies.

Dean was no stranger to beekeeping. He started bees in 1984 when the Museum curator at Salisbury State asked if he was interested in taking over his six bee colonies as he did not want to move them to his new position in New York State. Dean had had a bit of experience with bee culture, remembering his Summer visits to his grandfather's farm in Georgia and had helped his father manage his bees. It was Winter when he started but the six colonies survived. Then Dean experienced what most beekeepers know well ... those six colonies grew ... and grew... and grew until he had 30.

Currently he has bees in about eight locations during the Summer but consolidates to two primary overwintering locations in the Fall. One of his overwintering sites, an apiary in Pemberton Park, also is one of the best nectar flow locations for his annual honey production. The Park is a county-maintained 300 acre former farm estate dating to 1740. Since the farm archive indicated the farm had bees in the 1700s, the Park is delighted that Dean keeps an apiary there. Dean also manages an observation hive for the farm at their education house.

Dean, like many hobby beekeepers, started honey extraction in the kitchen and then moved to a "honey room" in the basement – though the rest of the family referred to it as the laundry room. Before his retirement, Dean established a honey house by purchasing a 12 X 16 shed, which he put in the backyard. Water and electrical service were added and a loft added for equipment storage. Unfortunately, his sideliner projected honey production goal of around 6000 pounds annually has not yet been reached as the Delmarva area lacks adequate nectar producing crops after the middle of June. Last year he produced about 2500 pounds.

Dean has standardized his honey marketing to feature only 12 ounce squeeze containers and pint and quart jars of extracted honey. He had a graphic arts student design a distinctive label. His honey is sold at two roadside markets where he pollinates and in one health food store. He is usually out of honey by the end of the year. He also has a growing market niche that is unusual – he puts his honey into four or eight ounce hex jars as a wedding favor, using a label design from the couple that includes his name and address

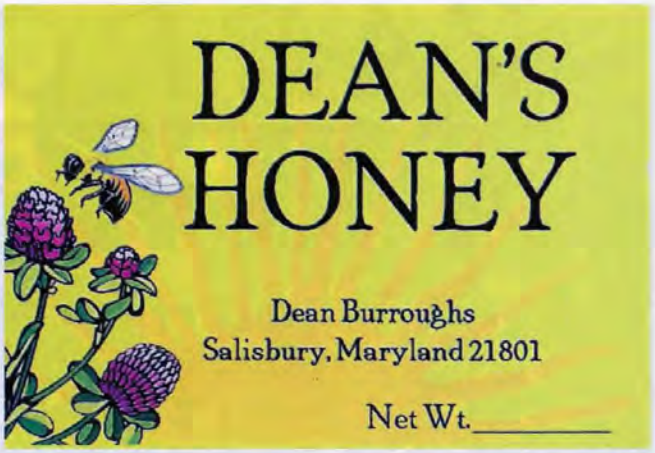
Dean's goal was to generate 50% of his sideliner bee income from honey and the rest from pollination rentals; he started such rentals as a hobbyist. He currently rents about 150 colonies, some getting double duty for Spring strawberry and fruit plus Summer rental to vine crop growers. He has established two permanent apiaries at farm sites that need pollination colonies. One site, the farm market "How Sweet It Is," is his most profitable outlet for honey sales. His colonies at this site are clearly visible from the farm stand alongside a major highway and are used by the market staff to help sell product. Now sold out, the farm market is taking customer orders already for his 2007 honey crop.

Dean moves pollination colonies with a pick up and utility trailer – he can move 40 at one time. He offsets the colonies on the ground at the pollination locations, most of which remain a month or more on site. There is no alternative nectar available in the area so the pollination sites provide at least some pollen for his colonies. But vine crops are hard nutrition-wise on the bees so he moves most of his colonies to Fall wintering sites where

he can medicate and feed to get them ready to overwinter and they have access to early spring pollen sources.

Dean has helped host EAS twice at Salisbury State, in 1990 and 2000. During the 2000 conference, he was coordinator for one of the buildings used for EAS events and EASers visited one of his apiaries on the Salisbury campus. He has had bees on the gym roof (for three years) and then on the premises of the President's house on campus. He lost both apiary sites to unusual "incidences" – in the case of the gym, all uses of the roof (including as apiary site) were banned when ROTC cadets, using the building for rappelling practice, had an accident with an injury and the apiary at the President's home had to be relocated when a visitor got stung (with yellow jackets) and jumped in the pool to get the "bees" off him.

This year at EAS Dean will be back on the program to discuss his transition from hobbyist to serious sideline beekeeper and also provide a second presentation on beekeeping. Dean's sideliner bee business has a challenge this season. Like many other beekeepers across the US he had heavy Winter losses – only 40% of his total stock survived. He will purchase packages as usual but is in a quandary with his overwintered stronger colonies; if he splits too heavily he will lose honey production. He was thinking, in fact, on cutting back on pollination rentals and increasing honey production with the strong local demand for his product.



So how will he continue his serious sideline bee business? Come hear Dean and perhaps share with him your thoughts. How do other beekeepers transition from hobbyist to serious sideliners. What are the challenges of honey bees supplementing rather than draining retirement income? Hear and talk with Dean, and many other top notch speakers, at EAS 2007 August 6-10, University of Delaware. BC

Dewey Caron is past Chairman of The Eastern Apicultural Society and program Chair for EAS 2007 in Newark, Delaware.

VARROA

A Review

Don't Forget The Basics

James E. Tew

A historical shift

Beekeepers and our bees have been through a lot in the last 20+ years. Tracheal mites, *Varroa*, Africanized honey bees, small hive beetles, and Colony Collapse Disorder (CCD), have all come our bee way. That is a lot of colony crud in two decades. In fact, the list of new pests roughly equals a bee crisis about every four years. The last twenty years are without parallel in US beekeeping history and it is not necessarily "good" history. Truly, beekeeping has been passing through a historical shift.

The old problems

Yet, though we have 20 years of new problems, not a single one of the old problems can be removed from the honey bee pest and disease list. We still have traditional problems with American foul brood, nosema, chalk brood, insecticides, poor queens, ants, skunks, irate neighbors and bad weather. European foul brood seems to be just a bit less common, but it, too, is still out there.

Why another discussion of *Varroa*?

With mysterious die-offs occurring across the country and Africanized honey bees becoming established in Florida, why write about *Varroa*..... again? Because no matter what our other problems are, *Varroa* infestations are not going away and *Varroa* infestations remain serious. Twenty years of desperate dedicated research have primarily yielded *somewhat* resistant queen stocks and an incredible list of possible chemicals that offer *some* control of the mite, and a few management techniques that help. Nothing has really worked well, but we are at present, uncomfortably coexisting with *Varroa*.

Varroa mites – a fairly new pest?

Actually, *Varroa* has been attacking honey bees for a long time – just not attacking U.S. bees. After finding *Varroa* on *Apis cerana* (the Indian honey bee, or Asian honey bee, or the little honey bee), Oudemans (the person who discovered this mite), in 1904, in Java, Indonesia, gave *Varroa* the earlier name of *Varroa jacobsoni*. *Varroa* mites were first found on honey bees in Japan in 1958, but experts guess that they had been there since 1915. By 1970, *Varroa* infestations were widespread in Europe. With human assistance, the mite finally made its way to Florida in 1987. The rest of the invasion is U.S. beekeeping history. Though they may seem a new pest, *Varroa* has been afflicting honey bees for a long, long time.

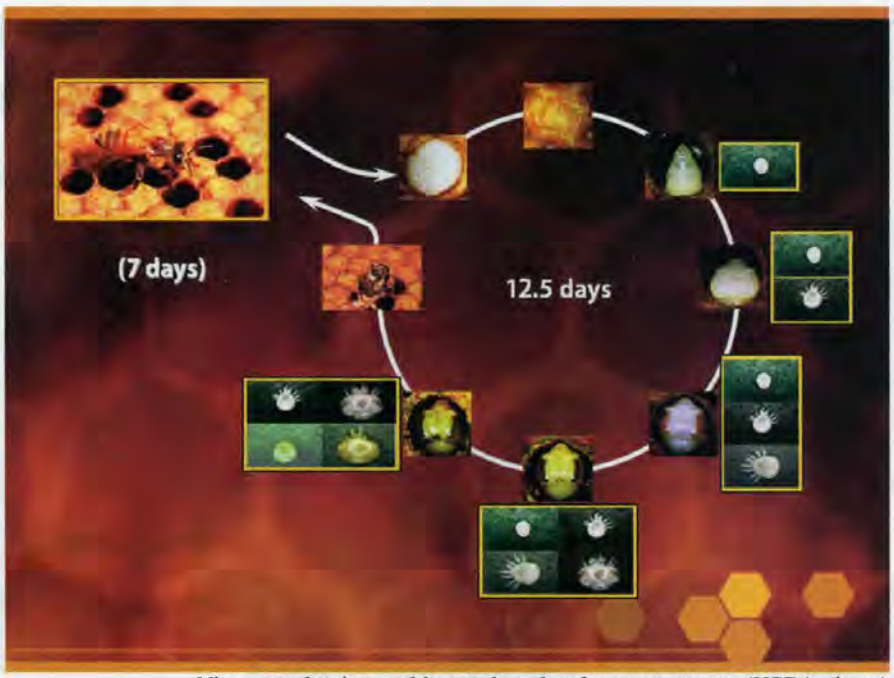
Hawaii has long had the good fortune of being *Varroa*-free, but beekeepers there are now having to scramble. On April 6, 2007, a beekeeper found *Varroa* mites in three abandoned beehives. Presently, Hawaiian regulatory authorities are looking for other infested sites on the same island, and finding them. If it is discovered that *Varroa* populations are established at other locations on the Islands, that will make the infestation of the United States complete. While this is a new problem for Hawaiian beekeepers, for the rest of us, *Varroa* control has become just another task in a day's bee work.

Varroa jacobsoni vs. *Varroa destructor* – what's in a name?

Not unlike Disappearing Disease being renamed Colony Collapse Disorder, after all these years of struggling with *Varroa* infestations; we are still trying to correctly name it and refer to it. There are more than one species of *Varroa* (the genus). It is now apparent that *Varroa jacobsoni* is not the problem mite that we have, but rather its cousin, *Varroa destructor*. The name was changed in 2000, but nothing else has changed. Regardless of the name, *Varroa* still kills our bees. If we have a *Varroa* infestation, it is said that our colonies are suffering from varoosis – not "Varroasis," "Varroatosis," or *Varroa* disease. Since *Varroa* is the genus name, the mite *can* be called *varroa*

Adult Varroa *mites.* (USDA photo)

(lower case "v"), but not Varroa (upper case "V"). It is also correct to say that our infected colonies suffer from a "*Varroa* infestation or infection." So there, for those readers who want to dot every jot and tiddle, it is correct to say that our infected colonies suffer from *varoosis* and that *Varroa* is a problem for both the bees and the beekeeper. (Of course this magazine has yet a different editorial policy when it comes to this pest. *Bee Culture* believes that *Varroa* mites are absolutely deserving of 100% of our attention. If you do not attend to them, and you do not have bees resistant to this pest, your colony will die. As a result, we treat the written word differently than the dictionary says we should, and differently than the scientists say we should. To us, there is no word more important in beekeeping, and to beekeepers, than *Varroa*. Ed.)



Mite reproductive and honey bee development stages. (USDA photo)

For the newer beekeeper, a discussion of the *Varroa* cycle, for the established beekeeper, a tedious review of the *Varroa* life cycle

The mature female *Varroa* mite is dark red-brown and is about 1.5mm in diameter or about the diameter of a broken pencil lead. Compared to the honey bee host, it's a large parasite. It would roughly be comparable to me having a parasite the size of a dinner plate stuck on me, which would make me stand out at a party.

Varroa reproduction is closely allied to bee development. Due to the longer development time, *Varroa* prefers drone pupae, but it can readily develop on worker pupae. Generally, queen cells are unaffected. Female *Varroa* mites survive broodless periods by puncturing intersegmental membranes of mature worker bees and partaking of a blood feast. Mature honey bees generally exhibit some grooming behavior that is intended to remove the pests, but apparently, most mites are able to withstand this behavior. (The cover photo this month shows a mite riding on an adult bee, partially covered by one segment. This makes it difficult, or impossible, for the bee to groom the mite off her body.) Adult female mites can only live a short time away from her bee host and male mites are unable to live outside the cell.

A healthy worker bee spends three days as an egg, eight days as a larva and prepupa, and nine days as a pupa for an average total of 19.5 – 20 days to complete development. The larva is fed brood food secretions for the length of its development. After eight days, the larva sends out a chemical cue that incites worker bees to begin capping the cell. The final bee larval molt occurs on the 11-12th day. A mature female mite leaves a nurse bee and enters a worker brood cell 0-18 hours before it is capped. The mite submerges herself in the liquid brood food at the bottom of the cell and breathes through snorkels called peritremes. During this phase, the female mite remains so immobile that she appears to be dead. The female mite remains in this stuporous state until the worker larva has eaten all the available brood food. Sometime on the 9th day, the mite becomes active and begins to feed on the blood of the larva. If, per chance, the mite does not become active quickly enough, the larva, as it undergoes complete metamorphosis, will entomb the mite in the larval cocoon that is spun as the larva changes to the pupal form. These trapped mites die.

The mite, in preparation for feeding, pierces the body wall of the larva and feeds on the draining blood. Interestingly, all individuals in the mite family feed from this one wounded area. White fecal residue is deposited on the comb wall near the wound site. All stages of mite development occur in the protected capped cell. This developmental characteristic has always made chemical control of *Varroa* mites more challenging. The female usually lays one male egg and, over time, lays about four female eggs within the cell. It is unusual for more than a couple of the female eggs to reach maturity. The bee's blood is the only food on which the mature and immature mites feed. It takes 6.5 days for the male mite to develop while only five – 5 ½ days are required for females to develop. Female mite eggs are laid about every 30 hours until a maximum of five eggs are produced. Eggs produced late in the bee's development cycle will not have time to develop before the worker bee emerges. On the 17-18th day of bee development, the mite's son and first daughter will reach adulthood. Young adult mites are snow white but both male and female will darken, but the female will become even darker and larger.

Mite mating

The new adult son will mate several times with his sister and with subsequent sisters should they reach adulthood. Mating occurs near the fecal pile. As do queen bees, the female mite will store enough spermatozoa to last her reproductive lifetime. This aspect of mite biology has always been puzzling to me. It would seem to me that such harsh inbreeding would be the downfall of all *Varroa*. Apparently, if an organism is highly adapted to its environment, inbreed-

A bee with useless wings and a Varroa *mite.*

ing is not necessarily disadvantageous to its genetic survival.

The emerging bee

By the end of the 19th day, the parasitized honey bee pupae makes preparation to emerge on the 20th day – if she is able. As she departs, the new bee gives a ride to the original mother mite and one or two newly mated daughter mites. Typically, an average of 1.4 – 1.5 of the young daughter mites successfully reach adulthood. The male mite stays in the cell where he is killed, or dies naturally, and is removed by house bees.

The condition of the emerging bee

Parasitized worker bees commonly are underweight and may have been infected with bacteria and/or viruses. Such weakened, undersized bees tend to fly earlier, not return from orientation flights more often, and die more easily during winter months. If the wings are so extensively deformed from deformed wing virus that the bee can't fly, she soon dies. Clearly, it is not to the developing bee's advantage to be the food source for such ravenous parasites.

Establishment and spread of *Varroa* populations

It would appear that *Varroa* mites kill every colony they infect. While that is frequently true, it is not always true. Many mites are infertile. Many mites are either groomed off or are knocked off host bees. Many mites simply don't make it to maturity. Many mites die in the colony or in the field. I suppose it could be said that being a successful mite is not as easy as it sounds.

Environmental conditions also play an important role. It seems that the better the nectar flow, the poorer the mite's chances. Too many bees are outside the hive on foraging trips. Yet, long winters that force bees to live more closely are conducive to mite success. Consequently, all colonies are not affected at the same rate and same intensity. Honey bee hygienic behavior clearly plays an important role in resisting mite infestations.

In general, three-four years are required for mites to reach a population level large enough to overrun a colony – assuming everything else is also in their favor (and that additional infestations do not occur, and that viruses do not overtake the colony). It has been reported that mites and bees can live together amicably if the colony otherwise remains healthy and unstressed.

Colony congestion

In general, putting colonies near each other – i.e. in beeyards or beneath nets on trucks – is not good. All diseases and pests are much more easily spread. *Varroa* population increases certainly result from congested, stressed colonies with lower honey crops. Congestion (bee drifting) is not the only reason, but is an important reason that *Varroa* mites are spread from colony to colony.

Controlling *Varroa* mites in colonies

To my knowledge, no beekeeper, anywhere in the world, has been able to develop a foolproof method of consistently controlling *Varroa*. Natural resistance is desirable, but does not eradicate the mite. To a greater or lesser extent, all chemicals – hard or soft – have some unintended effect on the honey bees in the colony. If we kept our colonies singly and miles apart, a lesser chemical program could probably be used (assuming all other environmental conditions are favorable).

Few of us like using chemicals in our colonies. I am one of those beekeepers. But the reality is that if we keep colonies near each other and occasionally move them to new pollination sites, sooner rather than later, we are all going to have problems with out-of-balance *Varroa* populations. Select a legal chemical with which you are comfortable and use it sparingly and correctly. Always be looking for a legal chemical replacement. What presently works well for your bees will not always work well. The life cycles of bees and mites, combined with environmental variations, are too complicated for us to expect an easy, one-time, chemical fix.

Bee diseases in general

I have only reviewed and discussed *Varroa* infestations. No other bee disease can be ignored. For instance, if I allow a colony to become weakened by a nosema infection, manageable *Varroa* populations can use the weakness to exploit the colony. Stress the colony as little as possible. For the most part, leave the colony alone. There is just so much you can do. At some point, the colony is responsible for itself. BC

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A Practical, Functional, Successful Homemade Small Hive Beetle Trap

Sonny Chidister
Mel McConnell

After several trials and modifications we have been successful in reducing the number of Small Hive Beetles in our hives. Use small plastic sandwich containers with lids or petri dishes with lids. Using a small soldering iron burn 6 to 8-3/16 in. holes ¾ of the way up the sides of your containers.

Insert soldering iron FAST to control the size of the holes.

Place a large bottle cap (Gatorade™) with the lure inside the container. Cover the inside bottom of the container with FOOD GRADE Mineral Oil. LURE is made of ½ cup apple cider vinegar, ¼ cup sugar, one cup water and ripe banana peel cut up fine or ground. Combine and let ferment before placing in the trap.

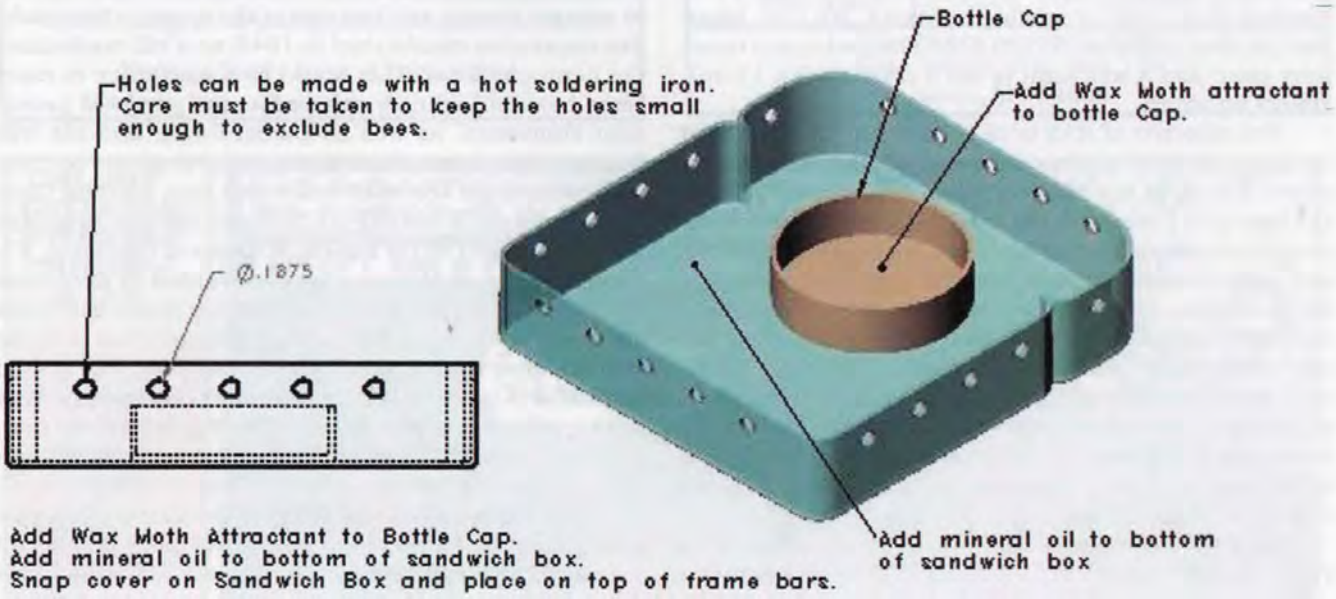
In 2007 we will be hanging these same traps modified by attaching a cover over the lid, to protect from rain, in and around the beeyard.

It appears that NEMATODES applied in Spring and again in midsummer to the soil around hives can greatly reduce the number of larvae that survive in the soil. There are several kinds of nematodes, some will live in colder conditions and some will live in hotter conditions. Select the type that is suitable for your location. BC

This was a joint effort of Sonny Chidister and Mel McConnell. If you have any questions contact Sonny Chidister at (beemaker@hotmail.com) or Mel McConnell at (melemcc@yahoo.com)

The parts and pieces.

You'll need a shim to accommodate the trap on the top bars.



HAS 2007

www.heartlandbees.com

Greg Hunt

About seven years ago we began talking about starting a Midwestern beekeeping association. The idea was to have an association that would put on a conference each year, loosely modeled after the Eastern Apiculture Society. In fact, the Heartland Apiculture Society owes a debt of thanks to EAS for their generous grant that helped to get us started. You can think of HAS as sort of a 'low-budget EAS.' Each year we have a three-day conference, which is our main reason for existing. We try to keep registration fees low by holding the annual conferences at small colleges. This gives folks the option to stay for cheap in dorms if they chose.

Our first conference was in 2002 in Goshen, Indiana. It was a huge success. Although our attendance was only about 200 people, we had beekeepers from eight different states, Canada and Mexico. This conference set the general pattern – lots of concurrent workshops that are repeated at least once so that people can pick and choose with less chance of missing the ones they were most interested in.

Another theme that began at the first conference was to have nighttime entertainment and daytime outings. We had excursions for beekeepers, and also for spouses who were less interested in bees. Since we were in Amish Country, we were able to enjoy some Amish beekeeping and have some fantastic home-cooked food. Last year HAS came back to Indiana to historic Vincennes University and we enjoyed meeting some Caribbean beekeepers and hearing some very interesting speakers. We also heard the Corydon Dulcimer Society play. The traditional tunes were great and it was sight to see a concert with 11 dulcimers on stage!

The objective of HAS is to 1) have fun, 2) work hard and put on good professional and educational conferences, and to 3) not take ourselves to seriously (gets in the way of #1). So far, we've tried to keep conferences as cheap and simple as possible. This is a beekeeper-owned and -operated organization that gets together once a year for education, fellowship and fun. We elect a president each year, who has the formidable task of organizing the next conference. This person is assisted by a vice president and the HAS chairman. The chairman gives overall guidance to the association – sort of our spiritual guru. Each year for the past five years HAS put on a conference in Indiana, Kentucky, Tennessee or Illinois. Next year we will be in West Virginia.

So if you can't make it to EAS in Delaware this year, we hope you all will enjoy some good ol' Kentucky hospitality in Bluegrass country. We will meet at KSU in Frankfort for three days of talks and hands-on beekeeping workshops. Kentucky has a long tradition with beekeeping. Until recently, most of the hives in Eastern Kentucky were gum hives: hollow logs with plywood roofs. Walter T. Kelley (a.k.a The Bee Man) started his beekeeping supply company in 1924 in Louisiana but in 1934 he moved to Kentucky. You can visit the Kelley Company in Clarkson, and while you're there you may want to go to nearby Paducah and check out the Museum of the American Quilters Society. Our current HAS chairman, Robin Mountain, is giving the Kelley Company some competition by opening up a Dadant & Sons branch in Kentucky, so he may try to steer you to his shop!

KSU is located at Frankfort, in an area of scenic rolling hills and woods along the Kentucky River. We will have a beautiful area for our conference in this small valley bordered by limestone cliffs. There are some great local diversions if you want to get away from the conference for a little while. Visit the nearby Equus Run Winery and Vineyards, or the Shaker Village. Just 10 miles south of town is the Buckley Wildlife Sanctuary and Audubon Center on 374 acres of rolling hills. Or visit Harrodsburg, the first permanent settlement east of the Alleghenies, established in 1774. At Harrodsburg State Park you will find the reconstructed Fort Harrod, people in period costumes, civil war memorabilia and Native American artifacts. Or if your have an interest in another Kentucky tradition, you could visit the Buffalo Trace Distillery near Fort Hill Park in Frankfort.

During our conference, you can relax in the evening with fellow beekeepers in Frankfort, one of the most picturesque state capitals that served as the capital of the Commonwealth of Kentucky since 1792. Frankfort is rich in pioneer history and has one of the nation's first park-like cemeteries (established in 1843) on a hill overlooking the Kentucky River. This would be a good place to enjoy some beautiful scenery, which has the graves of prominent statesmen, as well as Daniel Boone and his wife Rebecca. Downtown Frankfort and the cemetery are just short walk from the conference site. One evening there will be a dramatic reading of The Honey Harvest, originally written as a play by Liz Bussey Fentress of Louisville, KY. The character of Melissa Holt has wanted to keep bees since, as a child, an old woman told her that when times are good, bees sing. Now in her mid-twenties and the sole caregiver for her father who suffers from depression, Melissa sets up her first hive with the hope that the bees will serve as a therapeutic hobby for her father and that, together, they will hear them sing. It premiered at Kentucky Repertory Theatre at Horse Cave in 2004.

So come see what this Midwest beekeeping association is all about! This year's agenda includes a panel on queen rearing and breeding for resistance, workshops

on apitherapy and many other topics. We will also be trying something innovative by presenting a workshop in Spanish for the Hispanic community. For the latest information on the conference, please check our website at Heartlandbees.com.

Partial list of presenters: Phil Craft – State Apiarist, Kentucky and HAS president; Robin Mountain – HAS chairman; Dr. Ernesto Guzmán-Novoa – Univ. of Guelph, Ontario Canada; Dr. Jamie Ellis – Univ. Florida; Dr. Diana Cox-Foster – Penn State Univ.; Maryann Frazier – Penn State; Dennis Van Engelsdorp – Pennsylvania Dept. of Agriculture; Dr. Nancy Ostiguy – Penn State; Dr. Clarence Collison – Mississippi State Univ.; Kim Flottum – Chair of Eastern Apicultural Society; Jerry Hayes – Chief Apiary Inspector, FL; Dr. Larry Connors – Wicwas Press; Dr. Roger Hoopingarner – MSU; Dr. Zachary Huang, MSU; Dr. John Skinner – Univ. Tennessee; Dr. Rick Bessin, Univ. KY; Nancy Calix – KSU; Dr. Tammy Horn – Berea College, KY; Dr. Tom Webster – KSU; Dr. Jim Tew – OSU; Dr. Dewey M. Caron – Univ. Delaware; Dr. Greg Hunt – Purdue Univ.; Gordon Vernon – past KSBA president; Bill and Nancy Troup; Lisa Jager; Pam Hauser - Cozy Nest Farm; Steve Meador; Edwin Holcombe – EAS director, TN; Kent Williams, EAS President, 2008, KY; Dr. Randolph Richards; Andrew Kartal – Ohio Dept. Agriculture. Apitherapy workshop: Reyah Carlson and Frederique Keller. Queen Rearing Panel: Dr. Stu Jacobson – Univ. IL, Dan Purvis of Purvis Brothers Apiaries, and David Eyre of The Bee Works, Ontario Canada. BC

Greg Hunt is the Extension Specialist in Apiculture at Purdue University and also an HAS officer.

SERIAL KILLER ... Cont. From Pg. 12

The punch line here is that bees do have direct impact on human food, while pets don't. Bees pollinate food plants, while pets urinate on them. Why can't we get the FDA to lend a hand with what could be a significant threat to the availability of pollination services, and hence the availability of a wide range of fruits, veggies, and seed stocks? The FDA certainly had time and budget for Fido and Wiskers.

Like Rodney Dangerfield, bees don't get no respect.

The result of the meeting was a wish list of work that would require funding. A delegation was to meet with Senate staffers, and explain the difference between the few capabilities we have, and the many we need.

No attempt was made to narrow down the list of suspected causes of CCD.

The list of suspects grew longer as the meeting progressed, a natural outcome of asking a diverse group of specialists to propose an approach to a problem. As in the parable of the blind men and the elephant, each participant viewed the solution as potentially resulting from a well-funded effort in his or her area of specialty. When you are an expert with a hammer, every problem starts to look like a thumb.

But what are the clues that might eliminate some suspects? Some are harder to ignore than others.

While the marshaled forces of bee science deliberated, fax machines and computers across the country were quietly humming, drafted into a guerrilla movement. A 19-page indictment written by David Hackenberg, the migratory beekeeper to first report serious losses from CCD, claims that systemic pesticides are behind CCD. The key point offered is that corn, soybeans, canola, and cotton are all treated with these pesticides, and that all the large beekeepers who have been hit by CCD had placed their hives on one of these crops to build up their colonies or for a honey crop.

This gentle manifesto sparks outrage among all who read it, as it shows how laws requiring warnings intended to protect bees have been twisted by pesticide ad men into phrases like "You can apply Assail® at any time during the season, even during bloom (when bees are not active)."

Is this advice to fire poison at whim during bloom? It seems to imply the impossible – that bees will somehow not be "active" during bloom!

The misleading wording cynically subverts laws protecting pollinators.

Where are the offices of Cerexagri (makers of Assail, who placed the ads), and where's that rope?

But Hackenberg's calmly written first-hand account seems lost and ignored amongst all the hysterical histrionics of the press and special-interest groups trying to leverage CCD as "proof" that their pre-existing pet peeve is worthy of attention and your donations. "See, the bees are dying, we were right all along!" say the anti-this and anti-that groups. The "Cause of CCD" has become a virus itself, affecting beekeepers, whose minds risk being hijacked by fringe thinking. Victims are infected via e-mail forwarding.

Then there's the experience with comb. Beekeepers who stacked woodenware from dead-outs killed by CCD atop healthy hives to protect the comb from wax moth and small hive beetles saw many of the healthy hives "catch" CCD soon after.

The obvious-to-even-the-casual-observer conclusion here is that CCD is caused by a pathogen that can live on comb even after the bees die.

But researchers hesitate to connect these dots before running tests on comb from CCD-affected hives. No one (as of mid-May) has run these tests yet. No money. Not even enough money to collect a statistically significant number of samples using proper preservation techniques. It's on the wish list.

To confuse matters further, we have the prior outbreaks of CCD. They happened decades ago, before (these new) pesticides, before industrial monoculture agriculture, before genetically-modified crops, before even high-fructose corn syrup. How can anything developed in the past century be blamed?

There is also the simple overt pathology of CCD to consider. Colonies are quickly reduced to at most a queen, a few worker bees, and a large patch of brood. The brood proves that very recently, the hive had enough healthy workers to tend all that brood. The bees were fine, or they would not have been raising so much brood. Something that affects so many bees so quickly just has to be a virus, doesn't it?

And what about the missing house bees? Foragers failing to return from their sorties are expected from pesticide kills, but why are most house bees abandoning brood? The urge to stay with brood is strong - most species will die to protect their young. Something is overpowering even that very basic instinct. These bees seem to be going "insane". Brood is the future of the colony, the only thing bees really live for.

We just don't know yet - we don't have any of the high-tech forensics gear from the TV program "CSI Miami." We don't even have the resources of "Quincy." Decades of "flat" federal funding in inflationary times have reduced the scope of federal research, while draconian budget cutting at the State and University level has eliminated entire programs. Many states don't even have a State Apiarist, let alone bee inspectors. Once-thriving entomology, bee research, and extension efforts have been reduced to lone sages, hoping to stay employed long enough to collect a pension.

The skilled experts who support beekeeping have been victims of a "Disappearing Disease" of their own. The cause of this disease is clear – no one gave a damn about bees, and neglected prudent investment in apicultural science for decades. Thus, beekeeping's "crime lab" capabilities are nothing close to "CSI Miami." They have been reduced to the level of what The Professor could cobble together from coconuts, palm fronds, and bamboo on "Gilligan's Island." We have bright, skilled people, but they lack the proper tools.

And that's why perhaps the largest collection of bee research luminaries to gather into a single room spent all of their time together making to-do lists for use in begging Congress for money.

I hope that by the time you read this, they will have some of that money. So do your bees. BC

Jim Fischer now lives in Manhattan and keeps a few hives on Long Island, but hangs out at the intersection of science and politics, as this is where the truly spectacular train wrecks happen.

MAKING HIVE BODY HANDHOLDS

Peter Sieling

Make handholds that are <u>better</u> than what you can buy

The most common way to make handholds or grips on homemade equipment is to cut a dado or nail cleats to the hive sides. Even the best homemade supers and hive bodies still look homemade.

You can make professional looking grips without specialized tools, using your saw's tilting arbor with a simple jig. For years woodworkers have stretched the limits of their table saws, running boards at different angles to the blade to make molding, using the saw blade's tooth set to cut sideways.

Grips cut with a table saw are cleaner than the commercial equivalent because there is no tear out as the blade exits the wood. This jig makes an upward angled cut at the top of the grip to provide a better hold. Because saws vary in blade diameter and saw table size, the following directions provide general dimensions that need to be custom fit to your table saw.

Early hives had grips cut only into the front and back. If you want grips on all four sides the easiest way is to make two jigs, one to fit the sides and the other for ends.

Taper Jig

To bevel the top of the grip, the hive ends slide into tapered grooves on the jig. Mark a 3/4" per 12" taper on scrap of planed lumber that is approximately 3/4"x 2 1/2"x 24". Cut it out on a band saw or by hand. Drive a 1-5/8" drywall screw half or three quarters in near the wide end to hold the board in which you will mill the groove. The screw holds the piece against the taper jig.

Instructions

1. Make the base boards the same length as your saw table. That gives you easy places to clamp the jig to the saw table.

2. Mill the tapered grooves. Stack the dado blades for a 13/16" dado. Set the taper jig against the table saw rip fence and adjust the fence until the back, wide part of the jig is about 1" from the dado blade. The screw in the jig should be well away from the blade. Raise the blade to 1/2". Carefully cut one dado. The second needs to be a mirror image. Rotate the taper jig end over end. Now you will push the wood against the screw on the taper jig. Watch your fingers.

3. Cut the grooved pieces to length. Lay the pieces across the saw table and raise the blade to its full height. Find the position where the blade nearly reaches the top of the groove. That point should line up with the blade. Cut the cross pieces to length.

4. Cut notches on the cross pieces to fit the end pieces. Insert a hive end or side into the dados, center it over the blade. Fit a few slips of paper or a piece of thin cardboard into the dados so the hive parts don't fit too tightly. Center the cross pieces over the blade. Mark, drill and screw the jig together.

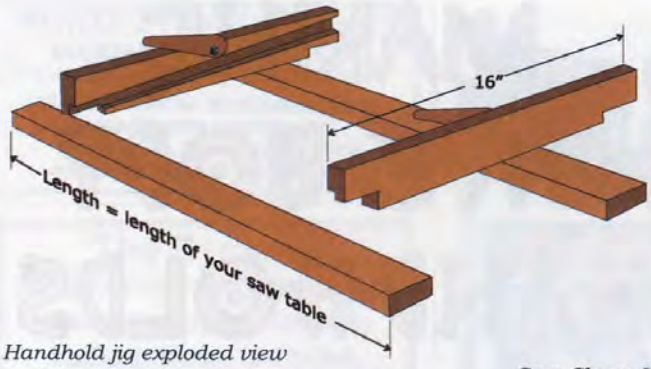
5. The hive ends have to be clamped with no danger of shifting. The easiest way is to add two cam levers. Orient them so that tightening them pushes the ends against the bottom of the jig.

Using the jig

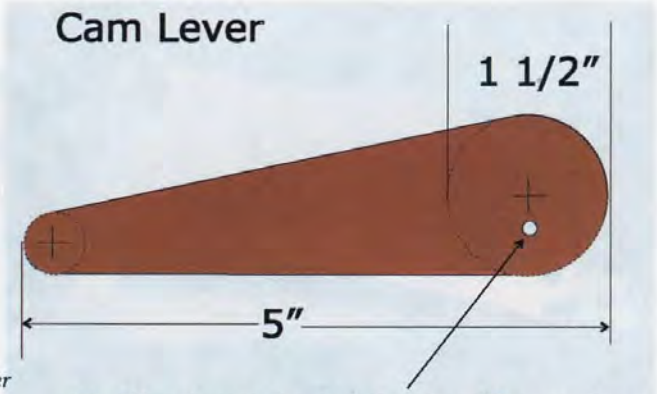
Handles are usually placed two to three inches below the top of a deep super and 1-3/4 to two inches from the

Parts List for 10-frame cover

Number	Part	Size	Notes
1	Taper jig	¾" x 2½" x 24"	
2	Base Boards	¾" x 2½" x 28"	Length varies to fit your saw
2	Cross Pieces	Nominal 2" x 4" x 18"	Length varies to fit your saw
2	Cam Levers	¾" x 1½" x 5"	
11	Drywall screws	6 x 1-5/8"	For taper jig, fastening base to cross pieces and cam clamps



Handhold jig exploded view



Cam Clamp Lever

Cutting Tapered Dados

Tapered Dados

Handhold Jig

top of a medium super. Position the jig on the saw and clamp it to the table. Raise the saw blade all the way up. Slide a hive end into the grooves until it touches the blade. If you measured perfectly the blade will be just below the hive end's top face. Lower the saw, counting the turns until it clears the hive end. Slide the hive end into position and clamp. When milling grips on medium and shallow supers, make appropriate sized boards and slide them into the grooves as shims.

Start the saw, raise the blade until it bites into the wood and pivot the blade out of the cut with the arbor angle crank. Raise the blade a little more and bring it back to 90 degrees. Trial and error will teach you how much you can raise the blade with each pass. Too much burns the wood and overheats the blade.

When done, shut off the saw, lower the blade below the table and remove the freshly milled end.

Side bars:

Grip size

The bigger your saw blade, the longer your hand holds. My 8" saw makes a 4" wide grip. My 12" saw makes a 5-1/2" long grip. The bigger the saw blade, the better the grip.

How does this thing work?

Jigs for many purposes accumulate in any wood shop. You may use a jig only once or twice a year. It's easy to forget how it mounts or what the blade height should be set at. You can save a lot of time by marking the jig with copious notes. My grip jig, for example gives directions for mounting and for use:

Step 1 – set blade height by sliding board into grooves against blade. Raise blade, stopping crank handle at 10:00 position just below top of board.

Step 2 – Lower blade four turns

Step 3 – On saw, raise blade two turns and tilt to 45 degrees

Step 4 – Raise one turn, crank back to 90 degrees

Step 5 – Raise to 10:00 top position and tilt

Step 6 – Lower saw blade

Your exact setup will vary depending on your saw.

Peter Sieling builds furniture quality beekeeping equipment, keeps bees and writes from his home in Bath, NY.

Southern Trees

Connie Krochmal

Each region of the country has its own unique growing conditions. In the South, plants must withstand considerable heat and humidity. Here are some tough Southern trees that happen to be excellent bee plants.

American holly (*Ilex opaca*)

An evergreen, this usually reaches about 20 feet or more in height with an equal spread. Initially, it has a medium growth rate, which slows as the plant ages.

American holly needs a rich, moist, loose, acid soil. It must be well drained. Suitable for full sun to partial shade, this tree tolerates air pollution. It is recommended for zones five through nine.

The creamy white blossoms bring nectar and pollen over a two to three week period during late Spring to early Summer. Very reliable, this can yield a honey surplus very quickly for a total of around 150 pounds per colony. The heavy bodied honey granulates slowly. Ranging from almost white to various shades of amber, it has a distinctive, pleasant flavor.

Basswoods (*Tilia spp.*)

Several basswoods or lindens are suitable for the South. American linden (*Tilia americana*) grows from 20 to 60 feet or more in height and nearly half as wide. Suited to zones two through eight, this fast growing tree adapts well to transplanting.

Native to the South, beetree linden or white basswood (*Tilia heterophylla*) does well in zones five through nine. This is about the same size as the American basswood.

Basswood

Basswoods need light shade to full sun. They prefer a moist, well drained soil, but tolerate most soil types.

With flowers that open in clusters, the basswoods bloom for almost a month, beginning in late June. These offer nectar and pollen even during rainy weather. Not always dependable, the trees give good yields two or three years out of five. When the nectar flow is heavy, the honey crop can be tremendous – 60 pounds or more per day. This premium quality, very white honey has a delicate aroma and a pronounced, yet pleasant flavor.

Black gum (*Nyssa sylvatica*)

Growing 30 to 50 feet tall, this has a spread of 20 feet or more. It prefers a deep, moist, acid, well drained soil. This tree dislikes alkalinity with the optimal pH being between 5.5 and 6.5. It thrives in full sun, but can tolerate light shade. Since black gum doesn't transplant well, buy container plants. It is recommended for zones three through nine.

Black gum

Related species include water tupelo (*Nyssa aquatica*) for zones six through nine. This species will grow in waterlogged soils.

Blooming from April to June, all of the black gums or tupelos provide nectar and pollen. They're excellent honey plants, yielding 80 to 120 pounds per colony. Among the best Southern honeys, the flavor is mild yet distinctive. It has a thick body with little granulation. The color can be slightly dark, depending on the tree species.

Maples (*Acer spp.*)

Maples that do especially well in the South include the following. Hedge maple (*Acer campestre*) grows 20 to 35 feet in height with an equal spread. It tolerates severe pruning. Suitable for dry alkaline soils, this tree tends to grow slowly. Hedge maple is suited to zones four through eight.

Red Maple

Painted maple (*Acer truncatum*) grows 20 feet tall with about an equal spread. With a slow growth rate, this does well in zones five through eight.

Red maple (*Acer rubrum*) can reach 40 to 60 feet with a slightly smaller spread. Dwarf cultivars, including columnar ones, are available. An attractive, fast growing tree, this species tolerates wet soil. It is recommended for zones three through nine.

Sugar maple (*Acer saccharum*) reaches 60 feet or more in height with a spread of 40 feet or more. Recommended for zones three through eight, this is native to much of the South. There are several subspecies in the area, including the Southern sugar maple, which does especially well in wet places as far south as zone nine.

Tatarian maple (*Acer tataricum*) reaches 15 to 20 feet with an equal spread. A good tree for small spaces, it grows best in zones three through eight.

Trident maple (*Acer buergeranum*), a slow growing species, is only 20 feet tall and wide. An excellent small tree, this grows best in zones four through nine.

Considered to be among the best shade trees, maples need partial shade to full sun, and a reasonably fertile, well drained soil. Though a pH of 5.5 to 7.0 is best, they thrive in most any moist soil.

As important bee plants, maples are very good for brood rearing. Blooming for several weeks during the very early Spring, they bring lots of nectar and pollen with a good honey potential. Averages range from 50 to 200 pounds or more per colony per season. The trees also provide honeydew.

The honey color can vary from one species of maple to another. It can be yellow, greenish, almost brown, or any shade of amber. With a distinctive flavor, this granulates slowly.

Ornamental fruit trees

A number of ornamental fruit trees are particularly suited to the South. Bell flowered or Taiwan cherry (*Prunus campanulata*) grows to 20 or 30 feet tall. This does well in zones six through nine.

Higan cherry (*Prunus subhirtella*) is a long lived tree that thrives in zones four through eight. It has a moderate growth rate, reaching 20 to 40 feet tall with a 15 foot spread.

Oriental cherry (*Prunus serrulata*) does best in zones five through eight. It grows to 12 feet tall and two-thirds as wide. This has a short life span, perhaps 20 years.

Sargent cherry (*Prunus sargentii*) has a medium growth rate. Reaching 20 to 30 feet with an equal spread, it blooms in late April and May. This does well in zones four through seven. A carefree tree, it tolerates clay soil and drought.

Yoshino cherry (*Prunus x yedoensis*) is a fast growing tree that can be 40 to 50 feet in height. This thrives in zones five through eight.

Crabapples (*Malus spp.*) are suitable as far south as zone eight. These vary widely in size from ten to 20 feet or more. Many cultivars are available, including dwarfs.

Ornamental pear (*Pyrus calleryana*) is 30 to 50 feet tall with a spread of 20 feet or more. Dwarf cultivars will be much smaller. With a medium growth rate, this adapts to a range of soils, including clay. It is suited to zones four through eight.

Japanese flowering plum (*Prunus cerasifera*) is around 25 feet tall and a little over half as wide. With beautiful purple foliage, this adapts to most soils, even slightly heavy ones. It does well in zones two through eight.

Ornamental fruit trees need full sun. They prefer a fertile, moist, well drained soil with a pH between 6.0 and 6.5.

As excellent sources of nectar and pollen, these stimulate brood rearing. The trees bloom for several weeks during the Spring. They can provide a honey surplus. Though the flavor and color of the crop can vary, it typically resembles that from fruit trees. Often, the color is golden to pale yellow. This tends to granulate rapidly.

Eastern redbud (*Cercis canadensis*)

Redbud reaches 20 to 30 feet tall with a comparable spread. Typically, mine have always been shorter. Often, the trunk will divide, which creates a low, umbrella-like canopy. Redbud has a medium growth rate, reaching 10 feet within six years.

This prefers a deep, moist, well drained soil. It can tolerate very moist conditions so long as the soil isn't

waterlogged. Adapted to a wide range of pH levels, redbud thrives in light shade and full sun. This is recommended for zones four through nine. Related species that are also suitable for zone six southward include Chinese redbud and Judas-tree.

Blooming in April and May, redbuds provide an excellent yield of nectar and pollen, which is especially good for brood rearing. The light colored honey has an excellent flavor.

Sourwood (*Oxydendrum arboreum*)

Also known as lily of the valley tree, this can reach over 20 feet tall with an almost equal spread. It has a slow growth rate.

Sourwood needs a rich, moist, acid, well drained soil. The pH should be between 5.5 and 6.5. Though it tolerates light shade, full sun is best for flowering purposes. This tree can adapt to short periods of dry weather. It thrives in zones five through nine.

Sourwood trees start blooming in late June, continuing for a month or more. Abundant even during rainy weather, the nectar is so plentiful it falls from the flowers.

This is considered one of the best Southern honeys with an excellent yield most every year. It can range from 75 to 200 pounds or more per colony with the best yield being at higher elevations. The honey is almost water white to extra light amber. Granulating very slowly, it has a heavy body with a delicate aroma. The delicate, distinctive flavor gives a hint of tartness.

Sourwood

Southern catalpa (*Catalpa bignonioides*)

This tough tree reaches 30 to 40 feet tall with about an equal spread. However, nurseries sell dwarf cultivars. Initially slow growing, it quickly makes up for lost time. Southern catalpa adapts well to most soils, including high pH levels, dry sites, and poorly drained conditions. Recommended for zones five through nine, it tolerates pollution. This needs full sun.

Blooming in June and July, southern catalpa provides lots of pollen and nectar even during rainy periods. Nectaries underneath the foliage yield for a month or more after the flowers fall.

Tulip Poplar

Tulip poplar (*Liriodendron tulipifera*)

Also called tulip tree, this requires a lot of space, but is well worth the effort. The species can reach 70 to 90 feet tall with a spread of 35 feet or more. Dwarf cultivars are available, including a narrow, upright form.

Tulip poplar needs a deep, rich, moist, well drained soil. Though it adapts to a wide range of pH levels, slightly acidic conditions are preferred. This tree needs full sun. It grows well in zones four through nine.

Blooming for about three weeks in April and May, tulip poplar blossoms aid in brood rearing. This tree yields nectar and pollen as well as honeydew. Very abundant, the nectar drips from the blossoms. A very dependable honey plant, it averages 100 pounds of honey per colony. Initially dark amber to dark red, this ages to brownish-red. The rich flavor is pleasant, and distinctive. It has a strong aroma. With a thick heavy body, this tends to granulate.

Willows (*Salix spp.*)

Relatively short lived, willows love moist soils. They adapt to most soil types, even poorly drained and rocky ones. These prefer a pH of 6.6 to 7.5. Most need full sun.

Several willows are especially suited to the South. Babylon weeping willow (*Salix babylonica*) grows from 30 to 40 feet tall with an equal spread. Recommended for zones six through eight, it features wide spreading branches, and a short trunk.

Corkscrew Hankow willow (*Salix matsudana 'Tortuosa'*) can be grown as either a shrub or tree. As the latter, it reaches 30 to 50 feet tall. This does well in zones four through eight.

Goat willow (*Salix caprea*) is 15 to 30 feet or so in height with a somewhat smaller spread. This thrives in zones four through eight.

White willow (*Salix alba*) reaches 75 feet in height with a spread of 50 feet or more. A golden weeping form is available. This tree does well in zones two through nine.

Willows are valuable because they bloom so early – from late February or March onward. While both male and female blossoms provide nectar, only the former have pollen. The trees also yield honeydew.

Willow honey comes in a range of colors, including white, various shades of amber, and yellow. Normally, the crop will have a delicate, distinctive, flavor. Sometimes, it can be slightly stronger tasting. With a light aroma, this thin bodied honey granulates to a fine texture. High honey yields are possible – up to 90 pounds or more per colony. BC

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

PROVIDING WATER

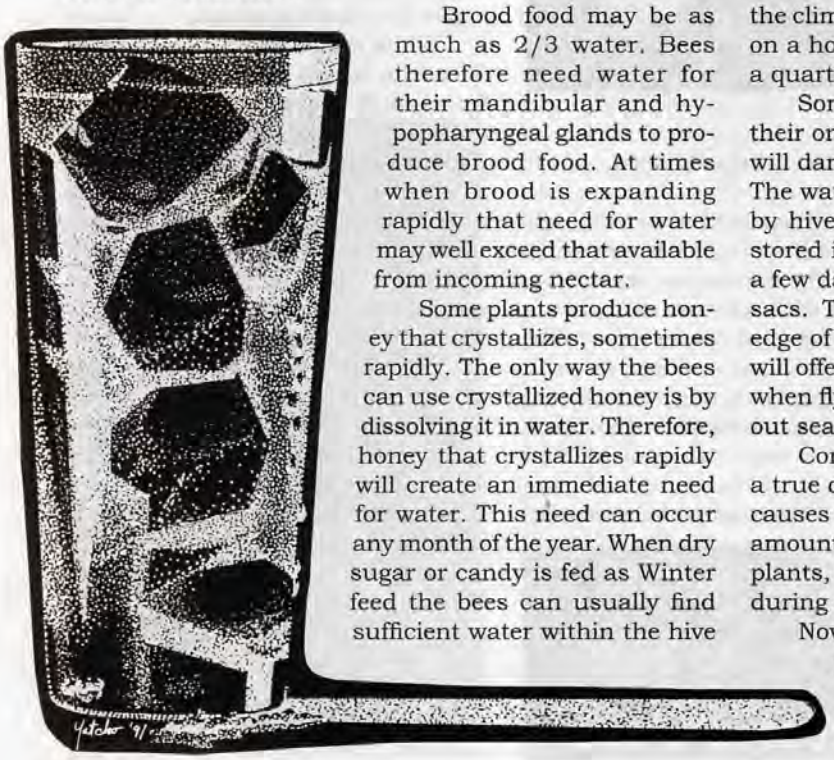
Ann Harman

Eighty years ago Flying Hawk, an Oglala Sioux chief, said: "Indians and animals know better how to live than white man; nobody can be in good health if he does not have all the time, fresh air, sunshine, and good water." Honey bees certainly agree with him.

We spend so much time thinking about our bees' food. Should I feed syrup now? Better buy pollen patties. Looks like they might be starving. Wonder how the nectar flow is doing? Good – here's enough food for the winter. Do we ever consider the bees' needs for water?

Every living thing needs water. Well, some live in it so their needs are usually met. But what about land creatures? True, some desert animals can derive most of their water needs from their diet and desert plants wait for a rain before they bloom in profusion. But honey bees, like humans, need water for survival. Let's take a look at the many things bees do with water.

We all know that honey will ferment if the water content is too high. In general bees will evaporate water from the stored nectar until it reaches 18.6% or less of water. In dry climates honey can easily have a water content as low as 12%. Bees actually prefer to use a 30 to 50 percent solution. The stored honey is thick, sticky and difficult to handle. Bees mix water, or at times some nectar, with the honey for themselves to eat and to mix with the brood food.



Brood food may be as much as 2/3 water. Bees therefore need water for their mandibular and hypopharyngeal glands to produce brood food. At times when brood is expanding rapidly that need for water may well exceed that available from incoming nectar.

Some plants produce honey that crystallizes, sometimes rapidly. The only way the bees can use crystallized honey is by dissolving it in water. Therefore, honey that crystallizes rapidly will create an immediate need for water. This need can occur any month of the year. When dry sugar or candy is fed as Winter feed the bees can usually find sufficient water within the hive to make the sugar or candy (fondant) useable as food. Condensed water, from metabolism and expiration, may be sufficient but in warmer climates or very dry climates there may not be sufficient water inside the hive for the bees to use to dissolve the sugar or candy.

Water is used by the bee herself. She loses water, although small amounts, through the cuticle.

The interior of a bee is bathed in hemolymph, a liquid. That liquid, containing water, transports nutrients to all parts of a bee's body and serves to transport waste products. The air a bee breathes in has the same amount of moisture as the surrounding air. But the air that goes out of the spiracles contains more water to help keep the interior water content in balance. Some water is produced through metabolism but at times the bee must take in some water. Although the water needs of an individual bee may seem minute, think about multiplying that by 40,000 or more. A bee deprived of water cannot survive.

Eggs and developing larvae need to be kept moist – but not too moist. Bees control the humidity carefully within the brood cluster. The humidity necessary for the eggs to hatch has a narrow range, between 90 to 95%. Outside that range the hatching of eggs is diminished. In a dry climate the bees will need to bring in water from an outside source to maintain the appropriate humidity. The larva does not have the protective cuticle of the adult bee and thus is subject to desiccation. The need for water during brood rearing is great if the colony is to be healthy and well populated.

An important need for water is the air conditioning system the bees provide for the hive. Water is brought in and distributed in various places throughout the hive. Sometimes droplets will be seen on the wax comb. Sometimes the bees will coat parts of the hive with a film of water. Then the "ventilation bees" get to work. Air is fanned into and out of the hive at the entrance. The circulating air evaporates the water and the hive is cooled. Obviously the hotter the weather and the drier the climate, the more water will be needed. A good colony on a hot day in a moderately temperate climate will use a quart of water a day.

Some field bees are water collectors. That may be their only job during their field lifetime. Water collectors will dance when there is a shortage of water in the hive. The water collectors will cease collecting if not unloaded by hive bees within 10 minutes. Water is not actually stored in the hive but a short-term storage, enough for a few days, is made by bees storing water in their honey sacs. These water-storage bees wait in the hive near the edge of the brood area. When approached for water they will offer it until their honey storage sacs are empty. Then when flying conditions permit the water collectors will be out searching and collecting.

Constraints on water, such as a hot, dry climate or a true drought put stress on a colony. Drought not only causes water sources to dry up but also can decrease the amount of water available in nectar. In addition some plants, such as white Dutch clover, simply stop blooming during a drought.

Now are you convinced that water is an essential part of your bees' health and growth? You see it can be just as important as food. The problem with water is that it seems invisible. You can see pollen. You can see honey. You can provide

those if necessary, but are you providing water?

Bees like to collect water from close-to-the-hive sources. They seem to prefer running water. But I frequently hear from beekeepers who are horrified to find their bees happily visiting water puddles in a feedlot. Don't worry, the bees have found a source of water containing minerals that are essential to their bodies also.

Now just how are you going to provide water for your bees? I can suggest many ways but you will have to decide what works best for your situation.

If you have a stream that does not vanish in a drought, and is within about a quarter of a mile of your hives, you can stop reading now and go read another article. Your bees have what they want.

For providing water to a few hives at your home you may want to consider a Boardman or entrance feeder. Since you will be able to see the contents of the jar almost daily, this type of feeder is easy to refill. No robbing would take place and unless the weather, day and night, is consistently cold, the bees can take the water easily. It is easy to keep it clean.

"Bees need water. If you don't provide it, they'll find it somewhere."

Some beekeepers will use a pan or a tire cut in half and put in some material for floats. There is no point in providing water if the bees are going to drown. This sort of arrangement works but has drawbacks. Rocks sitting in the water are better than straw or sticks. Wet straw gets really funky in hot weather and ends up rather disgusting when time for cleaning out. Sticks last longer but eventually they get waterlogged and sink. Sponges can be used but in summer also get a bit yucky.

There's an old saying . . . It takes a cell of honey, a cell of pollen, and a cell of water to raise a single bee.

. . . Elbert Jaycox

If your beeyard is only visited on weekends you will have to think about the wildlife that may pay a visit to the water source and drink it up. Deer, birds, fox and other critters may decide your water source is handy. If you cannot keep your pan or tire full until you return, then try something different. More on that in just a bit.

You can use hivetop feeders for water but they block upward ventilation, particularly essential during hot weather. You can use some of the quail waterers or chick waterers with pebbles in the narrow tray. These can be set on top bars with an empty hive body set over. But bees may well build wild comb. If set outside, a thirsty coyote might knock it over.

I have seen many water systems for bees. But the best one I have ever seen can be made from a few bits and pieces. In fact you may already have everything you need. This waterer does not depend on yucky floats, is a size that can be left for a week or more and gives the bees just about what they are looking for.

Here's what you need to make one. (If you have many hives, then make two or three.) You need a three-gallon or five-gallon plastic bucket with a lid, a piece of old fence board (not treated lumber), scraps of 2X4s, and a leaky faucet or an IV drip set (available at a friendly doctor or veterinarian).

Take the 2X4s and create a stand for the bucket so that the bucket will sit a few feet above the ground. Makes no difference how high. If you think some critter will knock the bucket off, just use some more 2X4s or other scrap to make a "cage" for the bucket. Take the old fence board and on one flat side of it make a zigzag pattern down the board. Now prop the board against the stand so the board is at about a 35 to 45 degree angle. Not critical. Nail top end of fence board to stand so it won't fall down. Attach the leaky faucet or a short piece of IV drip line containing the control to the side of the bucket near the bottom. You can stick the IV line through a small hole and seal with bathtub caulk. This bucket will now resemble the honey bottling buckets you see in the equipment catalogs – the white plastic buckets with a plastic gate. Fill bucket with water. Put lid on so leaves and junk don't fall in. If you have a tight-fitting lid punch a small hole in top with a nail to let air in. Adjust leaky faucet or IV drip line so that water slowly trickles down old fence board in the zigzag grooves you chiseled in. The bees will line up along the zigs and zags and get their water. If you have the leaky faucet or IV control adjusted right by the time the trickle of water gets to the bottom of the old fence board the board will be dry.

Please remember to establish the bees' waterers early in the season (or year around in warm climates) so your bees do not become unwelcome visitors at neighbor's pools and birdbaths.

Now I hope you'll think of food – and water – the next time you visit your hives. BC

Ann Harman waters bees near her home in Flint Hill, VA.

? DO YOU KNOW ?

Learning Curves

Clarence **Collison**
Mississippi State University

Inexperienced beekeepers as well as the general public often look to experienced beekeepers as experts in all aspects of the industry. Being able to handle all of these inquiries requires an individual to have a broad working knowledge in many different areas of apiculture. Beekeepers need to be keen observers and good naturalists. A large part of this knowledge base is derived from personal experiences (learning from your own mistakes). In addition, beekeepers learn from reading a vast assortment of beekeeping literature, by attending beekeeper meetings and short courses as well as sharing experiences and ideas with other beekeepers. Please take a few minutes and answer the following questions to see how you are progressing on your knowledge base.

Level 1 Beekeeping

1. ____ Bumble bees, honey bees and carpenter bees are social insects. (True or False)
2. ____ Carpenter bees normally mate in the Fall and bumble bees in the Spring. (True or False)
3. ____ Bumble bees and carpenter bees have a caste system like honey bees. (True or False)
4. ____ Feed-Bee® and Bee-Pro® are commercial pollen supplements. (True or False)
5. ____ Blue orchard bees are excellent pollinators of apples, cherries and pears. (True or False)
6. During the swarming process, name three mechanisms that may be used to eliminate all but one of the unmated queens from the broodnest that are produced during the process. (3 points)
7. Colonies that are supplemented with pollen or a pollen substitute in the spring normally start brood rearing earlier than colonies not receiving the added protein. (True or False)
8. Pollen availability in the colony affects worker lifespan. (True or False)
9. Queen mandibular pheromone reduces colony defensive behavior. (True or False)
10. Nosema infection of the queen leads indirectly to ovary degeneration. (True or False)
11. Name one reason why blue orchard bees may be more efficient pollinators than honey bees. (1 point)

Advanced Beekeeping

Threonine, Valine, Methionine, Leucine, Isoleucine, Phenylalanie, Lysine, Histidine, Arginine, Tryptophan

12. The names of the chemicals listed above are known as _____ .
13. What is the source of these chemicals in the honey bee diet? (1 point)
14. Name two bee biological functions that are impossible without all of the chemicals listed above. (2 points)
15. Isoclear®55 and Isoclear®42 are two different formulations of _____ . (1 point)
16. Spores associated with _____ release an infectious amoeboid from the spore that contains a pole fiber that penetrates the epithelium of the ventriculus.
    A. Chalkbrood Disease B. American Foulbrood
    C. Nosema Disease D. Sacbrood Disease
    E. European Foulbrood
17. ____ In royal jelly the primary component is water. (True or False)
18. ____ Royalisin, a protein component of royal jelly, has antibacterial activity. (True or False)
19. ____ 10-hydroxy-2-decenoic acid is a chemical component of worker mandibular pheromone and royal jelly. (True or False)
20. What is the common feature of the following plants in relation to beekeeping? California buckeye, black nightshade, Summer titi, yellow Jessamine and tansy ragwort (1 point).
21. Flavonoids and phenolics are common components of _____ .
    A. Bee venom B. Propolis C. Pollen
    D. Beeswax E. Royal Jelly

Listed below are several chemicals associated with bee venom and a body's reaction to a sting. Please select the correct answer.
A. Apamin B. Immunoglobulin G (IgG) C. Histamine D. Hyaluronidase E. Phospholipase A. F. Melittin G. Acid Phosphatase H. Immunoglobulin E (IgE)

22. ____ The main peptide of bee venom.
23. ____ Chemical component of bee venom that is involved in the disintegration of red blood cells.

ANSWERS ON NEXT PAGE

?Do You Know? Answers

1. **False** Both honey bees and bumble bees are examples of social insects, whereas carpenter bees are not. Qualities of sociality include: cooperative brood care, reproductive castes and overlap between generations.
2. **False** Young adult carpenter bees over-winter in the tunnels and mating occurs in the Spring. Bumble bee colonies produce queens and males in late Summer. Mating occurs in the Fall and only newly fertilized queens over-winter, hibernating in the soil or plant debris.
3. **False** Both bumble bees (queen, workers, males) and honey bees (queen, workers, drones) have a caste system associated with a reproductive division of labor. Carpenter bees have males and females. Females excavate new tunnels in wood or use old ones; each produces no more than six to eight young. In the northern part of the United States there is only one generation per year.
4. **False** Feed-Bee® and Bee-Pro® are commercial pollen substitutes, not pollen supplements. Both of these products can be fed either as patties within the hive or in powder/dry form in pollen supplement feeders.
5. **True** Blue orchard bees are excellent pollinators of early Spring orchard crops. Cherries, apples, pears, apricots and almonds all benefit from their foraging activities, collecting primarily pollen.
6. During the swarming process, all of the unmated queens but one are eliminated from the parental nest by three different mechanisms: queen-queen duels, pre-emergence destruction by an emerged queen or departure with a secondary swarm.
7. **True** In a three year study, colonies that were supplemented with pollen or a pollen substitute in the Spring started rearing brood earlier than colonies with limited pollen supplies and produced the most workers by late April or early May.
8. **True** Numerous experiments have shown that a honey bee worker's life span is somewhat dependent on the availability of pollen during brood rearing. Workers from colonies with abundant supplies of pollen or protein diet supplements typically live longer.
9. **True** Honey bee queen mandibular pheromone influences many aspects of worker behavior and physiology. Research has shown that synthetic queen mandibular pheromone seems to calm colonies and reduce stinging. Colony defensive responses were assessed for colonies that were queenright, queenless or supplemented with synthetic mandibular pheromone. Colonies with queens showed decreased defensive behavior when exposed to queen mandibular pheromone. Colonies without queens and exposed to mandibular pheromone had no change in the number of stings.
10. **True** Nosema infection of the queen leads indirectly to ovary degeneration. The protozoa damages cells lining the mid- and hind-guts. Metabolic processes are disturbed. Ovaries suffer severe damage. A high proportion of eggs fail to hatch and the queen stops laying.
11. Blue Orchard bees fly at lower temperatures than honey bees
    Blue Orchard bees work longer hours than honey bees Blue Orchard bees primarily collect pollen so are more efficient pollinators
12. Amino Acids
13. Pollen
14. Complete the development of brood, amino acids are the building blocks of proteins and enzymes
    Unable to activate the brood food glands to produce food for larvae
    Reduces the amount of fat body within adult bees
15. High Fructose Corn Syrup
16. C) Nosema Disease
17. **True** Royal jelly contains two-thirds water, with the remainder rich in sugars, protein and lipids.
18. **True** Royalisin is unique protein component of royal jelly that has antibacterial activity. Royalisin kills bacteria because of its ability to disintegrate bacterial membranes.
19. **True** 10-hydroxy-2-decenoic acid is a product of the worker's mandibular glands. In royal jelly this chemical has both antibacterial and antifungal activity.
20. All of the floral sources listed produce nectar or pollen that is poisonous to honey bees or to the brood.
21. B) Propolis
22. F) Melittin
23. E) Phospholipase A.

There were a possible 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.

GLEANINGS

JUNE, 2007 • ALL THE NEWS THAT FITS

VARROA FOUND AT HAWAII HONEY FARM

A honey bee mite has been discovered at a bee farm in Manoa, Oahu, after abandoned hives from Makiki Heights were relocated to the property last week. *Varroa* mites were detected on bees in three of the abandoned hives on April 6 by the beekeeper and reported to the Hawaii Department of Agriculture (HDOA). Samples of the mites have been sent to a mite specialist at a U.S. Department of Agriculture (USDA) laboratory on the mainland for confirmatory identification.

The *Varroa* mite is considered one of the most serious honey bee pests and occurs almost worldwide. Hawaii had been one of the few places where the mite was not known to occur. It is not known at this time how the mites were introduced to Oahu. So far, surveys conducted on hives in the Tantalus, UH-Manoa and Makiki area have detected varying degrees of infestation of the mite. Surveys on commercial hives on the Big Island, where several of the state's queen bee raising operations are located, have not detected the *Varroa* mite.

"We are enlisting the help of all beekeepers, commercial and backyard hobbyists, to help us in assessing the extent of this infestation," said Lyle Wong, administrator of HDOA's Plant Industry Division. "HDOA officials will be visiting bee hives to conduct surveys and the cooperation of beekeepers is very crucial in possibly stopping the spread of the *Varroa* mite."

Beekeepers who suspect that bees in their hives have the varroa mite are asked to contact HDOA as soon as possible at 973-9530 (Oahu) or the state's toll-free hotline at 643-PEST (7378).

NOD APIARY WINS AWARD OF EXCELLENCE

NOD Apiary Products (NOD), for the development of Mite-AwayII™, was awarded the Premieres Award of Excellence for Agri-Food Innovation in a special ceremony on March 8, 2007 in Toronto, Canada.

Both *Varroa* and Tracheal mites have long been a serious problem, threatening honey bee populations, eliminating pollinators, and reducing honey production. David Vander Dussen, CEO of NOD, supported through the University of Guelph, and by the Ontario Beekeepers Association developed an effective and environmentally-friendly product to control these parasitic mites.

Mite-AwayII™, with its extremely high efficacy rate, has received approval fromt he Pest Management Regulatory Agency (PMRA) in Canada and is registered with the Environmental Protection Agency (EPA) in the U.S., and is now widely used across North America.

In addition Mite-AwayII™ is now proving to be an important tool in the fight against CCD plaguing the beekeepers of the U.S. Not only does it work to effectively to kill off parasitic mites, it does this by using a very effective delivery system for an organic acid vapor, leaving no chemical residues in the hive. In addition, formic acid (the active ingredient) has been proven to be a formidable bactericide, fungicide and anti viral agent. packing this kind of punch Mite-AwayII™ is an effective tool for beekeepers to use against *Varroa* and Tracheal mites as well as helping to solve the new problem of CCD.

"Ontario's farmers have helped build a world-class agri-food sector in this province," said Premier Dalton McGuinty. "By recognizing their hard work and investing in their innovating ideas, we can help farmers pursue new markets, attract investment and strengthen our rural communities."

100TH ANNIVERSARY OF THE MINNESOTA HONEY PRODUCERS

The 100th anniversary of the Minnesota Honey Producers will be celebrated July 18-21, 2007 at Northern Lights Casino and Convention Center in Walker, Minnesota. The South Dakota Beekeepers Association will be joining in the celebration and you are invited too.

Industry speakers include Dr. Marla Spivak, Dr. Jamie Ellis and Dr. Larry Connor. Ted Takasaki, a top competitor on the pro-fishing circuit and President of Lindy Fishing Tackle, will inspire the fisherman in all of us. A cooking demonstration will be given by Darrel Rufer. Mann Lake Ltd will provide a tour and a meal catered by Famous Dave's BBQ. Live chainsaw sculpting demo of bees and flowers will also be held at Mann Lake Ltd.

The Kids and Bees Expo is scheduled for Saturday July 21st in the Hackensack City Park, on the shores of Birch Lake. These ladies put on quite a program don't miss it.

Make Northern Minnesota your vacation destination. The Headwaters of the Mississippi are only 50 miles from the convention center. There are 140 lakes within 10 miles of Hackensack. Forestedge Winery is only 20 miles away from the convention center. Our area also offers some of the best golf courses in the state.

Make your reservations early for the event of the century. Northern Lights Casino and Event center is filling up fast with rooms starting at $60.00. To make reservations call 866-652-4683 and mention the Minnesota Honey Producers. If you would like a listing of other hotels or campgrounds in the area call Mann Lake at 800-880-7694.

Watch your mailbox for registration information in early June, but do book your rooms now! The Minnesota Honey Producers are looking at a huge turn out. It is going to be a great time to catch up with beekeepers from all over Minnesota, South Dakota and the other 48 states.

HONEY BEE DANGEROUS IN AUSTRALIA

The honey bee is deadlier than the snake in the Australian state of Victortia.

Statistics collected by the University of Melbourne-based Australian Venom Research Unit show that since 1979, bees were to blame for 13 deaths and snakes 12.

The unit said that nationally small insects - ants, bees and wasps - had killed 59 people while snakes were responsible for 67 deaths.

Venom expert Ken Winkel tells the Melbourne Age newspaper the statistics highlight the need for people to be as cautious about insect stings as they are about snake bites.

"Snake bites are important, we should be putting that message out," said. "But there are people dying from a preventable cause – bee sting allergies."

Australian Honey Bee Industry Council executive director Stephen Ware tells the newspaper the venom death figures should alert people to the potential danger of common insects such as the bee.

"People see a snake and they say 'let's get away' but when people see bees wandering around in the clover, rather than leave them, they go and play with them," he says.

Alan Harman

HIVESTAN RECEIVES SECTION 18 APPROVAL

The Environmental Protection Agency has granted Section 18 clearance for Hivastan™ a powerful new weapon to help beekeepers protect their bees against *Varroa* mites, and in the process, become more profitable.

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

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

To provide maximum control, Central Life Sciences recommends treating all infested bee colonies with Hivastan twice a year – prior to the first honey flow in the spring, and again in the Fall after the last honey flow. "*Varroa* mite control requires integrated pest management," says Taylor. "Current alternatives are proving to be merely temporary solutions, and rotational products like Hivastan are necessary to control *Varroa* populations."

According to the USDA, the number of honey bees and managed beehives is down so much that production of pollinated plants has fallen by about a third in the last two years. *Varroa* mites, a type of parasite which came to the United States in the 1980s, are considered the primary culprits for wiping out the honey bee population.

Hivastan is available in 25 pound buckets containing enough product to make 50/ 8 oz (225 gram) applications.

To find out if Hivastan has been approved in your state, please contact your local Department of Agriculture, visit www.CentralApiary.com or call 1-800-248-7763.

About Central Life Sciences – The Professional Agriculture division which markets Hivastan and Apistan® is part Wellmark International dba Central Life Sciences, a strategic business unit of Central Garden & Pet (NASDAQ: CENT). Central Life Sciences is dedicated to creating healthier environments and making life better for people, plants and companion animals around the world. As inventors of insect growth technology more than 30 years ago, the founders of Central Life Sciences pioneered biorational pest control: using the insect's chemistry as a means to reduce pest populations.

GRANT GIVEN TO TEACH HONEY USE TO POOR FAMILIES IN VIETNAM

A Canadian professor has been given C$1 million by the Canadian International Development Agency to teach the poor in Vietnam how to use honey to put food on the table.

Gard Otis of the University of Guelph Department of Environmental Biology, has developed a project aimed at teaching farming families effective beekeeping so they can cash in on the sweet crop.

His six-year project is focused on villages in north central Vietnam – one of the poorest regions of the country – where selling just a dozen jars of honey can provide enough income to feed a family for months.

Otis said beekeeping is a lucrative business in rural Vietnam because honey produced in these villages is believed to have exceptional medicinal qualities.

Some people will drive more than 60 miles to rural villages in search of the honey to cure ailments as common as a sore throat.

Not only is there money to be made but beekeeping is also ideal for poor farmers because it doesn't require land ownership and start-up costs are small.

Otis says that although many families already have a few beehives on their properties, they haven't had any formal training in beekeeping.

"Their skills are rudimentary and their yields are far below what they could get," he says. "I want to help them develop their potential."

Otis and colleagues Leo Smits of the Department of Family and Community Social Services at the University of Guelph-Humber and Steffanie Scott of the Dept. of Geography at the University of Waterloo, recently spent two weeks in Vietnam developing and updating the training methods used by the Vietnam Bee Research and Development Center (VBRDC), the organization responsible for monitoring and training beekeepers in the rural villages.

NATIONAL HONEY BOARD HONORS PAST CHAIRMAN

Eleven past chairmen and current Chairman Lee Heine were honored at the February meeting of the National Honey Board (NHB) in San Francisco. The former chairmen attended the meeting and an anniversary banquet in honor of NHB's 20th Anniversary.

Pictured: Left to right, front: Harry Rodenberg, 1987-1990; Dwight Stoller, 1990-91, Bill Gamber, 1991-92; Binford Weaver, 1992-94; Neil Miller, 1994-95; Randy Johnson, 1995-96; back: John Miller, 1996-97; Bert Belliston, 1997-99; Steve Conlon, 1999-2000; Brent Barkman, 2000-01; Gene Brandi, 2001-04; and Lee Heine, 2004-present.

APIS CERANA FOUND IN AUSTRALIA

There's growing concern in Australia after the Queensland Dept. of Primary Industries finds a hive of Asian honey bees in the mast of a yacht that had been docked in Cairns in the far north of the state for two years.

The Asian honey bee, *Apis cerana*, carries two breeds of the *Varroa* mite that have the potential to devastate Australia's honey industry.

Australia is the last major honey-producing country free of *Varroa* but the Asian bee is common in areas to Australia's north such as Papua New Guinea and Southeast Asia.

The department believes the Asian bees came to Australia on a freight ship and colonized the yacht. Spokesman Ron Glanville tells the Australian Broadcasting Corp. the hive has been destroyed and officers are looking for others.

"The biggest problem with Asian honeybees is they can carry exotic mites that can infect our normal honeybees and can be quite devastating depending on the strain or the species of mite," he says. "They can actually be quite devastating in terms of killing off our normal honey bees.

"The procedure is to kill the nest at night when all the bees come back to the hive. The big question is whether there are any other bees in the vicinity And that'll be a longer term program for us and we'll be setting up pheromone traps in the vicinity to see if we can detect any other bee hives."

The Asian bees look very similar to *A.mellifera* but are smaller and have more predominant abdominal striping.

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I was visiting my friend, Dr. Amar al Hockim, curator at the Metropolitan Antiquities Museum. He was sorting through a shipping container full of neat stuff just delivered from Egypt.

"What's this?" I ask, pointing to the large stone box in a corner, "A sarcophagus?"

"No," answered Amar. "See those rings along the sides? Slaves used to insert wooden poles, then carry it through the streets as people emptied kitchen garbage and household waste into it. We call it an Egyptian dumpster. That stone slab inside the box that's hooked to the bronze ferrule used to have a wooden lever for compacting the garbage."

"Ah!" I replied, poking through the debris in the box. I lifted out a crumbling papyrus and blew off the dust. "This must be a priceless find: the answer to some ancient riddle of life along the Nile!"

"Nah, actually we're using the old dumpster as a dumpster. Those old papyri have no value at all on the antiquities market. They used to line the pyramids with those for insulation."

"Would you mind if I took this one?" I asked cautiously.

"Geez, take the whole box. It'll save us the disposal fee."

I carefully opened the brittle scroll and stared at the mysterious hieroglyphics. "What's it about?" I asked.

Amar looked the first couple lines of text. "It says something like 'Egyptian Bee Culture', dated Mesore 1268 B.C.E. – totally out of date."

I thought modern beekeepers might be interested in the contents. "Would you translate this for me? I'll trade you a jar of honey..." I asked.

"Are you kidding? I've got banquets with foreign dignitaries in the evenings and meetings with smugglers late at night. I spend my free time dodging FBI, CIA, ATF and IRS agents, searching for Solomon's gold, locating Atlantis and trying to solve Da Vinci's code..."Amar paused. "I'll tell you what. Wait a minute." He shuffled through a filing cabinet, pulled out a large photograph and handed it to me.

"What's this?" I ask, looking at a picture of a black rock covered with indecipherable scratch marks.

"It's a picture of the Rosetta Stone. This side is Greek. This side is Egyptian. Get yourself a good Greek to English lexicon and you can translate the papyrus yourself."

That's how I acquired and translated the following text, the only extant Egyptian Bee Culture Papyrus in the world.

Translator's note: In the following excerpts, I have endeavored to retain the original phraseology without sacrificing clarity of meaning. Sadly much of the writing is missing or illegible. I can only present fragments of articles.

Modern Egyptian [Api]culture Mesore 1268 B.C.E.

Table of Contents:

Make your own Embalming Fluid with Honey
Feed the Animal [Gods] for Higher Profits
Honey Medicine
Writing Rental Contracts
Cyprian Bees, Answer to [Parasite] Problems?
New Invention to Save Your Back
Modern Hive Materials: Mud, Clay or Dung—Which is Best?
Greek Honey Dumping on World Market
Mud Caps

Letters to Scribe

Esteemed Scribe,

I love your papyrus, having subscribed since sixty-two years. Keep up good work! I learn something new in each issue. Especially love the wit and wisdom of Mud Caps column on end of papyrus, plus all other columns. I read end to end every month. I am of 82 years, once having 25 cylinders of bees and now just three to keep busy in retirement.

Aminhotep IV

Loathed Scribe,

Please cancel my subscription. I learn nothing of value in your papyrus. You spend too much time on upper Nile beekeeping and nothing on beekeeping in Nile Delta. Plus who cares about Medo-Persian, Babylonian and Assyrian beekeeping? They use dung hives. I now subscribe to [that *other*] papyrus.

Ramses III

Section missing

Feed the Animals: Offering Honey to Croc God Good for Your Fortune and Your [Pocketbook]

Our host, one of the most honored men in Arsinoe, showed us holy things and accompanied us to the lake taking with him a cake, roasted meat and a little bottle of honey mead left over from the meal. We found a crocodile lying on shore. The priests approached it, two of them opened its mouth, the third one pushed the pastry and then the meat into it and then poured the honey mead into it. The animal jumped into the lake and swam to the opposite shore...

Section missing

...I tell people the reason of my good fortune as beekeeper: I always offer lots of honey to crocodile god, lion god and hippo god. All gods like honey and plenty of it. Gods especially like my honey as I am good person. If people buy my honey, they can offer it to the gods and have good fortune like me. This way I get more *deben* per jar at produce market near temple...

Section missing

Honey Medicine

When thou examinest a man who suffers from constipation, who has coughing fits, while his suffering is beneath the flanks of his body like lumps of excrement, then prepare for him effective remedies to be drunk. Ferment oil and honey, add [?] seeds, and 1/8 [?]. This thou shalt add to fresh gruel and cook until it is a [gloppy mass], which will be drunk during four days. This shall cleaneth anybody out.

If, after four days you find him in the same state of suffering as during the first time, tell him he shall recover. Eventually he shall or die. Either way, request pay[ment] *before* treatment...

Section missing

Classified Corner

Not enough slaves since Habiru people escape over Red Sea? **Merenptah Employment Services** have plenty excellent Sabian Slaves. Good workers and we do all [paperwork] for you to keep government off [back] . . . [*contact information missing*]

200 hive cylinders I sell or trade for pyramid. Excellent condition. Clay or mud – no dung. Lowest [prices] guaranteed. Also used migratory bee barge with two slaves for lifting. Needs work. . .

Peter Sieling

Back To The Future