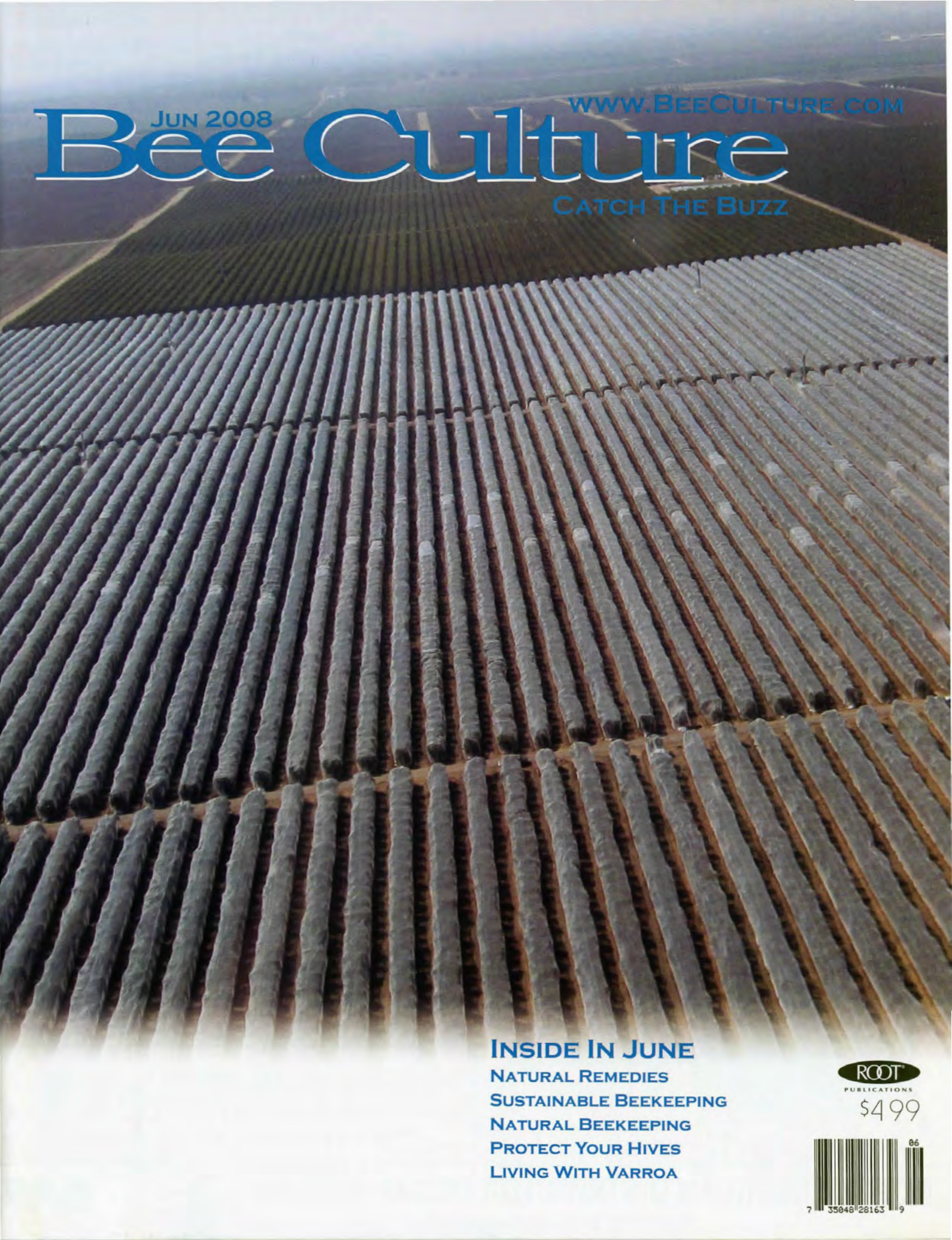

JUN 2008

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Gerry Miller, of the California Dept. of Food and Ag took this photo from a helicopter over the mandarin fields in California. You may recall the two articles by Joe Traynor we ran last year. The problem is that if pollen from nearby orange trees makes it to these mandarins, the mandarins end up with seeds....which tends to drastically lower their value. The mandarin growers wanted beekeepers, who they blame for pollen transfer, out of the area to stop the seedless mandarin from producing seeds. The beekeepers were there first, and a lawsuit was sought. Finally a committee was set up to find a resolution to the problem. In the short term the growers decided to net the trees. The cost is somewhere in the neighborhood of $1500 $2000/acre. There are about 20,000 acres of seedless mandarins in California. Growers are trying this for the first time this season but perhaps just netting the edges may work, or netting the pollen sources may work. The nets are plastic fish nets made in China. Growers hope to use it two or three seasons to recoup their costs.

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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 2008, Volume 136, 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.

Contact Information
V800.289.7668 • V330.725.6677 • F330.725.5624 • www.BeeCulture.com
email: info@BeeCulture.com

Advertising
For information on advertising contact Dawn Feagan at 800.289.7668, Ext. 3220

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 *is* PRINTED WITH SOY INK™ Trademark of American Soybean Association *on* *Recycled Paper*

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

JUNE 2008 VOLUME 136 NUMBER 6

FEATURES

DEPARTMENTS & COLUMNS

Bear Resistance

Here's what happens when a 'newbee' has a creative mind and too much time on his hands.

This is on our 20 acres in Northern Michigan, in bear country The stairs are raised and lowered with the rope and pulley shown. Then they are rolled away (old lawn mower wheels) so "Ben" cannot use them. The platform is seven feet off the ground. When I install the girls (first week of May) I request that they only bring in light honey to make it easier on my Fall workload.

Bruce Sabuda
Pinckney, MI

Feeding Bees?

After two letters titled "Why Feed Bees," I feel like responding. Let's start with the writer's 87% Winter loss the year of 2006. That Summer wasn't bad through June. I had three or four supers on most hives and eight on one hive. At the end of June I put two empty supers on the one eight-super hive for a total of 10, and one on the other hives. That was the last time that year that I put any supers on. It was the first year in 20 that I didn't put all of my supers out. From July through September, that year, my supers on the hives emptied out. The hive with 10 supers had five empty ones by the middle of September I pulled all of the supers and started feeding sugar syrup. By the middle of October all of my hives were up to wintering weight. Alas, too soon old and too late smart. If there was a shortage of nectar, then there must have been a shortage of pollen too. I didn't discover this until early Spring when hives were dead, but full of honey. Not a bit of pollen in any of the dead hives. Bees need both to live. My loss that year was 52%. The best beekeeper in the state of Ohio lost 50% that year, so I didn't feel too bad about my loss. Bear in mind that this was the Winter/Spring of CCD too, although I don't attribute any of my losses to that.

My point in all this is that although foraging is a genetic trait, the year of 2006 was the perfect storm for bees in that there was no food from June on. If I hadn't fed my bees, I probably would have had the 87% loss the letter writer had.

I have fed bees when needed for 20 years. My usual loss is four percent. I haven't bought packages of bees or nucs for those 20 years. I do however buy queens every April. I buy them from Hawaii and Florida. Hawaii doesn't really like to ship to me because my order isn't large enough. The Florida queen raiser is very accommodating. I know that both of these queen raisers get breeder queens or bee semen from Ohio. To me its the same as the Ohio State queen raising program with the added benefit of being able to get the queens fully bred in April.

According to *The Hive and The Honey Bee* "dark honey is higher in ash than light honey and this high ash may explain why honey bees over-winter poorly on this source." Here in northeast Ohio we do have some of these dark honeys in the Fall when the bees are storing their Winter food supplies. Again a couple of gallons of sugar syrup would be beneficial every Fall in every hive.

To say that foraging is purely a genetic trait is erroneous. If there is no nectar and pollen or if the honey gathered in the Fall is dark and high in ash content then the best foraging bees are in trouble. For goodness sake feed the poor bees so that they have a fighting chance. If you elected to keep bees, open your mind, try to think like a bee and keep them in a responsible way, a way which gives them a chance to live healthy Remember, buying nucs or packages year after year is a sign of a poor beekeeper

J. Michael Haas
Concord Township, OH

April, One Of The Best

Your April edition was in my opinion one of your very best

Bruce Brown's quick fixes and Mel Disselkoen "out breeding the mite" were not only informative, but could be the answer to a lot of problems facing our bees.

Man (referring to us), has always thought we could improve

situations that don't really need improvement, honey bees being a good example. They survived for at least 50 million years, and even longer according to Bruce Brown without any interference by man. I'm sure they had their ups and downs in that period seeing as they claim honey bees were not native to North or South America. I had never heard about fossilized comb found in the petrified forest of Arizona. So they were here once!

On to Mel Disselkoen's writing. When someone comes up with an idea that you almost had it proves to be interesting. Several years ago I thought if a person could break the brood cycle in colonies before the mite killed them, this would be a way to Winter more bees.

My plan was to take the queen and two frames of brood. Put this into a five-frame with two frames of honey and one empty comb, and do this at the end of the honey season. Raise a new queen (16 days) and probably seven or eight days before she mates and starts to lay, by this time most of the brood laid by the old queen would have hatched, no place for *Varroa* to breed to even be more sure, as soon as the new queen starts to lay take her away for 10 days, making sure there are no eggs in original hive (hopeless queenless). After the 10 days reintroduce this queen back and forget about them until next Spring.

My thinking came after one of my hives swarmed in August. It could have been a supersedure swarm. Anyway my thought was maybe the swarm would make it through the Winter but not the parent colony For the simple fact the swarm had a laying queen, but the parent hive would be broodless for a time before the virgin had time to lay, and not enough time for her to lay enough (Winter bees) low and ➢

behold, this hive came through with lots of bees, and the swarm died.

At that time I wasn't aware that queens mated this late in the year, would lay just like a new queen in the Spring (thank you Mel) this explains a lot.

One other thing about Spring build up. There are an abundant amount of drones being raised at this time, and the *Varroa* does better here than in workers. In fact they claim they purposely search out drone comb to reproduce in.

When the queen stops drone production, the mites have no recourse but to lay in worker cells, the mites in drone cells show little effect of the strength of the colony, but once it spills over into worker brood colonies collapse pretty fast. In fact your strongest colonies seem to go down hill the fastest.

Well that's some of my thoughts on the subject, and can't wait to make splits this July

Jim Cowan
Aberdeen, WA

More On Hive Stands

I enjoyed the article by James E. Tew on hive stands in the April issue. There was no mention of hive stands suitable for use with Open Mesh Floors (OMFs) (*Varroa* Screens).

I can use OMFs on my hobbyist non-migratory hives all year round. The enclosed solid or semi-solid stands are not suitable. The hive debris gathers and can attract wax moth. I use a simple four leg stand with the sides and top mainly open. The debris falls to the ground, and when needed I can remove it without moving the hive or stand.

Colin Taylor
Bury, Lancaster, UK

Taken Over By AHB

I could not find the correct place to do this but I most, sadly, request that my subscription be canceled. I loved the magazine and my bees.

The bees I purchased in 2006 were very gentle and were coming right along great in 2007 They overwintered without issues and started up great this Spring. But that all changed almost overnight.

One day I noticed tremendous amount of activity and the guards were very agitated but they were being overwhelmed by the number of bees entering the hive. Within a week after that I noticed a big difference with the bees. They did not like us getting close to the hive. Then two weeks ago we had a friend who was stung by one of the bees even though he was over 200 feet away from the hive standing in the yard not even close to anything the bees would want. Then I was stung working in my field when I came within 100 feet of the hive. I put on my suit and instead of one or two bees coming out when I was by the hive to see what was the matter and was assaulted by 100s of them. The final straw was when my wife was stung on our porch which is close to 300 feet from the hive.

I knew I couldn't take a chance with my grandkids or with my wife getting stung again. So, I closed it up that night and quickly killed them. From what I can tell, my hive was taken over by Africanized bees.

Please cancel my subscription and know that it has nothing to do with your great magazine.

Max Miller
Rogers, AR

No Mites On Island

I enjoy reading *Bee Culture*. Beekeepers on the Continental U.S. sure have a lot of problems. We don't have mites, beetles or Colony Collapse Disorder on our Island. Most of our local bees are descendants of Italian bees brought to HI from OR in the 1850s. Foulbrood wiped out many bees over the years and the survivors are strong today

We introduced 150 gentle Italians from Tollet Apiaries before the ban on importing bees. We put our hives on half a 50-gallon steel drum filled with rocks or bricks. Hives need to be 20 inches above ground or the toads will eat all the bees.

I've seen five toads, one on top of the other, eating bees as they came in for a landing. When the top toad gets fat and full it hops off and the next toad moves up and 'Fatty' becomes the toad on the ground.

Bruce Brown's guest editorial 'Honey Bee Nutrition and Medication' says it well – "Beekeeping will not get better with old management techniques because the old ways are a medicationally and nutritionally weakening event. Give the bees what they need." What the bees need is lots of flowers, fruit and nut trees, bearing pollen and nectar The pesticide applicators (corn companies) are killing us. Let's have more on better beekeeping and gardening without poisons which make us sick and kill bees.

David Maki
Kekaha, HI

Putting Lipstick On A Pig

If you've listened to National Public Radio recently, your reaction was probably the same as mine when you heard the following announcement (not a commercial, NPR doesn't air commercials) for Fiji Water: "Working to give back to the environment"

"Huh?!" You mean putting water in plastic bottles and hauling it from Fiji to the U.S. is giving back to the environment? They must think prospective buyers of Fiji Water have an IQ equivalent to that of a gerbil.

You are then directed to their website, www.fijigreen.com where you are assured that the Fiji Water people are doing everything possible to eliminate their carbon footprint and they are committed to saving the rain forests of Fiji. If you're truly committed to the environment, wouldn't you do a lot more good by crusading to eliminate all bottled water? (except in the few instances where it is superior to tap water).

When people reach the top of their game – in this case, manipulation through promotion – they often feel invincible – that anything they touch will turn to gold, including promoting Fiji Water as environmentally friendly

I have the utmost respect for the owners of Fiji Water, Stewart and Lynda Resnick. They have turned almond, pistachio, citrus and now pomegranate cultivation in CA into an art form and their holdings are models of how farms should be managed. Building pomegranate cultivation from nothing into a major ag enterprise, as they have done, is truly remarkable. Why sully this well-deserved reputation as premiere agriculturists with a boondoggle such as bottled water? Why not use your enormous talents on a truly worthwhile project: promoting honey

Joe Traynor
Bakersfield, CA

INNER COVER

Officially, the count is 35.2% Winter loss across the U.S. (that's a 10% increase over last year's survey numbers). But they arrived at that number way back in January and February and a big chunk of it was taken out in the almond orchards. The 'they' here is the Apiary Inspectors of America's official second Winter loss survey It's unfortunate that they couldn't wait until beekeepers (and survey takers) up north could get to their bees without the aid of snowmobiles because the losses reported there this Spring are *staggering*. My estimate would be that the AIA numbers for overall Winter loss would have been increased by *at least* 75%, for a total Winter loss of about 44%. I don't think I'm too far off on that figure.

But because the higher-ups wanted numbers they had to move when they did so it's all speculation now. However, if you extrapolate even their 35.2% loss to *all* of the NASS counted colonies in the U.S. (2.5 million) it comes to a total loss of 880,000 colonies that were dead early on this year If you use my figures, and I think you should, those numbers get worse. My figures say that 44% of all colonies died this Winter, for a total of 1,100,000 colonies lost. Interestingly, that is just about the number of colonies needed in almonds next year Are you listening, Almond Board?

Put another way 71% of the colonies that died, died of 'natural' causes and 29% of the colonies that died, died of CCD, according to the survey Do the math and that comes out to **10%** (225,000) of all the colonies in the U.S. last year died of CCD.

There was other information gathered in the survey (published on CATCH THE BUZZ the day it came out by the way [subscribe at www.beeculture.com]) that pointed out that those who lost colonies to causes other than CCD lost about 17.5% of their colonies. If your operation lost colonies to CCD however, you lost on average 41.3% of your colonies, or more than double the loss.

You may still not believe in this creature because neither you nor anyone you know has seen it...but these kinds of numbers should convince you. Whatever it is, it's still out there and it's still killing bees.

The Secretary of the Department of Agriculture isn't worried though. At least he wasn't in early May In an interview with *U.S. News and World Report* he said, when asked about the millions of dollars requested for CCD research by the Senate, "We don't need it. We already got it in the labs. We got this great bee guy tinkering away to see what's going on"

So there you have it. USDA leadership doesn't want more money to find out why almost half the bees in the U.S. died last year, and 10% died of CCD because they already got it figured out. You wanna bet the cost of almond pollination, of all pollination just went up for next year? Got complaints from a grower about prices? Tell 'em the Ag Secretary already has it figured out... go ask him what's going on.

•

I'm getting real good at waxing plastic frames. I can lay that stuff on exactly where I want it, exactly the thickness needed, and the bees just love it. You have to have the wax hot enough but not too hot, and you have to use a sponge paint brush going both ways, very, very lightly And you can't stop mid-frame just because you ran out of wax or your arm got tired or the brush slipped. You have to go side to side or top to bottom in one stroke. If you stop the wax will puddle and you'll fill in the hexagonal indents and it takes the bees longer to draw those out so the buildup is uneven. Yup, I'm getting pretty good at this.

Which is a darn shame, isn't it? You'd think frame manufacturers would have figured this out by now. They've been at this over a decade and they still aren't even close. The wax is applied by the nanogram millionths of a millimeter thick. It's worthless the way they do it.

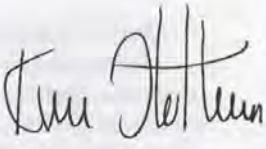
So, I can spend my time putting together frames with wax foundation . . let me tell you, that'll never happen again. Or I can spend my time waxing plastic foundation that's still happening, but it's getting old. Or, here's a viable solution I can quit beekeeping. Keeping bees is tough enough with the all the pests and whatnot. You'd think the suppliers would want customers, not want to drive them away

And while I'm on this little rant, let me speak to the fact that packages are made for the package maker, not for the beginning beekeeper If you've ever watched packages being filled and finished it's an assembly line job that makes it easy on the help. It's a 'how fast can you do this' job, as opposed to 'how well can you do this job' And the package did you know that design is over 120 years old. In a century we haven't come up with anything better Or rather, the package producers haven't changed because there are better packages on the market. Much, much better packages. With plastic bottles that don't leak syrup and cages that don't leak bees. That the post office would actually like. That are easy for beginners to use.

This is just one more case of

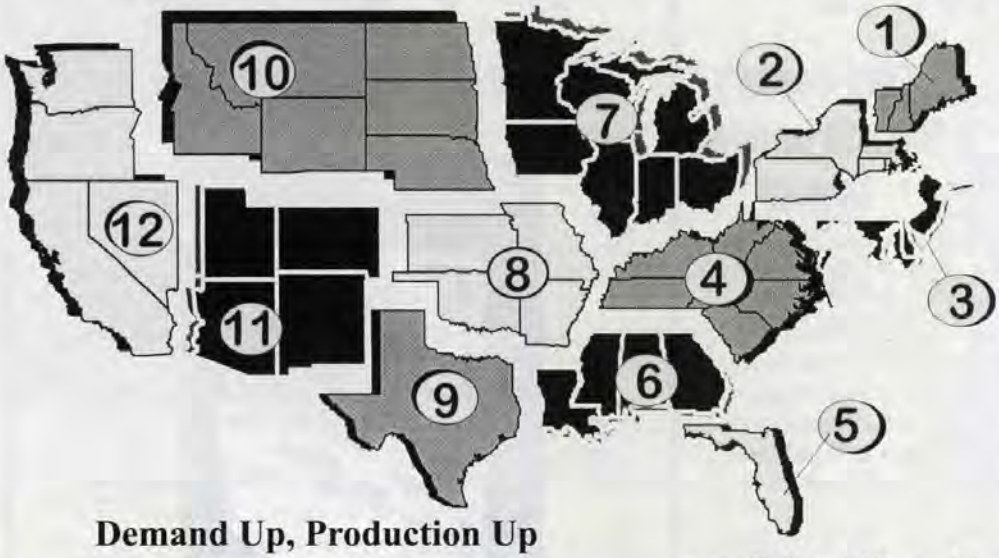
You'd think the suppliers would want customers, not want to drive them away

Meanwhile, keep your hive tool sharp and your smoker lit we're all we got.



We're All We Got

JUNE – REGIONAL HONEY PRICE REPORT



Demand Up, Production Up

The world supply of honey right now is a bit precarious. Production declines in Argentina and the U.S., restrictions on Chinese imports and other problems have reduced the world's supply causing the real price of honey to increase. Bulk prices are steadily, if slowly increasing in the U.S. almost daily.

Couple this global shortage with the phenomenal attention honey bees and beekeeping have been getting for the past year and one can only wonder, what has the demand for the beekeeper's product seen – higher prices should reduce demand, but increased attention should increase demand – so we asked our reporters.

Has demand for honey increased? Absolutely! 57% of our reporters have seen an increase in demand, while 39% say demand has remained steady, and only 4% say demand has decreased.

Here's the interesting part. What are our reporters going to do because of this situation? Well, 38% will increase production. And, 60% say they'll not change. They'll stay steady, and though they weren't asked, our bet is that prices will go up. That's probably too obvious since production costs have certainly increased recently, and it seems that they will continue to rise – no increase in production, and no decline in production – keeping the status quo, so to speak. That's cautious, but with everything going on probably a good move.

For those 38% making changes? Here's what they're doing – should you be doing some of the same?

14% will produce varietal honey. 34% will add comb honey and 29% are adding creamed honey. 14% are adding cut comb honey and 23% are adding chunk honey. And, though only 6% are trying infused honey, it's a step in the right direction. To accommodate all this 37% are changing their labels and 40% are adding new containers.

How did regions stack up for increase, no change or decrease in demand?

1 – 66% no change, 33% decrease.
2 – 66% increase, 33% no change.
3 – 71% increase, 29% no change.
4 – 43% increase, 57% no change.
5 – 75% increase, 25% no change.
6 – 45% increase, 55% no change.
7 – 73% increase, 27% no change.
8 – 33% increase, 66% no change.
9 – 83% increase, 17% no change.
10 – 100% increase.
11 – 53% increase, 33% no change, 13% decrease.
12 – 43% increase, 57% no change.

	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	1.41	1.35	1.25	1.42	1.35	1.35	1.31	1.41	1.41	1.31	1.25	1.25	1.25-1.42	1.34	1.23	1.03
55 Gal. Drum, Ambr	1.16	1.25	1.10	1.23	0.94	1.08	1.35	1.25	0.92	1.09	1.05	1.10	0.92-1.35	1.13	1.10	0.95
60# Light (retail)	122.50	122.00	116.00	111.17	120.00	120.00	118.63	113.33	120.00	129.99	132.50	129.00	111.17-132.50	121.26	116.41	112.31
60# Amber (retail)	110.00	113.33	115.00	109.20	120.00	112.50	112.57	110.00	100.00	120.44	130.00	125.00	100.00-130.00	114.84	114.88	109.52
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	51.04	60.98	40.93	42.28	64.21	64.21	43.44	64.21	64.21	45.00	47.70	86.50	40.93-86.50	56.23	50.40	46.64
1# 24/case	65.35	68.53	64.60	61.74	82.20	73.60	64.83	68.80	64.00	82.38	73.00	90.70	61.74-90.70	71.64	69.77	67.13
2# 12/case	69.86	63.72	60.67	55.60	78.00	55.20	58.22	78.00	55.00	57.84	56.33	75.68	55.00-78.00	63.68	61.75	57.78
12.oz. Plas. 24/cs	65.00	63.18	49.87	60.17	54.00	63.00	54.36	56.80	48.00	47.64	63.00	63.25	47.64-65.00	57.35	57.05	55.30
5# 6/case	77.27	71.74	67.50	63.06	72.50	78.00	67.85	77.40	60.00	66.50	69.00	84.00	60.00-84.00	71.24	71.15	64.92
Quarts 12/case	85.00	100.35	98.60	87.67	85.00	79.83	81.58	81.00	102.00	120.00	91.96	130.00	79.83-130.00	95.25	92.30	91.65
Pints 12/case	51.00	51.95	57.00	59.40	57.00	49.33	48.30	49.00	66.00	51.84	53.50	67.00	48.30-67.00	55.11	54.86	55.25
RETAIL SHELF PRICES																
1/2#	2.58	2.85	2.54	2.91	2.19	2.50	2.50	1.69	2.54	2.17	2.84	3.50	1.69-3.50	2.57	2.84	2.72
12 oz. Plastic	3.63	3.88	3.20	3.48	3.49	3.50	3.17	3.80	3.27	2.86	3.34	4.50	2.86-4.50	3.51	3.46	3.22
1# Glass/Plastic	4.25	4.36	4.41	4.61	4.62	4.44	3.80	4.45	4.32	4.20	4.59	4.95	3.80-4.95	4.42	4.33	4.06
2# Glass/Plastic	7.88	7.24	7.35	6.90	7 12	6.45	6.49	8.50	6.72	6.47	7.50	9.85	6.45-9.85	7.37	7.03	6.70
Pint	6.00	7.38	5.75	6.00	5.95	5.75	5.15	6.36	6.37	7 13	6.10	8.50	5.15-8.50	6.37	6.20	6.29
Quart	14.00	9.48	9.75	9.78	8.42	9.03	9.42	10.49	11.47	15.00	9.34	14.85	8.42-15.00	10.92	10.64	9.75
5# Glass/Plastic	14.50	14.66	16.07	14.28	18.00	16.00	15.95	17.50	21.50	11.96	15.78	22.24	11.96-22.24	16.54	16.13	15.03
1# Cream	4.38	6.06	4.81	4.80	5.49	4.00	4.90	4.76	5.49	5.46	5.75	5.75	4.00-6.06	5.14	5.03	5.50
1# Cut Comb	4.75	4.60	4.85	5.17	7.07	4.63	6.52	5.00	7.07	6.00	8.25	7.25	4.60-8.25	5.93	6.03	5.92
Ross Round	6.79	3.98	4.85	5.61	6.79	4.00	6.50	6.50	6.79	6.79	7.00	7.50	3.98-7.50	6.09	5.41	5.44
Wholesale Wax (Lt)	3.00	3.48	2.05	2.50	2.15	3.50	2.38	3.50	3.25	3.10	2.88	3.13	2.05-3.50	2.91	2.65	2.27
Wholesale Wax (Dk)	1.75	2.97	2.00	2.35	1.90	3.25	1.98	3.00	1.95	2.79	2.72	2.25	1.75-3.25	2.41	2.32	1.73
Pollination Fee/Col.	62.50	79.33	57.50	43.83	90.00	57.00	47.86	60.00	125.00	140.00	75.00	130.00	43.83-140.00	80.67	84.39	69.44

RESEARCH REVIEWED

The Latest In Honey Bee Research

Steve Sheppard

"Living with Varroa destructor *. . . examples from across the pond."*

The relationship between the western honey bee, *Apis mellifera* and the parasitic mite *Varroa destructor* can be seen as an ongoing and changing interaction. Given that the mite originally evolved as a parasite of the eastern honey bee, *Apis cerana*, both the mite and its new host face novel selection pressures for continued survival within this new relationship. In some cases, such as with some Old World African *A. mellifera* subspecies or Africanized honey bees in the New World, the relationship seems to have reached a measure of stability relatively quickly, where the mite and host survive in a manner reminiscent of the parasite and its original host. That is, the mite maintains a "presence," but does not normally increase its population in individual colonies to the point where the demise of the host is inevitable. However, in most situations with European honey bee subspecies or their New World descendants, infestation with *V destructor* is likely to lead to unsustainably large mite populations and the death of host colonies. There are exceptions to this path and in this month's column, we will examine two recent studies where *Varroa destructor* and European honey bees coexist without chemical treatment.

In the first, Fries and colleagues reported on their continued work on a population of honey bees that have survived for seven years on the small island of Gotland in the Baltic Sea (Fries et al. 2007). These bees are the survivors of a population that was originally set up and infested with *V destructor* as part of a so-called "live and let die" experiment, with the surviving colonies receiving the name "Bond colonies", after the famous secret agent (Fries et al., 2006). The authors noted that the reasons for the bees survival until now were unknown, so in this work they attempted to determine whether the traits leading to survival were associated with the mites, with the bees or with both. In the experiment, the researchers produced 20 queens from the two best colonies selected in 2005 within the resistant "Bond" population and another 20 queens were produced from two different breeder queens by a local queen producer of Italian type honey bees. The 40 queens were then installed in standard 10 frame Swedish beehives with adult worker bees that had been taken from colonies treated with Apistan® (fluvalinate) for eight weeks. The colonies were placed into two separate apiaries of 20 colonies each and all colonies in each apiary was inoculated with a group of mite-infested adult bees taken from either the Bond apiary (each sample containing approximately 105 "Bond" mites) or from a normally treated apiary (each sample containing approximately 40 "Control" mites).

The hives were managed normally and fed for the Winter The following spring, 13 were eliminated from the experiment for various reasons (queen replacement, drone-laying, dead or weak). Of the 27 remaining colonies, the Control mite apiary contained five colonies with Bond queens and seven with Control queens and the "Bond" mite apiary contained seven colonies with Bond queens and eight with Control queens. From May through November, monthly estimates of bees and brood are were made, together with estimates of the *Varroa* mite population found on adult bees and in brood.

The researchers reported that in both apiaries (and with the different mite sources) "the mite populations increased more rapidly in the Control colonies compared to the Bond colonies." They found no difference in the growth rate of mite populations related to the mite source, although there was a difference in the mite levels between apiaries due to the higher inoculation rate with "Bond" mites. Near the end of the season, the mite population was about three times higher in Control colonies than in the "Bond" colonies. Overall, the authors concluded that the slower growth of the mite population in the "Bond" colonies was "linked to the honey bee source rather than to the source of mites." Although the adult bee population levels did not differ between apiaries or between "Bond" and Control colonies overall, Control colonies did maintain a larger overall amount of worker brood than did the "Bond" colonies. The authors were unable to fully explain this, although they noted that, while the differences in the amount of worker brood produced by these groups were significant, they were not "huge." They also suggested differences in individual bee longevity (not studied) or errors in the estimates of colony size could be responsible for the fact that adult bee populations did not differ between the two groups. The authors noted that late in the season, the mites were distributed differently within the colo-

nies of the two groups of bees. Thus, "the Bond bees had an increasing and significantly larger proportion of the mites located on the adult bees (compared to the brood). The higher proportion of mites living on adult bees in the "Bond" strain (rather than reproducing inside brood cells) may have contributed to the measured lower mite population growth rate on that strain. The authors pointed out that their results contrasted with some previous studies of surviving bee populations, where the resistance appeared related to reduced virulence in the mites, rather than to differences among the bees tested.

In another paper published in the same journal issue, a team of French researchers reported a population of honey bees that also showed long term survival in the face of *Varroa destructor* without treatment. In this study, the researchers set up two apiaries with a total of 82 colonies of local honey bees that previously had shown some resistance to *V destructor* (survival for two or three years without treatment and apparently "normal" colony development). These apiaries were established between 1994 and 1999 and received no management other than periodic inspections and addition and removal of honey supers. Inspections of these "*Varroa* surviving bees (VSB) were conducted monthly during the beekeeping season and included evaluation for diseases, colony development, queen status and swarming. Honey yield was measured by removing the honey and weighing. Mite populations were estimated through the use of a screened bottom board and some control colonies were included for comparison with the VSB colonies. Overall, the annual mortality of the VSB colonies from 1999-2005 varied from about 10% to 17% per year and was not significantly different than in the normally chemically treated (control) colonies. In addition, the percentage of VSB colonies that survived the entire seven-year period (45%) was not statistically different than that of the treated colonies (56%).

Overall, there was no significant difference in swarming over the seven years. However, over the course of the study, the chemically treated colonies did produce significantly more honey than the VSB colonies (averaging about 1 7 times more honey). The authors concluded that their results demonstrated that some honey bees could survive for long periods of time without mite treatment. Of the 12 colonies in the initial group (1994), the average survival age for the colonies was 9.8 years and five of the 12 survived for over 11 years. At the time of publication, the authors were unsure of the mechanism for the resistance, although they felt it was unlikely the mites had been selected to be more benign. They further noted that the locations where the bees were kept were very favorable for beekeeping and the lack of intensive management and movement of the colonies may have produced less stress than was typically faced by commercially maintained bees. Although the VSB colonies produced less honey than the treated colonies, the authors concluded that such selected bees "may become an integral part for integrated *Varroa* management in France. "

While these two studies were restricted to local situations, far across the sea from the U.S. (and figuratively and literally even further from the almond orchards of California), they join a growing body of literature that suggests there are opportunities for the development of a more balanced host-parasite relationship between *Apis mellifera* and *Varroa destructor* As the literature in this field continues to grow, a laudable goal is that we strive to take the opportunity to apply these principles to the larger case of keeping bees within our agricultural system. BC

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Fries, I., A. Imdorf and P. Rosenkranz. 2006. *Survival of mite (*Varroa destructor*) infested honey bee colonies in a Nordic climate.* Apidologie. 37: 564-570.

Fries, I. and R. Bommarco. 2007 *Possible host-parasite adaptations in honey bees infested by* Varroa destructor *mites.* Apidologie. 38: 525-533.

Le Conte, Y., G. de Vaublanc, D. Crauser, F Jeanne, J-C Rousselle and J-M Becard. *Honey bee colonies that have survived* Varroa destructor Apidologie. 38: 566-572.

Malcolm T Sanford

Recent Events In Florida Beekeeping

"The rest of the nation can look for inspiration from the many activities of beekeepers in the Sunshine state."

By some accounts, beekeeping appears to be booming in Florida. It is difficult to process this information, given recent challenges faced by beekeepers in state. Beyond low honey prices over the last couple of decades, these included detection of tracheal then *Varroa* mites in the 1980s, followed by effects of viruses and small hive beetle in the 1990s and after 2000, the appearance of a resident Africanized bee (AHB) population, as well as the rise of CCD. Nevertheless, the evidence is there. Four new beekeeping associations have sprung up across the state bursting full of fresh-faced, eager-beaver beekeepers. A brand new beekeeping extension and research program is in full swing, accompanied by the traditionally strong inspection service enjoyed by Florida beekeepers. All this means that the face of apiculture is rapidly shifting from a commercial-based one we "old timers" are familiar with, to that dominated by part timers (hobbyists) and sideliners.

Back in April 2004, I wrote about the arrival of Jerry Hayes as Florida's new chief apiarist in *Bee Culture*.[1] At that time I said, "bee inspection in Florida has been known as one of the best-run and most-supported beekeeping services in the U.S. There have been relatively few chief inspectors over the years contributing to its stability Several have had long tenures, including Mr. Laurence Cutts, who recently retired after a decade and a half of service. Dr Roger Morse, well known for his writings in *Bee Culture*, was Florida's chief apiarist for a period and authored a document on Florida beekeeping. Innovations in bee inspection have been the watchword in Florida over the decades."

This continues to date. A significant program rolled out by the Bureau of Apiary and Plant Inspection is one based on best management practices (BMPs). Beekeepers in Florida who voluntarily sign on commit to following BMPs to the best of their abilities and this is monitored by the inspection service. The key here is to prove "intent," a watchword important in most litigation.[2]

Another Florida initiative is the establishment a Honey Bee Technical Council (HBTS), which meets periodically and provides advice and assistance to Florida's Commissioner of Agriculture with reference to beekeeping affairs. A recent meeting featured a number of reports about research being conducted around the state, in addition to an in-depth presentation on the BMP program.

A provocative presentation at the latest HBTC meeting by Mr Richard Gentry, a registered attorney, concluded that signing onto BMPS is the best possible defense against being sued. In addition it could minimize the consequences of having ones bees in proximity to any stinging incident, and show that one is a responsible beekeeper that does not have "killer bees." In response to a question about proving bee ownership, he gave an example that if someone was stung by a bee, and there are bees in a nearby hive, it does not have to be proven what or whose bees are at fault, only that the bees are there and there was an attack, "jurors will fill in the blanks."

Mr Gentry concludes in the strongest possible terms that anyone not signing BMPs is a fool and risking the future of their business. The Department of Agriculture and Consumer Services asks nothing extraordinary, he says, but has offered an official action in the BMP program that any ordinary, reasonable person who is a prudent manager should take advantage of. Signing this agreement would make one defensible and provide grounds for a judge to dismiss a case. Mr Gentry says that the goal is to be in compliance with the BMP, showing one's intent of being concerned for public safety

This appears to have come none to soon. The first reported human death associated with African bees took place in Okeechobee, Florida in April 2008. However, the circumstances, "A man in Florida died after being stung more than 100 times by bees that officials think were Africanized honey bees,"[3] does not seem to reflect a typical attack by AHB. A posting on the Bee-L network March 19, 2008 by "Peter L. Borst" **peterlborst@GMAIL.COM** reveals that Martin County could be the first Florida entity banning beekeeping due to Africanized bees. Again, the published reasoning doesn't correlate much with what most of us know about honey bee biology and management: "There have been 22 complaints about the highly aggressive bees in two years in Martin County The number is expected to rise because bee colonies split eight to 16 times a year, said Gene Lemire, the county's mosquito control administrator " This unfortunately reflects the kind of misinformation that is the target of increased extension and regulatory efforts as noted elsewhere in this article.

Meanwhile, in California a video describes the Africanized bee in a much more positive light than previously, asking "What ever happened to those killer bees?"[4] It reflects on several events with reference to the "invasion," and provides reasons why it didn't affect the human population as much as was projected. One was the significant resources going into educating the public before and during the arrival of the insects that beekeepers following BMPs are the first line of defense against feral AHB.

The hiring of Dr Jamie Ellis as Florida's Extension Apiculturist by the University of Florida (IFAS) has also added much to the resources available to the state's beekeepers. This continues a long tradition. The first beekeeping education specialist in the Florida Cooperative Extension Service was John D. Haynie.

"Another part of Florida's beekeeping renaissance is the continued evolution of the Florida State Beekeepers Association."

"Honey Haynie" began a newsletter called *Hum of the Hive* in the 1950s. It was regularly published until his retirement in 1971 Mr Haynie also began the Florida Beekeepers Institute in 1957 *Hum of the Hive* was taken up by Dr Danny R. Minnick in September 1971. His "last issue" was written in August of 1972. At that time, 1,800 hundred persons subscribed. Thereafter, Dr. Freddie Johnson sporadically authored the newsletter along with Frank Robinson, until July 1981 The following month's issue was written by the author of this article, who edited the document that became the *Apis newsletter*,[5] and retired as "Professor Emeritus," in 2001.

Dr Ellis and Chief Apiarist Hayes have embarked on an ambitious program to inform the public about bees and beekeeping. One of the hallmarks of this program is a full-fledged program to educate the public about African bees.[6] Another is both agencies cooperating to produce a quarterly pamphlet, *Florida Melitto Files: News for Bee Lovers*, which goes to all registered beekeepers in the state. Beekeepers are required to be registered by state law.

Recently, Dr. Ellis put on the first edition of Florida's Bee College at the IFAS Research and Extension Center in Apopka, Florida. This author was proud to be among the first faculty featured at this event.

This is Dr Ellis' rendition of a yearly seminar/short course, traditionally known as the Beekeepers Institute, which was held in Florida continuously from 1957 until 1993, and became the inspiration for similar events around the nation.[7] The 2008 Bee College was featured on a segment on Good Morning America.[8] Attendance was 166 and 60 brand new Apprentice Beekeepers were graduated as part of a newly-developed Master Beekeeper Program. Here at the criteria met by the first cadre of apprentice graduates at the Bee College:

A: must be a Florida registered beekeeper or a registered beekeeper in home state

"B: must own at least one colony of honey bees for at least one year Special exceptions to this rule will be considered.

C: no age limit (although the examination may be too difficult for children under 12 years of age)

D: must score a 70% or higher on a written examination (must attend the annual UF Bee College to take the written examination).

E: must score 70% or higher on a practical examination (must attend the annual UF Bee College to take the practical examination).

Comments about the Bee College from those present were by and large complimentary and again reflect Florida's growing community of smaller-scaled beekeepers. The event provoked 19 of 20 non-beekeepers present to indicate they will begin active beekeeping soon. All participants said they planned to attend future events. The addition of Welsh-trained honey judge, Robert Brewer, who lives in nearby Georgia, and the associated honey show with 48 entries added greatly to the festivities. Twenty eight people took honey judging training and this means a number of qualified judges will now be available in the state.

Another part of Florida's beekeeping renaissance is the continued evolution of the Florida State Beekeepers Association. This outfit has a long and impressive history as related by Mr Laurence Cutts, Florida Chief Apiarist Emeritus on the Association's web site: "The Florida State Beekeepers Association was organized at Gainesville on October 6, 1920. It was anticipated that it would make for rapid improvement in the beekeeping industry of Florida (Newell, 1921). A report of the organizational meeting states that a group of 100 enthusiastic beekeepers from all over the state were in attendance. The first officers were: J.W. Barney of Bradenton, President; F.K. Isbell of Wewahitchka, Vice President; K.E. Bragdon of Cocoa, Secretary; and J.R. Hunter of Wewahitchka, Treasurer It is also stated that the establishment of the state association followed the organization of several strong local associations. On the same page is a classified ad for two or three frame nuclei from the Sarasota Bee Company, the beginning of a segment of the beekeeping industry that became a major part of the industry here in later years (Anonymous, 1921).

"On July 1, 1957, an Act of the Florida State Legislature became effective which provided to beekeepers compensation for bees and equipment destroyed by the state because of American foulbrood (Martin, 1960). Florida was the first state to implement such a program. The compensation program increased cooperation between the Department of Agriculture and the beekeeping industry and contributed to a steady decline in the incidence of American foulbrood in the state.

"Between 1920 and 1940 tupelo honey shifted from a honey for blending to a specialty honey recognized as one of the premier honeys of the United States. Since then beekeepers have exercised care to produce and market as pure a product as possible. In 1962, the Florida Department of Agriculture initiated a program to certify tupelo honey as a marketing tool for those who produce a quality product (Packard, 1962). This continues to be the only program of this nature in the United States."[9]

The Florida State Beekeepers Association has recently been enriched through the addition of new local groups as noted above, which have been the heart and soul of the Association itself. It has also been involved in initiatives that have injected new funding into Florida honey bee programs. Over the last two years, around $700,000 has been appropriated by the Florida legislature for bee research and extension efforts due principally to association lobbying efforts. It sponsors a yearly meeting and in the last few years has held a mid-year event as well. The Association sports 80 life members, whose dues are paid by the Association's apiary named after Florida beekeeping icon, Conrad Cramer, and run on shares by volunteer managers. Finally, it publishes *The Florida Beekeeper* each quarter, a 48-page booklet crammed with news and advertising. Another Association initiative, which is expected to go nation wide, is developing a standard

of identity for honey, based in part on that found in the International Codex.[10] Stay tuned for more on this exciting program in the future.

A final organization affecting beekeeping in Florida is the Apiary Advisory Committee of the Florida Farm Bureau (FFB) Beekeeping (apiculture) is one of many activities (commodities) championed by the FFB, and the committee is made up mainly of commercial beekeepers. It engages in setting policies[11] that the National Farm Bureau pursues during the year, and assists the industry in its lobbying efforts in Tallahassee.

All the above organizations and activities are providing a special synergy to Florida beekeeping that is sure to serve it well in the future. And as in the past, the rest of the nation can continue to look for inspiration from the many and varied activities of beekeepers in the Sunshine State. BC

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

References:

All URLs accessed April 20, 2008.
1. http://www.squidoo.com/Bee_Culture
2. http://www.doacs.state.fl.us/pi/plantinsp/apiary/apiary.html
3. http://www local6 com/news/15862169/detail.html
4. http://video.aol.com/video-detail/whatever-happened-tothe-killer-bees/225811865?icid=acvsv1
5. http://www.squidoo.com/Apis_Newsletter
6. http://afbee.ifas.ufl.edu/
7 http://apis.ifas.ufl.edu/apis93/APSEP93.HTM#1
8. http://entnemdept.ifas.ufl.edu/honeybee/links.shtml
9. http://floridabeekeepers.org
10. http://www beekeeping.com/articles/us/honey_quality.htm
11. http://www.floridafarmbureau.org/issues/policy_book/Commodities

NATURAL REMEDIES - Part II

Products From The Hive For Health, Beauty & Energy

Abbas Edun

Bee Venom

The venom (apitoxin) in the sting of a honey bee is a clear liquid with an aromatic odor, an acidic reaction and a sharp, bitter taste; it dries quickly at room temperature. It is stored in two glands connected to the poison sac of the worker bee, and empties into a special channel of the stinger Apitoxin is composed of enzymes and peptides.[1]

The venom also contains the following compounds: phospholipase A2 (about 10 per cent), hyaluronidase, acid phosphatase and histamine.[2] The first two of those compounds have an emollient effect on the acids which bind tissues, allow the toxins to spread more freely into the flesh and cause pain. The enzymes are the allergic components while the peptides are bioactive substances. The main peptides are apamin and melittin;[3] they have a positive effect on the immune system through the adrenal, hypothalamus and pituitary glands. Therefore, as opposed to most other medications, BVT supports the immune system and does not weaken it.

A worker bee that is between one and three days old has very little venom in its sac, but the amount gradually builds up with age, to approximately 150 micrograms in those which are two weeks old. After she reaches the age of 18 days and becomes a guard, no additional venom is produced. The amount of venom in worker's sac and the time of venom production 12-21 days) depends on the breed of bee. The weight of the venom in the sac remains unchanged, and cannot be replenished after the sac is emptied. Workers must eat pollen in order to be able to manufacture venom.

In the past the venom was obtained by the laborious process of dissecting the poison glands of the worker bees one at a time. However, in 1963, Charles Mraz[4] and Roger Morse[5] invented a venom-collecting device. It consists of a wooden board with a membrane covered by evenly spaced metal wires. The device is placed underneath the brood chamber of a colony and the wires are electrified. This stimulates the bees to release their venom by stinging the membrane. The stinging does not cause a loss of their venom sac in this case, and it therefore does not do any harm to them.[6] The device may be moved from one hive to another Under ideal conditions a gram of venom may be produced by ten thousand worker bees.[7] The average amount of venom given when a worker bee stings a man (or woman) is about 50 micrograms.

Today, more than at any other time, we have a better understanding of how BVT works, and its possible therapeutic potential. Every day many more people are employing BVT in the treatment of arthritis and MS.[8] The former is a group of conditions involving damage to the joints of the body. It is the leading cause of disability in people over 55 years of age. MS is a chronic, inflammatory disease of the central nervous system in which the myelin sheath of neurons is damaged. It usually occurs in young adults and is more prevalent in women.

An anaphylactic reaction may be caused when a worker bee stings someone who is allergic to her venom. Anyone who is susceptible to anaphylactic shock (*hymenopterism ultima*)[9] should not undergo BVT If you are not allergic to the venom in a bee sting and wish to investigate for yourself the medical benefits attributable to bee venom, you should contact The American Apitherapy Society, and from there contact one of the many laymen who practise BVT Should you be interested in monitoring developments in BVT, wish to learn more about it or be introduced to persons of a similar persuasion, you are advised to contact the AAS.[10]

BVT is also popular in Pakistan. Recently, the Ednan Shahid Foundation organized a free camp in Faisalabad at which Muhammad Akram, a famous apitoxin expert was present. He treated hundreds of people for various diseases, including hepatitis and arthritis.[11]

Honey

The aqueous substance secreted by the nectaries of flowering plants is the basic material from which honey is derived. That secretion is known as nectar [12] It is a mixture of sugars and trace amounts of other chemicals. Nectar is ripened into honey by inversion of the major portion of its sucrose into laevulose (fructose) and dextrose (glucose) and by the removal of excess moisture. The approximate

percentages of fructose, glucose and water in honey are 40, 35 and 18 respectively. It also contains special enzymes[14] produced by the bees, amino, citric and malic acids, volatile oils and pigments. It is a nutraceutical[15] food which contains all the essential minerals for sustaining life, including Vitamins A, B-complex, C, D, E, and K; beta-carotene; and enzymes. Nutraceuticals are usually contained in a medicinal format such as capsule, tablet or powder in a prescribed dose. The implication is that the product is demonstrated to have a physiological benefit or provide protection against a chronic disease.[16]

The Food and Drug Administration (FDA)[18] recently approved an artificial sweetener made from crops such as wheat, rice, corn, potatoes and barley. This new product is produced by creating an enzymatic degradation of all the natural crops which is then processed and purified. The result is an all-natural sweetener that looks and tastes exactly like, and has the same consistency as honey.

In a press release entitled *Honey High in Food Value*, the United States Department of Agriculture stated: "Honey is one of the best of the high energy-producing foods.[19] Because it is composed almost entirely of simple sugars, it can be assimilated with ease. Most sugars require action by the gastric and intestinal secretions to break them down into simple sugars similar to those occurring naturally in honey."

As a result of its unique ability to readily absorb air, honey is often used as a moistening agent in baking. Unlike fruits and vegetables, it can be stored indefinitely at room temperature. According to the National Honey Board (NHB),[20] honey stored in sealed containers can remain stable for decades and even centuries. Viable honey has been found in pyramids over 5,000 years old. Even though honey is a very popular food product, it is not the real reason for the importance of the honey bee. Crops relying on honey bee pollination are estimated at $14 billion per annum in the U.S.A. alone.

Honey has been used medicinally by many cultures from ancient times.[21] The Chinese, Greek, Islamic, American Indian and Roman civilizations all used it. It has been employed in the treatment of colds, influenza, diarrhea, disorders of the digestive system, sore throats, skin and stomach ulcers.

It was documented by the Egyptians in 2400 B.C. as a treatment for wounds.[22]

In the Middle Ages, a document of 1392 gave details of the use of honey in the treatment of wounds.[23] It was commonly known that abrasions, burns and cuts covered with a layer of honey healed quickly with hardly any infection. And in the last two world wars poultices made with honey were used to help the wounds of soldiers to heal. However, the discovery of new antibiotics caused attention to be diverted from the natural remedy. It is only since the latter part of the last century that the antibacterial properties of honey have become well studied,[24] and the use of honey has once again become attractive for the treatment of wounds. It is thought that the antibacterial properties of honey include the release of hydrogen peroxide at safe levels plus an additional phytochemical antibacterial component.[25]

There have been numerous reports of the anti-inflammatory, debriding and deodorising effects of honey. The reports of it as an effective anti-microbial agent have been comprehensively reviewed.[26] The review shows that honey is active against a wide range of bacterial and fungal species, many of which cause infections.

Honey was used as an essential ingredient in beauty treatments by Cleopatra VII[27] and the ancient Greeks because its humectant[28] qualities help to keep the skin moist, soft and elastic and to stay younger looking. Honey does not irritate the skin and is ideal as a beauty product for sensitive skin. Because of its anti-microbial activity, and its ability to penetrate deep into the epidermis, honey is a useful remedy for skin blemishes and acne; it attacks the bacteria that cause the problems while moisturizing the skin to aid rejuvenation.

Poppaea Sabina[29] regularly applied a mixture of milk and honey[30] to her face to keep the skin looking young and smooth. The Comtesse Du Barry,[31] a famous French belle, found honey to be indispensable in creating the beauty preparations that kept her looking radiant. Its natural antioxidant properties protect the skin from the damage of the sun's rays and also help support the skin's ability to rejuvenate should damage occur. BC

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

References

[1]An enzyme is a variation of proteins capable of acting as a catalyst for organic reactions, i.e., a molecule that controls the rate of a biochemical reaction but is not itself used up in the process. The reactions that occur in cells, tissues and organs are controlled by enzymes. A peptide is a combination of two or more amino acids covalently joined in a linear sequence in which the carboxyl group of one is linked to the amino group of another. In 1973 the Kennedy Institute of Rheumatology published a study about Peptide-401, a substance that occurs naturally in bee venom. The study proved it to be one hundred times stronger than hydro cortisone in its anti-inflammatory properties.

[2]See Winston, Mark L. 1987 The Biology of the Honey Bee, p. 30, and the references there cited. Phospholipases are enzymes that help melittin to destroy the membranes of cells. Hyaluronidase is a mucolytic (mucus dissolving) enzyme that catalyzes the random hydrolysis of hyaluronic acid, a major constituent of the interstitial barrier Hyaluronidase lowers the viscosity of the acid, thereby increasing the permeability of tissues, and facilitating the spreading of fluid through them. Acid phosphatase is a type of enzyme, used to free the phosphate portions of high-energy chemicals during digestion. A histamine is an amine ($C_5H_9N_3$) released by the body in allergic reactions. It is a white crystalline substance found in plant and animal tissues and as a decomposition product in histidine. It stimulates gastric secretion and lowers the blood pressure.

[3]Both apamin and melittin are unique to bee venom; their approximate percentages are three and 50 respectively. The former is a neurotoxin, i.e., it causes damage to the nerves or nerve tissues. Melittin is a water-soluble toxic peptide, and is cytolytic, i.e., it results in the destruction of cells. Melittin contributes to swelling and itching, and is the primary cause of the venom's pain. It was reported to have inhibitory effects on hepatocellular carcinoma. However, its role in anti-metastasis and the underlying mechanism remains elusive: Bee Venom Component Inhibits Spread of Tumor Cells, Hepatology, 31 Jan

2008, as detailed in Midwest Beekeeper Vol 2. No. 1, January 2008.

[4]Son of Karl and Maris Mraz, he was born on July 26, 1905 in Woodside, New York City and died on September 13, 1999. In 1992, he was named by the American Beekeeping Federation as one of the five most distinguished beekeepers in the United States. Charles was a founding member and Executive Director of the American Apitherapy Society (AAS). See note [10] below.

[5]A bee biologist born in Saugerties, New York on July 5, 1927. He was a Professor of Apiculture and Extension at Cornell University, Ithaca, NY He taught beekeeping fundamentals and science through his research and publications. During his distinguished career, three parasites of the honey bee, the acarine and varroa mites and the small hive beetle were found in the United States. Those, along with the Africanized honey bee and pesticides, were all important beekeeping issues. Morse was extensively involved in research on every one of them and gave advice to the beekeeping industry. He died on May 12, 2000.

[6]Similarly, a worker bee can sting other insects through their chitin with impunity. However, when she exserts her sting and thrusts it into the skin of a mammal, the elastic tissue of the victim contracts around the wound and the barbs of the sting become embedded. When the attacker tries to fly away, her sting, venom sac, and a large part of her internal anatomy remain behind; the result is her death.

[7]See Benton, Allen W., Roger Morse, and Joseph D. Stewart. 1963. Venom Collection from Honey Bees. *Science* 142:228 - 230.

[8]The term "arthritis" is derived from the Greek words *arthro* which means joint and *itis* (inflammation); the plural is arthritides. MS, formerly known as encephalomyelitis disseminate or disseminated sclerosis, was first described in 1868 by Jean-Martin Charcot (November 29, 1825 – August 16, 1893). He was a French neurologist and professor of anatomical pathology whose work greatly influenced the developing fields of neurology and psychology.

[9]The term "anaphylaxis" is derived from the Greek *ana* (against) and *phylaxis* (protection). It is an acute systemic (multi-system) and severe hypersensitivity allergic reaction in mammals. It occurs when a person or animal is exposed to an allergen (a trigger substance), to which they have not already become sensitized. Anaphylaxis may be life-threatening when an obstruction of the airway occurs, if blood pressure drops, or if heart arrhythmias occur. The etymology of "hymenopterism" is Greek *humen* (membrane) and *pteron* (wing).

[10]A non-profit organization devoted to advancing the investigation and promoting the use of products of the hive to further good health and to treat a variety of conditions and diseases. Its quarterly Journal contains a wealth of related information and is sent to all of its members. Other sources of data available from the AAS include videos, books and a CD created by the Apitherapy Commission of Apimondia. The latter is an international association of beekeepers with members all over the world. The AAS is located at 500 Arthur Street, Centerport, N.Y. 11721. Phone: (631) 470-9446 - Fax: (631) 693-252. E-mail: info@apitherapy.org.

[11]See The Post (Pakistan), Tuesday January 29, 2008.

[12]In Greek mythology it was one of the two favorite beverages of the Gods; the other was ambrosia. They were said to confer immortality on any human who was lucky enough to be able to consume them. The theological meaning of nectar and ambrosia is explained by Hermias, in his Scholia on the Phaedrus of Plato, published by Ast, Lips., 1810, p. 145. Homer at the beginning of the 4th Book of the Iliad makes mention of nectar being brought to the Gods by Hebe in golden goblets.

[14]An enzyme is a variation of proteins capable of acting as a catalyst for organic reactions, i.e., a molecule that controls the rate of a biochemical reaction but is not itself used up in the process. The reactions that occur in cells, tissues and organs are controlled by enzymes.

[15]The term "nutraceutical" is a conjunction of "nutrition" and "pharmaceutical." It was conceived in 1989 by Dr. Stephen L. DeFelice, the founder and chairman of the Foundation for Innovation in Medicine (FIM), Cranford, New Jersey, so as to clearly identity this field of biomedical research. The FIM was established in 1976. It is a nonprofit foundation whose purpose is to accelerate medical discovery by creating a more productive clinical research community. According to Dr. DeFelice, a nutraceutical may be defined as a food or part of a food that has a health benefit including the prevention and treatment of disease. It includes dietary supplements, foods, and functional foods which are really dietary supplements in food dosage forms. However, the term as commonly used in marketing has no regulatory definition.

[16]Health Canada, Policy Paper on Nutraceuticals/Functional Foods and Health Claims on Foods, 2002. Nutraceuticals and functional foods are regulated under the Natural Health Product Directorate (NHPD) and the producer must have a site licence to sell the product. The NHPD is part of the Health Products and Food Branch of Health Canada. It is the regulating authority for natural health products for sale in that country. Its role is to ensure that Canadians have ready access to natural health products that are safe, effective and of high quality while respecting freedom of choice and philosophical and cultural diversity.

[18]The FDA is an agency of the United States Department of Health and Human Services and is responsible for the safety regulation of most types of biological medical products, blood products, cosmetics, dietary supplements, drugs, foods, medical devices, radiation-emitting devices, vaccines and veterinary products.

[19]The First International Symposium on Honey and Human Health was held on January 8, 2008, at the Doubletree Hotel in Sacramento, California. It featured Dr. David Baer of the USDA Beltsville Human Nutrition Research Center in Maryland and scientists, researchers and physicians from all over the world. They presented studies which emphasized the role of honey as a useful food providing healthful benefits when consumed regularly. For more information on honey as a food, see Melcombe, Lynne: "Health Hazards of White Sugar" #22 in the series of Natural Health Guides published in 2000 by alive books, British Columbia, Canada.

[20]The NHB, through its staff, conducts research, advertising and promotion programs to help maintain and expand domestic and foreign markets for honey. Its work, funded by an assessment of one cent per pound on domestic and imported honey, is designed to lift the awareness and use of honey by consumers, the foodservice industry and food manufacturers. Its address is 11409 Business Park Circle Ste 210, Firestone, Colorado 80504. Phone: (303) 776-2337.

[21]Majno, Guido. 1975. *The Healing Hand: Man and Wound in the Ancient World.* Harvard University Press Cambridge,

Massachusetts; Ransome, Hilda M. 1937. *The Sacred Bee in Ancient Times and Folklore.* George Allen and Unwin London.

[22]Gelbart, M. 1999. Wounds in time: the history of wound management; see *Wound Management: Theory and Practice.* Miller, M. and D. Glover (Eds.) London, Nursing Times Press.

[23]Naylor I.L. 1999. Ulcer care in the Middle Ages. *Journal of Wound Care.* 8(4): 208-212.

[24]Dustmann, J H. 1979. Antibacterial Effect of Honey. *Apiacta* 14(1): 7-11.

[25]Molan, Peter Charles. 2001. Why honey is effective as a medicine. 1. The scientific explanation of its effects. *Bee World* 82(1):22-40.

[26]Kaal, Jacob. 1991. *Natural Medicine From Honeybees (Apitherapy).* Kaal Printing House, Amsterdam, Holland, English Edition, pp. 58-67; Molan P. C. 1992. The Antibacterial Activity of Honey. 1. The Nature of the Antibacterial Activity. *Bee World* 73, 5-28; Molan P. C. 1999. Why honey is effective as a medicine. 1. Its use in modern medicine. *Bee World* 80: 80-92; Cooper, Rose A. and P. C. Molan 1999. The use of honey as an antiseptic in managing pseudomonas infection. *Journal of Wound Care.* 8(4): 161-164.

[27]Circa 69 30 B.C., daughter of Ptolemy XI Auletes, King of Egypt. Upon the death of her father in 51 B.C., she and her younger brother Ptolemy XII inherited the throne.

[28]I.e., its ability to attract and retain moisture. It is water soluble, and may become granular at temperatures between 50° and 65°F (10° and 18°C).

[29]She was born in the year 30 A.D. and died when she was only 35. After having an affair with him for some time, she later became the second wife of the Roman Emperor Nero.

[30]Reference is made to this combination in the Bible, Exodus 3:8. The land flowing with milk and honey promised by God to the Israelites, when they were slaves in Egypt, was Canaan, the country which lies between the River Jordan and the Mediterranean Sea.

[31]Née Marie-Jeanne Bécu, August 19, 1743 December 8, 1793. She was a courtesan who became the last mistress of Louis XV

'Bout a 100 – Sideline Beekeeping

MAKING NEW COLONIES DURING THE LATE SPRING & SUMMER

More & More Sideline Beekeepers Are Making Their Increase During Late Spring & Even During The Active Nectar Flow

Larry Connor

More and more sideline beekeepers are moving away from the traditional early-Spring increase mindset. Instead of making colonies in March or April, they are actively making their increase during the late Spring (post fruit bloom in most areas) and even during the active nectar flow by using the colonies unlikely to produce surplus honey This follows the natural hive instinct to swarm during this period, and utilizes the behavior of the bees to brood up and build queen cells to full advantage. Swarms start in March in Texas and in April in Michigan, but peak in April-May in Texas and late May-early June in Michigan (both are big states with many climate zones). But keep in mind that the nectar flow is often over for the Texas beekeeper about the time it just gets going in most of Michigan.

An increase colony is a subdivision of a larger hive. Langstroth called them *nucleus hives*, which he established with a brood comb and adhering bees, plus an additional shake of bees if needed. He would utilize queen cells from swarming, or would force a colony to produce cells. Not much has changed since 1860 in terms of our basic knowledge on making up increase colonies, except that the number of variations on this theme is nearly endless.

Who is making Summer increase?

The primary group of beekeepers using Summer increase colonies are over-wintering these colonies as nucleus hives for the next season. There are several advantages in doing this.

First, it is easier to produce your own queens or to obtain locally produced queens or queen cells when you wait until the fruit bloom to produce queens. Many of us have just read about the advantage of having queens that have mated with many drones. It is easier to have a larger, genetically more diverse population of drones later in the Spring than in late Winter or early Spring. So far we have learned that queens that have multiple sexual partners are more likely to resist severe disease attacks, have better control of their colony's temperature, and are more attractive to retinue bees. If there is an evolutionary advantage to multiple mating in bees, as there appears there is, then it is highly likely that worker bees have developed methods to detect those queens with a dozen or so mates rather than the ones that have mated with only one or two drones. The worker bees take better care of the queens with multiple mates. Again the swarming season in hives is timed to occur when the maximum number of drones is produced from the greatest number of colonies.

There has been tremendous interest on the part of many sideline and commercial beekeepers to produce their own queens, as evidenced by the six queen rearing courses I am teaching this season. The interest in locally produced queens is huge right now, and fits into two trends, the need to use stock that is locally adapted that may have been selected for mite resistance; and the trend to produce food and other goods locally

Second, based on a prior generation of beekeepers, including England's Brother Adam, creator of the Buckfast strain of bees, American beekeepers like Kirk Webster and Mike Palmer, both of Vermont, have been producing summer increase colonies for well over a decade. This has stimulated other beekeepers to try this themselves, often

Collin County Hobby Beekeepers sponsor a bee school every Spring run by John Talbert at his apiary in Josephine, TX. He is helped by Texas Beekeepers Association president Ted Vance and 18-year old Blake Shook, VP of the Collin County group. Each class member, which includes 19 teenage scholarship students, receives a colony as part of the class. Some prior year students return with their parents to obtain additional colonies. Each colony is made with two frames of brood and bees, and placed against one side of the 10-frame box. The student/class members provide the hive body, the bottom board and lid, and eight frames to fill out the box. These colonies were set up in April and the colonies went home with the students at the end of that month.

The mating yard used by Texas beekeeper Ray Latner near the Dadant branch in Paris, TX where he is the manager. The colonies are set out on high, dry ground and out of the way of the prevailing wind (that always seems to blow in the spring). While used for several cycles for queen mating, they can also be used to provide nucleus hives. Note that these are not standard deep frame equipment. The jars are filled with syrup and fed to the bees during buildup. It was mid-April when I took these photos, so the flow was underway and feeding had ended.

with great success.

For some, success with over-wintering nucleus hives can be overwhelming. In March I spoke at the Kentucky Beekeepers meeting in Frankfort. As I was setting up my book display a man walked up to the table and said that he has purchased my book, *Increase Essentials*, the prior year and had used the information in the book to produce Summer nuclei which he had over-wintered. I asked him how the increase colonies had done during the Winter They were all five-frame nucleus hives.

"One out of 24 died," he said, seeming somewhat upset.

"Well, aren't you pleased with that?" I asked, totally confused.

"No, can you please tell me what am I going to do with 23 nucleus hives!"

I suggested he let folks at the meeting know that he had nucleus hives for sale, and he was later spotted wearing a second nametag that indicated he had Kentucky-raised, over-wintered nucleus hives available. I believe he had them all sold that morning.

Well, that is a great experience, but I would never tell anyone that they would do that well. But if the beekeeper sold the nucleus hives for $75 to $100 each in today's market, that gave him a tidy profit for the equipment and effort he invested in the concept. It was not a poor return for the $15 he spent on the book I sold him. Even if added in the cost of being at the beekeeper's meeting where he purchased it (probably the Heartland Apicultural Society), I think he did all right!

Empty jars on mating nucs or increase colonies. The jars remain in place to keep the feed-hole covered.

Other approaches

As I said, there are many variations on this theme. In April I taught a queen rearing class for the Collin County Hobby Beekeepers, located northeast of Dallas. I have added some photos from my visit to Texas from that trip that show how folks there are raising increase colonies, making queens, and more.

The class was full, and others wanted to participate. Beekeeper and host John Talbert, a retired engineer who gives back a lot of time to the beekeeping community, had brought in colonies to use for the class. They were set down in an area where dozens, if not hundreds, of Spring nucleus hives were set up by the bee class he teaches with Ted Vance and 18-year old Blake Shook, VP of the Collin Country group.

When I asked I learned that each student had made up one or more deep hive bodies containing eight empty frames each, (they just as well could have made up the unit with seven frames and a plastic frame feeder). To this two frames of brood and bees were added. Queens were obtained from a major supplier in Hawaii, although Shook produces his own queens as the season allows.

The system is pretty simple. The two frames of brood are placed along one side, or wall, of the hive, and allowed to expand outwards into the empty combs, most of which was foundation. An open feeder supplemented food supplies. The entrances were partially reduced to prevent overwhelming drifting from one hive to another

At the time the increase colonies were assembled the black locust was about to bloom, and was in bloom while I was there. This gives you an indication that the season is well underway, that the main nectar flow was upon them, and that the bees had plenty of opportunity to gather nectar and build in size. In late April each box of bees would be taken home to the beekeeper's home site. They would have May and early June to build on, and then the nectar flow is usually over in that part of the country If you want to move bees to the Chinese tallow in the southern part of Texas, this is another source in June. And then in the middle of the Summer the bees can be moved to West Texas for the cotton bloom, a crop much safer for bees now with the use of genetically modified cottonseed and the boll weevil eradication program.

The timing of your local nectar flow must be considered when you decide if and how to use increase nucleus hives. At another meeting this season, this one in Western Pennsylvania held in late February, I had a long discussion with many of the participants about the state of their nectar production in much of that area. In a few parts of Pennsylvania you might get Spring flow from Spring trees including black locust, tulip popular, sumac and basswood. But in a huge part of the state the abundance of these trees is not large enough to provide a predictable nectar flow. There are plenty of minor wildflowers that are enough to keep a colony going during the Summer months.

Instead, the beekeepers rely upon one primary nectar source for the main honey crop: goldenrod. These plants bloom in August and September in most of the northern parts of the United States, and are at times highly attractive to honey bees. In Pennsylvania the beekeepers consider the honey to be high quality and highly marketable. Beekeepers from other areas do not always share this experience or opinion or perhaps they do not share the same variety of goldenrod.

With a late season nectar flow, the increase nucleus can be made up as a method of swarm management in the mid to late Spring, and increase colonies can continue to be made throughout the season. As the goldenrod nectar flow approaches, the increase units are simply made stronger The goal is to have a strong population of worker bees ready to forage the moment the nectar flow begins. Populations can be monitored during the Summer to make sure the bees are building to an adequate number If not, the colony may be fed. Or the colony may become too strong and produce late season swarms. These colonies should be reduced in strength by removing frames of brood and bees and making more increase colonies!

Beekeeping would be very boring if one management plan worked for every beekeeper But the challenge for the new beekeeper is to learn 1) What are your local floral sources, and 2) How can you best manage your bees to benefit from these flows.

A simple increase colony

In June over-wintered colonies should be plenty strong to make one or more increase colonies from them. Here are some simple steps for you to follow if this is your first time making a new beehive from an existing one:

1 Find, purchase and prepare one box for the bees. This might be a three to six frame nucleus, an 8-frame hive, or a 10-frame hive. The box and frame size may be deep or shallow size. But, remember this *must* be the size of the brood *frames* used in the colony you are taking bees and brood from.

2. Go to your apiary For many sideline beekeepers that means you need to walk out to the backyard. If you have 10 colonies, I bet three or four are doing really well, three or four seem to want to catch up with the first group and the rest are sitting there, and don't seem to know the nectar flow is underway Go to one of those colonies that will not produce a honey crop this season.

3. Smoke and enter the hive, inspecting frame by frame, searching for the queen. Since it is June there is a strong likelihood the colony is undergoing swarming and there may be queen cells. If they are sealed, the old queen probably left with the first swarm.

4. Select two frames for the new hive. One should be a frame of *sealed* brood where the center of the brood frame has emerging workers. These bees will rapidly emerge and help populate the hive. The second frame should be a brood frame with good food reserves – both pollen and nectar – in the corners of the frames. Put the frames, including the bees, into the new box. Add more bees from the brood combs if you feel the bees do not cover the frames of brood. No returning forages will be added to the bee population.

5. If you have not found the queen, carefully check the frames for the queen bee. If you have found the queen, carefully check the frames for a *second* queen.

Latner had harvested queens the day before this picture was taken. During that visit any equalization of strength was done. We visited the nucs and added queen cells that were about one day away from emergence. The jar was removed from the feed-hole, the frames separated slightly, and the queen cell carefully placed between the frames so the tip of the cell was not obstructed and any part of the cell was pinched. The colony was not opened and the bees were not disturbed except for removing the jar and giving the bees a light puff of smoke.

6. Move the box to its permanent location. This may be an outyard or you may keep it in the yard. If you keep the increase colony in the same yard, I strongly suggest you do two things to keep the bee population high: First, add a shake or two of bees from brood frames so you are adding young, never-been-flown-worker bees to your increase hive. Second, reduce the entrance with *green* grass so the bees cannot get out until late in the day This will help keep some of the older bees in the hive, but many will go home the next day or two. This is why you need to have plenty of young bees emerging from the frames.

7 The day after you establish the increase nucleus, add a ripe queen cell from a colony that is undergoing swarming, or purchased from another beekeeper (someone like Ray Latner, as shown in the photos). Or install a laying queen from another beekeeper when you make up the unit, using a push-in or timed-release cage. Glance at the bee population to make sure bees cover the brood. If not, do this over again.

Ray Latner uses a simple incubator constructed from a wood box. He has added racks to hold the cell bars that hold the queen cells. A light bulb keeps the temperature around 92-93 degrees F. A pan of water keeps the humdity at an acceptable level for the cells. Not shown is the glass top, hinged to the box, which has a glass or plexigas window that allows Latner to check the temperature of the box without opening it. The entire incubator is kept in the warehouse where customers are able to pick up cells they have ordered in advance. If the cells are caged so the queens cannot kill each other, the virgin queens may be used in mating nucleus hives if their release is delayed using a candy plug in a queen cage.

These nucleus hives were transported from Florida to Texas by Jerry Latner, Ray's father. Jerry is the Dadant branch manager in Florida. The demand for nucleus hives in the spring of 2008 has been tremendous, sparked in part by the tremendous publicity the honey bee has received due to Colony Collapse Disorder. The Latners, father and son, and I discussed how long this national trend toward many new beekeepers will continue. While it would be tremendous to replace the many beekeepers lost over the past 20 years due to parasitic mites, hive beetles and African bees, the challenge of offering education and support is critical. The use of late Spring and Summer nucleus hives will provide one way of providing bees to new beekeepers without the pressure of early Spring nucleus or package bee production.

8. Four to seven days after the queen cell was introduced, do a minimum check of the hive to see if there are eggs and open brood in the bottom of the cells. If this is the case, you probably moved a laying queen into the hive. There has not been enough time for the queen to emerge, mate and lay eggs. If you find this, the colony the brood and bees were taken from will probably have a bunch of queen cells under construction. Now you have something else to manage.

9. Between 18 to 28 days after the queen was added, check the colony for a laying queen. She should have a nice pattern and be laying nicely Check for stored food and feed if necessary during the nucleus formation period.

10. Manage the colony as either a nucleus that will stay a nucleus all Summer and into the Winter, or manage the colony for a fall nectar flow, moving the bees and frames into 10 frame equipment in about a month as the brood emerges. Remember, bees can starve during the Summer, and often do. The cost of a few pounds of sugar is much less than any of the components of this hive are worth.

Keep after the bees and watch them as you can. That queen may be wonderful, or the bees she produces may be mean and lazy. You can decide what to do with them.

Good luck. BC

Dr. Connor is teaching queen rearing in Michigan and New England this Summer. One program that does not require pre-registration will be offered by the Connecticut beekeepers Association at their annual picnic on June 14th in Hamden, CT Dr. Connor's books are offered for sale through many bee supply dealers, and at his website, www.wicwas.com. A Pay Pal store is available on the site for those who want to have the convenience of purchase via this option.

The Honibe Story

No More Sticky Fingers

Kathy Birt

Getting honey into a compact, dry state has been a 10-year quest for John Rowe of Montague, Prince Edward Island.

But it has been a quest that has proven fruitful to the Island entrepreneur, who has a variety of business ventures on the go. He achieved sweet success early this year with the launching of his Honibe website. Almost immediately requests poured in for the tiny honeycomb shaped packets from the far corners of the globe. Marketing of the dry "no sticky fingers" honey to places like New Zealand, Australia, throughout Europe, across North America and even into Israel was much more than Rowe hoped for his Honey Drops.

Despite a delay in packaging, Rowe and his father, John Senior, began to bulk fill all those orders. Customers were eager to try the honey that can be dissolved in a cup of tea or coffee as a sweetener His largest order to date was from a beekeeper in Ohio that ordered 250 of the natural honey and 250 of a lemon-flavored packet. Sales in early spring spiked throughout the US, due to a barrage of publicity via food publications and TV cooking shows.

Rowe's father has been a big influence on his working life, getting him involved in a variety of family businesses. "Both my parents were school teachers and I've been in partnership with my father since I was 10, working at some business or another every Summer "

His grandparents and great grandparents were in agriculture, and he believes using PEI honey is a natural progression to that long history and what he terms, "My love of honey."

Rowe put his economics education to work for a number of years in software sales in British Columbia. He also had a company in the U.S. manufacturing computer accessories, but believes 911 upended that retail market.

In 2004 he moved back to his home province still intent on finding a way to market dry honey That's when he took all his research to the PEI Food Technology Center in Charlottetown and hired scientists to help. "There was dry honey out there, but it was all candied, so there was sugar added. It's also available in lozenge's," he says, and adds that there was nothing existing that was completely pure, dry honey

Financially, Rowe says, yes, there was some investment required for the traveling and research. But now shipping on a daily basis it has become the venture (adventure) of his working career

The inspiration that got him earnestly pursuing and researching what types of production methods existed for achieving the end result was a couple of hiking trips while living in British Columbia. "I went on a camping trip and put a jar of honey in my backpack, thinking it would be safe," he explains and adds that he ate the sweet, golden liquid for energy while hiking.

Inevitably the jar broke and his camping supplies were left in a sticky mess. Determined to try one more time, he took a plastic honey bear on his next camping trip. "Apparently I'm too rough with my gear, because I broke that one as well – the top popped off."

Believing firmly that there had to be a better way, Rowe set out to find it in 1998. "I discovered that many people had tried before me and failed. There are a lot of challenges in working with honey because of its properties – it is hydroscopic, which means when it sits exposed to air it attracts moisture (from that air). Honey naturally wants to be in a liquid state," says Rowe.

Hence, a good reason for the honey lover to make sure the tiny packets are tightly sealed. "What we had to do was remove the moisture – and we did. It is completely natural with no additives," he says.

He is careful not to share the process. "It is proprietary and I can't share that. But I know through my research, that people around the world tried and failed. We are the first ones to do it."

His choice of Island Gold Honey produced by beekeeper John Burhoe came about when the two had side-by-side booths at the provincial exhibition in 2004. "We hit it off and I told him about my project and he offered to help in any way he could."

With the product now on store shelves in PEI priced at $11 99 for 20 packets, Rowe says having achieved that goal, he now wants to further the reputation of PEI (honey) producers. "Maybe some day we'll (he and John Senior) become producers ourselves." BC

Kathy Birt is a free lance agriculture writer living on PEI, Canada.

All The Buzzz in...

Bonjour Bodacious Bee Buddies,

Do you ever get tongue tied? Send me your bee related tongue twisters. I always love hearing from you.

Bee B. Queen

Here's one for you.

Particularly popular pollen produces plenty pleasing plants.

What is Palynology?

Why the study of pollen of course.

Elayna Creech, age 7, TN

"A lady with a fly swatter got too close to a beehive and the guard bees are charging her."

Nicholas Walrod, age 7, MS

Pollen Questions and Answers

What is pollen?

Plants produce pollen. Pollen helps to make seeds. When a honey bee, another insect or wind carries pollen from one flower to another flower of the same kind of plant, seeds are produced. If you do not have a seed, can you have another plant? I'm afraid not. This important process is called pollination.

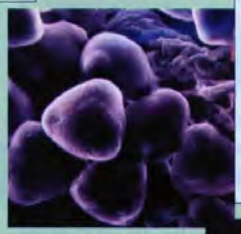
Why Do Bees Collect Pollen?

One word - food. Bees eat pollen and honey to survive. Pollen is full of protein and has some vitamins, minerals and fats the bees need. In other words pollen is the protein and honey is the carbohydrades. Kind of like our meat (protein) and potatoes (carbohydrates).

One apple blossom makes 100,000 grains of pollen!

How Big is a Grain of Pollen?

How small is more like it. A grain of pollen can only be seen under a special microscope. We can see the pollen pellet the bees collect and carry in their pollen basket.



Pollen magnified using a scanning electron microscope.

How many grains of pollen in one pellet?

One pollen pellet from a bee's pollen basket contains over two million pollen grains.

Go into your kitchen and find a teaspoon. If you fill it with pollen, there would be about 2.5 billion grains. The amount of time it would take a bee to collect that pollen would be the same as if you went to school for eight weeks and did nothing but collect pollen all day.

Bee kid's corner

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

Bees

Bees live in trees,
They fly with the greatest of ease.
They make sweet honey,
It doesn't taste funny.
The honey is a treat,
It's not too sweet.
The bee's sting then they die,
So they can't fly.
Get stung by a bee,
It could swell to the size of your knee.
Bees pollinate flowers,
For hours and hours.
Humans take the honey,
And sell it for money.
If the bees go quiet,
We'll change our diet.
We need to help the bees,
Or we'll lose some trees.
As you can see,
I will always care for the bees.

Ruth McGaughey, age 11, CO

Pollination Power

Fly from blackberry blossom to blackberry blossom picking up pollen and leaving pollen behind.

Finger Puppets

Make a bee for each finger.
Then let your fingers do the flying.
Find some flowers to pollinate.

1 Cut white or yellow paper in strips about 1½ inches wide and 2½ inches long.

2. Draw stripes long ways. Draw eyes and antennae.

3. Tape the paper to form a tube.

4. Cut out tissue paper wings and glue on the top of the paper tube.

5. An instant bee!

Sweet Research

We have a young bee researcher in our mist. This year Logan Hopper did his fourth science project about bees. It was chosen the best in his school. Past projects found their way to the state fair. In July, Logan will find out if this year's experiment will go on to the state fair Good luck Logan.

Logan wanted to find out which sweetener honey bees preferred. He did a great job setting up his experiment and kept very good records. Amid the procedure, graphs, and charts, Logan concluded that the bees preferred sugar water over honey and high fructose corn syrup used in soda pop.

Logan Hopper, age 11, keeps bees in Missouri with his dad who is a 4-H project leader with a focus on honey bees. Keep up the great work Logan!

Beecome a Bee Buddy

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

Name: _____

Address: _____

City, State, Zip code _____

Age: _____ Birthday: _____

E-mail (optional) _____

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

Sustainable Beekeeping

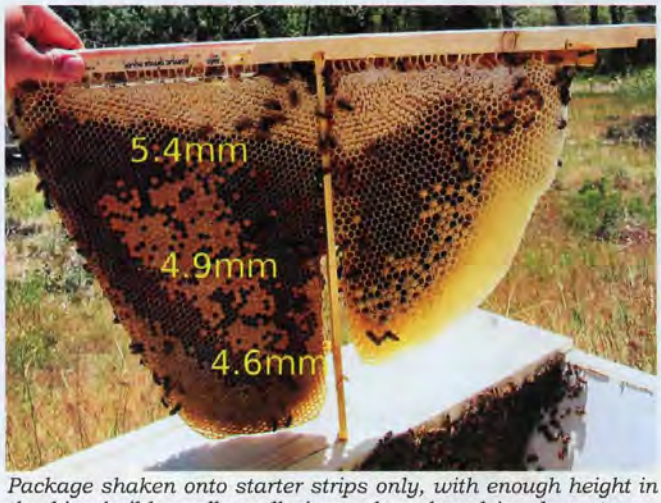
Erik Osterlund

You Can Keep Bees Without Chemicals

Erik Osterlund (photo by Bo Malmgren)

It's not an overstatement to say the beekeeping industry is in jeopardy around the world. Bees are dying. From every corner of the world alarm reports are reaching us... No, wait a minute! That's not entirely true. From *most* but not all places where our type of honey bee (*Apis mellifera*) are kept, is more correct. That gives us some hope that there are places to learn from, on how to save our beekeeping industry. The honey bee as a species is certainly not at danger, not at all. But we humans, we have a problem. And when we have a problem, almost always we have created it ourselves. So, what we need is a good analysis of the situation and how we arrived there. But that's already been done by many The answer is not still out there. It's down here. We know *Varroa* is stimulating virus to reproduce and attack our bees. We know pollen is essential for strong bees and good immune systems. We know plant protection chemicals kill and weaken insects, including bees. We know Apistan®, CheckMite®, Amitraz and other chemicals poison the wax and life environment of the bees. We know we pour acids on the poor bees. We know cell size is bigger today then when wax foundation was first introduced by A.I. Root in 1876. We know we have decreased the genetic variation in our bee stocks through too much inbreeding and too few queen mothers in commercial queen rearing. We know the bees can stand a lot we do to them, but now we know it's become too much. When will we ever learn? When man didn't interfere with the bees they survived and managed well enough. And they managed man's interference quite well for many years. Now we have to give the bees back more of their natural way of life, and reduce the stress factors we've given them:

1 Go back to five cells to the inch, at least, on wax foundation.
2. Really try to give your bees a good pollen and nectar supply
3. Avoid all kinds of poisonous chemicals.
4. Be sure to avoid inbreeding, but focus on survivors.



Package shaken onto starter strips only, with enough height in the hive build smaller cell sizes where brood is, closer to entrance and bottom, and bigger where honey is. (Photo by Dennis Murrell.)

1. GO BACK IN CELL SIZE

Why so much fuss about this? It's so easy Read the old bee books. Follow what's happened. It's clear Already in 1888 Frank Cheshire in England wrote he was the only one arguing against enlarging the honey bee. No scientific backup for this enlargement has been shown. Roy Grout in his PhD thesis in the 30s showed there was no gain with doing so. Can we lose anything giving the bees back what they wanted when foundation started in 1876? Even today given the right help the bees will build on their own what they did back then. Look here: http://www.bwrangler.com/bee/ncom.htm.

Don't come up with the argument there is no scientific study showing it's the solution against *Varroa*. It's not *the* solution. There's more to it. Show me instead why we shouldn't go back. You say it's too expensive. No, it's too expensive not to. Look at all the dead colonies and look at those that have gone back in size, besides the Lusby's, there's http://www.bushfarms.com/beesnaturalcell.htm; http://www.lapalmamiel.com/

Here's some positive studies: http://www scientificbeekeeping.com/index.php?option=com_content&task=view&id=51, http://www.honeysupercell.com/downloads/Commercial%20Bkpg%20in%20Norway.pdf

But you say there are some negative studies, too. Yes, there are. Here's one: http://video.google.com/videoplay?docid=3081789258595842918.

What's in common for the negative tests is that the control colonies and the test colonies are kept in the same apiary Also, tests are run for only part of a season or for

Raymond Cooper inspecting one of his thriving colonies in Spring 2007 (Photo by Erik Osterlund)

A thriving colony on Open Bottom Board with John Hoffman. (Photo by John Hoffman)

only one season – very seldom two or more seasons. And sometimes survival is not studied at all but just the short time reproduction rate of the mite.

Why do we even need control colonies in small cell size tests? At least they shouldn't be in the same apiary We've known for years that unselected bees on big cell comb if not treated will sooner or later die. And in 1990-92 it was shown by several that mite populations in hives in the same apiary even out in late season due to robbing and drifting between colonies (Arhus Aasne, Ingemar Fries, Henrik Hansen, Korpela Seppo, *Journal of Apicultural Research* 31 (3/4): 157 164 (1992): *Varroa Jacobsoni Oud.* "In cold climates: population growth, winter mortality and influence of the survival of honey bee colonies." After treating five colonies of group one in the Autumn of 1990, the mite populations in treated colonies equalized during late Summer and Autumn 1991 probably because of drifting and robbing as suggested by Sakofski et al (1990), Büchler and Hoffmann (1991) and Greatti et al (1992)).

What we learn from this is that whatever we do with our bees it's best doing it in the whole area. At least in the whole apiary Don't try a few colonies here and there among a large apiary and expect a clear cut result. Or a few VSH/Primorski/Weaver/Kefuss or whatever selected bees among a big crowd of otherwise unselected bee colonies. When you begin the path in the spirit of the Brotherhood of Better Beekeepers, always convert at least *one whole apiary* at a time and as far away as possible from bad bees. But if you're a small beekeeper in the midst of many others? Do as good as you can and consider using open or screened bottom boards and powdered sugar as well.

Five cells to the inch is an average for all cell sizes in a colony Brood cell sizes are smaller, and honey storage cell sizes are bigger We know brood area cell size are even smaller than five cells to the inch (5.1 mm) which is why Dee Lusby and others have gone down to 4.9 mm cell size.

It's interesting that the African bee, known to build 4.7 5.0 mm cell size in their brood area, have never experienced heavy colony losses due to *Varroa*, and has developed a good tolerance of the mite. In South America and now also in South Africa, see http://upetd.up.ac.za/thesis/available/etd-08082007 153050/unrestricted/dissertation.pdf

Today it's easy to get your bees back to small cell size. You can purchase plastic fully drawn 4.9 cell size combs from Honey Super Cell: http://www.honeysupercell.com/ Or you can shift to plastic (Mannlake PF100 or PF120: http://www.mannlakeltd.com/catalog/page10.html) or wax foundation (Dadant: https://www.dadant.com/catalog/).

Raymond Cooper

Raymond Cooper's bees have been successful because his bees dominate his area around Iola, Kansas. He's not using any drugs on his 1800 colonies, not even Terramycin. When he spots any American Foulbrood he takes it to a treatment apiary and treats it with Crisco and sugar That's it. He's still giving his bees a spoonful of that Crisco/sugar mix in the Spring and in Autumn since the days of Tracheal mite problems. He's dominating the area with his setup of bees on 5.1 mm cell size. And his wax is not loaded with poison. He's making his own foundation. He's even making foundation making equipment.

But it's not difficult to spot *Varroa* mites in his hives and as the mites go for the drones in first place, he has problems getting good matings for his virgin queens. But winter losses are minimal – only 5-10%.

And he harvests good crops normally Though too much rain stops all bees, even small cell bees. Nor is he using any particular strain selected for *Varroa* resistance. He's keen though on using queens that produce a lot of brood.

2. A GOOD FOOD SUPPLY

The proteins in our bodies are built from aminoacids in the food we eat. Pollen is the source for aminoacids for bees. Place your beeyards where the bees have access to good pollen sources. Watch out for the weather so it

Randy Oliver's 15-second method. Take away the inner cover, put on a screen frame with 1/8" mesh on the brood boxes. Pour one cup of powdered sugar for each brood box, without breaking apart the brood boxes. Brush the sugar evenly through the mesh. Take away the mesh and brush down from the top bars. Put on eventual excluder, super, inner and outer cover. Preferably you have a screened bottom board, or open, on the hive. (Photo by Randy Oliver)

Myron Kropf Winters his hives in single deep boxes four together insulated with a sheet of styrofoam or something similar. A good small cell size colony in November 2005 ready for Winter. Myron takes them down to a single box to avoid having the queens laying in combs with other cell sizes than 4.9 mm. He gets 4.9 foundation well drawn in brood boxes only in the beginning of the season. So it takes some time to create a good supply of drawn brood combs. But he's constantly selecting for colonies drawing 4.9 longer into the season. (Photo by Erik Osterlund)

Pollen trap of Myron Kropf's design. The ventilation metal sheet has 3/16" holes for the bees to go through. For his small bees that's perfect. In the back there's four somewhat bigger holes for drones and queens. In front there's also a small extra entrance through which the workers pass and bring in pollen to the colony. When the flow is strong this little entrance is not enough, so the bees go through the trap. (Photo by Erik Osterlund)

doesn't hinder the bees from getting pollen, especially in Spring after a tough period of no flow. The other important period is when bees are produced that will go into the next tough period without flow, often in August. Maybe pollen feeding is a good idea sometimes. Why not collect pollen when it's easy to collect and give it back at proper times? No pollen substitute is as good as real pollen.

Also there are many indications that you can't substitute honey for sugar either The bees need a good part of their honey for survival until next season. We don't have HFCS (High Fructose Corn Syrup) in Sweden. Maybe we should be glad for that. If you decide you have to use sugar, sucrose is better

3. POISONOUS STUFF

Chemicals that hinder normal body processes in the bees are of course stressing them and make it difficult to survive. These chemicals called miticides (including organic acids), are used for killing mites and thus helping the bees. But they also are more or less harmful to the bees. The important thing with these drugs is that the target bugs should be killed much easier than the host bug (the bee) should be harmed.

But the host doesn't go untouched. There is a negative impact on the bees too, more so with acids than correctly used phyretroids (Apistan). But acids don't end up in wax. Miticides are not the only chemicals used. Antibiotics against AFB and Nosema are others.

Chemicals used to protect plant crops are others that end up in the bee colony too. Together all these chemicals make up a mix more dangerous than each one on its own. The wax collects many of them. The drugs are released slowly to the bees and present constant stress, disrupting their normal way of functioning. That's why plastic foundation may be a good alternative these days. Mann Lake sells one that can be used by small beekeepers – http://www.mannlakeltd.com/catalog/page10.html. It is 4.95 mm cell size. Cappings wax contains much less chemical residue than the comb it's taken from. But how do you get foundation made from your own cappings? Maybe you can mold or mill it yourself.

Open bottom boards (OBB) and Screened bottom boards (SBB) do not leave any residues with the bees, and they help in fighting *Varroa*. Again, you have to get all hives in the beeyard equipped with them, rather than only a small part to get best effect. That may well be why tests with them have given somewhat differing results.

You're the one to decide

Only a few may be able to just stop any kind of treatment. It is difficult. Here's some advice. Others have advice, too, the same, or different. We don't take responsibility (we can't) for our advice in your operation. You are the one who takes the consequences of your actions. So I encourage you to be sure to make your decisions after a thorough consideration of all the advice you've acquired. If you decide you have to use something in your hives to help your bees consider powdered sugar It leaves no residues, is effective relatively quick if used as Randy Oliver does: http://www.scientificbeekeeping.com//index.php?option=com_content&task=view&id=31&Itemid=40&limit=1&limitstart=6 or the Brissons: http://www countryrubes.com/instructionspage4.html.

4. BREED SURVIVORS WITH GENETIC VARIATION

There are many today breeding honey bees that are resistant or tolerant to *Varroa*. The first one giving a recipe for doing it was Eric H. Erickson at the Tucson Lab (Erickson, E.H., Hines, L.H., and Atmowidjojo, A.H., 2000. Producing *Varroa*-tolerant Honey Bees from Locally Adapted Stock: A Recipe, *Am. Bee J.* 140:659-661 The bees they used were partly on 5.1 mm cellsize.) John Kefuss in France (and Chile) was one of the first with the "Live and let die" concept. His K-Star strain hasn't tasted miticides for 15 years. You can reach him at jkefussbees@wanadoo.fr More than 10 years ago B Weavers started their tolerance breeding. Today they haven't used any miticides on their own strains for many years. http://www beeweaver.com/home.php?cat=1 Kirk Webster in Vermont, Bob Brachmann in New York State, and Olympic Wilderness Apiaries (http://www.owa.cc) are others that have come a long way in breeding tolerant bees. These three use Primorski (Russian) bees as a part in their breeding programs. All of these five still use large cell size.

Today, using, for example HoneySuperCell, taking your bees down to small cell size for survival is quicker than breeding for survival on large cell.

You eventually need the kind of local stock that is adapted to your environment for long term sustainable beekeeping. For obtaining what you need, first get your bees down to small cell size in an area where you will mate your virgins. The easiest way of selection together with keeping a good genetic variation is just making splits from your good colonies letting them raise their own queens and mate in this area dominant with your bees which do not taste drugs or chemicals. Only the strongest drones will mate with your virgins. In the colonies that don't do well or produce enough honey you shift the queens. Perhaps you will decide to use powdered sugar on some. To have queens for shifting you need to breed some from your good survivors and honey producers that are easy to handle.

Myron Kropf

This is the way Myron Kropf in Middletown, Missouri developed his beekeeping business. He didn't want to use any chemicals (including acids or essential oils) in his operation when he started as a beekeeper But half of his bees died every Winter Then he got to know about small cell size and began his journey in the Brotherhood of Better Beekeepers. He has ended up building his own 4.9 mill. He also bought some Primorski queens and combined with his local Italians.

He has gone from buying a lot of packages each year to selling packages, as well as producing pollen and honey from his now 200 colony operation. (And he's producing pollen traps too, which have smaller trapping holes than other traps for his smaller bees, 3/16" in ventilation metal sheets.) The Winter mortality is down to normal. Those apiaries in which he has experienced somewhat higher death rates are close to other beekeepers.

MY OWN BREEDING ADVENTURE

My breeding adventure started as soon as I became a beekeeper in 1976. In 1983 I visited Brother Adam and his Buckfast bees for the first time. And in 1989 I went with three others on a trip to the wilderness of western Kenya

An average Swedish beekeeper, Thore Harnkloo, with thriving Elgon bees on small cell size, free of drugs. (Photo by Erik Osterlund)

to the mountains. We wanted to bring home breeding material of *Apis mellifera monticola* to combine with our Swedish bees and hopefully breed more *Varroa* tolerant bees. You can read about this trip here: http://beesource.com/pov/osterlund/index.htm and more about my breeding efforts on http://elgon.se.

That was long before I got the mite in my own yards. At last they have arrived. Probably some years ago, but they were only detected last year. (No sign of bad *Varroa* effects have been seen except a few bees with crippled wings in one hive, which by the way have made it well through winter in strong shape.) Very few Winter losses in the Winter of 2007-08. In the meantime before my bees got the mite other beekeepers have helped as test hosts to the extent they themselves have decided. You can read about one of them, Poul-Erik Karlsen, on the beesource site. http://beesource.com/pov/osterlund/abjmar2001.htm. He still keeps Elgon bees without drugs, on 5.1 mm cell size. Beekeeper B in that article is Leif Hjalmarsson in southern Sweden. He has an isolated apiary, on big cell size, now for 10 years without drugs. Well, he did a part of the colonies with Apistan® two years in a row. Two colonies were part of a test and this caused these colonies and the ones placed close to them to be treated.

Thore Harnkloo has his bees mainly in an isolated forest area. When he started with Elgon bees 10 years ago he had about 80 colonies. In 1999 mites were detected in his colonies. Now he has 60 colonies. He hasn't used any drug or treatment except for in Spring 2003 in about six colonies. They were the worst affected in two apiaries closer to apiaries of other beekeepers. His Elgon bees are on 4.9 and 5.1 mm cell size in the brood area.

DON'T GIVE UP

Your country needs you! Don't give up beekeeping! Discuss with your friends how to help yourself and others. Sometimes it helps to be somewhat politically incorrect. And share what works with us all, in bee clubs, on the internet and in magazines. BC

Erik Osterlund is the editor of the Swedish bee journal Bitidningen *and runs 200 colonies.*

NATURAL BEEKEEPING

There are numerous non-toxic alternatives that offer solutions for healthy hives.

Ross Conrad

Varroa Mites. After first being identified within the United States in 1987, they quickly multiplied and spread out across America to become one of the biggest challenges U.S. beekeepers face today The initial response from the beekeeping industry was to follow the path other agricultural commodity groups had trod, and turn to chemicals to control these damaging pests. History has proven however, that whenever we use chemicals to control insect pests, the insects always develop resistance to the chemicals forcing us to use larger doses of insecticide, or resort to chemical alternatives that attack the target organism differently and are often more toxic. History simply repeated itself when the use of Apistan (fluvalinate) quickly led to fluvalinate resistant mites, ushering in Checkmite+ (coumaphos, an active ingredient in VX nerve gas) which *Varroa* also began to tolerate, thus leading to the latest chemical panacea to be promoted: Hivastan (fenpyroximate). Rather than continue on this chemical treadmill, there are numerous non-toxic alternatives that are available that offer longer-term solutions for healthy hives. Over the next few months, we will cover some of these options.

Varroa Reproduction and Population Growth

One avenue that we can utilize in helping us to repress the *Varroa* population within the colony takes advantage of the fact that the *Varroa* reproductive cycle is intimately tied to the reproductive cycle of the honey bee. Once a bee larva (male or female) completely covers the bottom of its birthing cell, the female *Varroa* will be attracted to the cell. When a mite is carried by a bee close to such a cell, the mite will release itself from the bee and crawl down into the cell, immersing itself in the brood food at the bottom of the cell. This period is estimated to be 40-50 hours for drone brood and 15-20 hours for worker brood.[1] At least one stimulus that informs the mite which cells are ready for reproduction are pheromones given off by the developing brood in the form of methyl palmatate.[2] Once the cell is capped and the mite starts laying eggs she will typically have time to raise to maturity one-to-two daughters on worker brood and two-to-three daughters on drone brood.

The fact that the Varroa *mite's reproductive cycle is dependent upon the honey bee's reproductive cycle makes the mite vulnerable.*

While the mites do not have a very high reproductive rate individually, their offspring tend to have a high survival rate when they are successfully raised. As a result, there is a geometric growth that occurs in the *Varroa* population of a hive over the course of the season. This is very similar to the old riddle: Would you rather have a million dollars, or receive one cent that is doubled every day for the roughly 24 days that it takes for a drone to develop from egg to adult? If you chose the penny that is doubled every day for 24 days, you would end up with a lot more than a million dollars in the end due to the geometric growth that occurs from the regular doubling of the initial amount. It is a similar geometric growth that is responsible for the overwhelming population of *Varroa* destructor that, when combined with the queen's natural tendency to decrease egg laying with the onset of Autumn, causes colonies to collapse at the end of the season unless something slows down the *Varroa* population explosion.

Interrupting the mite's reproductive cycle seems to be one of the ways that various races of Apis mellifera such as the Russian bees or Africanized honey bees are able to naturally exhibit a level of *Varroa* tolerance. The Russian and Africanized bee stocks seem more likely to throw off a swarm, or supersede their queen, than their Italian or Carniolan cousins for example. As a result, they naturally interrupt the geometric growth of their *Varroa* populations, while at the same time dividing the total *Varroa* population in two; some staying with the parent colony and the rest being carried with the swarm to the newly established location. This interruption of the mite's reproductive cycle slows down the build up of mites and buys the colony more time.

The Nucleus Colony (An Artificial Swarm)

As beekeepers, we can mimic the swarm's natural form of mite suppression by making nucleus colonies from our strongest hives and letting the bees raise their own queens from the unhatched eggs we provide in the nuc. While helping to suppress the growth rate of the mite population within your colonies, the nuc-making process reduces swarming pressure on the colony, while at the same time allowing you to systematically improve the

quality of your stock through the propagation of the genetics from your best and strongest hives. Such locally raised bees generated from hives that have proven themselves by thriving in your particular geographical location while exposed to your unique management practices, provide the greatest opportunity for future success.

This method of adding colonies to your bee yard also has the economic advantage of requiring no additional cash outlays for packages or queens. Problems with queen installation and acceptance are eliminated. As long as the nucleus colony is created properly, your primary concern will be whether the virgin queen will return from her nuptial mating flight without getting eaten by a bird!

In Northern locations concerns about inadvertently importing Africanized Honey Bee (AHB) genetics through the purchase of packaged bees and queens from southern or western breeders located in AHB areas makes locally produced queens all that much more attractive.

Making The Nuc

Although you can purchase special equipment specifically designed for making nucleus colonies, a basic nuc can be easily made by utilizing the standard equipment you already own. In order to work with the bee's natural swarming tendency and thereby increase your chances of your nuc successfully raising a viable queen, it is best to time nuc making so it coincides with the area's first major honey flow in the Spring. This way, no additional feeding is typically necessary and the newly created colony has plenty of time during the rest of the season to store away plenty of honey for Winter, and potentially some excess for the beekeeper

Place your empty eight or 10-frame hive body on a bottom board and fill it with three to five frames containing bees, eggs, sealed brood, honey, and pollen taken from the parent colony Since most of the frames you will be transferring into the nuc will be from the brood nest, allowing the bees that are naturally crawling around on each frame to be transferred into the nuc along with the frame helps ensure that there are plenty of young nurse bees to aid in the raising of the new queen. Just be sure to leave the queen in the parent colony.

Only one of the frames transferred into the nuc must contain at least a handful of fertilized unhatched eggs. While it doesn't hurt to start with a lot more fertilized eggs in your nuc, the bees should be given at least a dozen or so in order to have enough "raw material" to successfully raise a queen. As long as these eggs are taken from a queen-right colony and are sitting in worker-sized comb, you can be relatively sure that the eggs have been fertilized and were not created by a laying worker and will hatch into drones. I like to position the eggs between two frames of sealed worker brood. This ensures that the frame with the eggs is positioned in the middle of the cluster and any queen cells that are created will be located in the warmest part of the hive. If the amount of pollen and honey stored in these three frames is minimal, then sandwiching the eggs and brood with an additional frame or two containing honey and pollen and then fill out the rest of your eight or 10-frame hive body with frames of either foundation or drawn comb.

If the nuc being created is immediately moved to another location two or more miles away from the parent

The easiest way to capture a swarm: Hive it before it leaves the parent colony.

As long as they have some unhatched fertilized worker eggs to work with, bees that find themselves without a queen will raise one in short order by modifying the cell within which the worker egg has been laid.

Moving colonies (or nucs) is much more fun for both the bees and the beekeeper when all the entrances are first sealed off and the hive components are either strapped or stapled together.

colony, you only have to top your nascent colony with an inner and outer cover, reduce the entrance to just a small opening in order to reduce robbing. If the nucleus colony will be left in the same apiary as the hive from which it was made, two or three frames of bees will have to be shaken into the nuc before being covered and having the entrance reduced. These frames need to be full of brood comb so that the majority of the additional bees being shaken into the nuc are young bees that have yet to go on their initial flights outside the hive. This step is crucial in order to prevent massive depopulation of the nuc as the older foraging bees acclimated to the original hive location return to the parent colony following their next foraging trip. Once the nucs have been set up, I like to wait 30 days for the new queen to hatch, go on her nuptial mating flight and begin laying. Open up the hive too early and you run the risk of damaging unhatched queen cells or not being able to tell if things are progressing as planned due to an absence of freshly laid eggs.

Following Up

It is during the new queen's formative period that the *Varroa* reproductive cycle will come to a halt with no new eggs being layed, and a minimal amount of young brood to infest. After waiting a month, the hive containing the original queen will not have experienced a disruption of its brood-rearing, and should contain frames with sealed worker brood. This hive will likely have filled the empty frames with honey, pollen or brood, or drawn out and filled the foundation you had given them to replace the frames taken when making the nuc and will be in need of additional room. Meanwhile, upon its initial 30-day inspection, the nuc will not contain sealed brood but should have a newly mated queen that is laying her first eggs. It is not necessary to find the queen to confirm she is there. If unhatched eggs are present, you can feel secure in knowing that your efforts have been successful without actually seeing the queen.

Care must be taken however not to confuse a laying worker, or non-fertile queen, with a successfully mated queen who is just learning the ropes. On numerous occasions I have observed that the first eggs laid by a new queen may look similar to those of a drone-laying queen or worker. Eggs flopped over on their sides or not positioned in the apex at the back of the cell, as well as more than one egg in a cell, are all part of the learning curve the new queen may go through as she grows into her role within the hive and figures out the nuances of her plumbing. It is the frequency at which such instances are discovered that helps the beekeeper distinguish between the hive with a mated queen and the one with a drone layer or laying worker. Cells with mislaid eggs will be the norm when dealing with the latter, rather than the exception occurring early in the egg-laying career of the former

Beekeeping has entered a new era. Chemically resistant *Varroa* mites, new diseases and more virulent strains of old diseases, small hive beetles, changing weather patterns, and Colony Collapse Disorder are just some of the new challenges and stresses the honey bee must now contend with. This new era calls for new approaches to caring for and managing these miraculous insects. Greater consideration needs to be given to management styles that focus on techniques that minimize or eliminate additional stress on the hive rather than create new forms of stress that the bees must deal with. The new era will emphasize the importance of working with the bees' natural instincts and biological processes rather than forcing our will on them through dominating management techniques. Using chemicals to try to control *Varroa* populations while exposing the bees to the stress of the sub-lethal effects of such chemicals, allowing residue buildup in the combs, and fostering chemical resistance among the mites is part of the old, domineering way of doing things.

Ultimately, a future where the honey bee can not survive and flourish without constant and regular intervention on the part of the beekeeper is not much of a future at all. We need to nurture long-term solutions that allow the honey bee and the *Varroa* mite to co-exist without the host being destroyed by its parasitic hive mate. While nuc making alone is not typically enough to keep a hive from eventually succumbing to the effects of *Varroatosis*, it is part of an overall program of gradual improvement of colony genetics that encourages those hives that show the most tolerance and ability to thrive despite the presence of *Varroa*, to reproduce and keep their traits alive and evolving. As a result, the work of bee breeders and backyard beekeepers who are striving to propagate new strains of stronger more robust colonies of bees in the face of the *Varroa* mite is among the most important work going on in beekeeping today. BC

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References:

[1]Keith S. Delaplane, Thomas C. Webster, *Mites of the Honey Bee,* Dadant & Sons, Hamilton, IL, pg. 137

[2]S. Hart, *"Baby Bee Odor Lures Cradle-robbing Mites,"* Science News (August 12, 1989): 103

Keeping Bees – Past, Present, and Future

All Three Time Phases Are Equally Important

James E Tew

Unlike last year, I presently have some live bees. The Winter season of 2006/2007 was terrible and right about now a year ago I was struggling to recover At that time, my primary task was retrieving dead-outs. Though I still experienced something like a 25 percent loss this past Winter, I did have some colonies survive Winter reasonably well. Plus, a couple of months ago I bought 15 packages so I now have about forty colonies to manage. Though there are the usual duds, most of the surviving colonies have built up nicely So far, so good.

A rare but none-the-less distasteful task I have been assigned is to disassemble one of Ohio State's honey bee labs that has been in operation for many, many years. While I absolutely hate to toss anything, there are truckloads of bee stuff – equipment, publications, research devices, and tools. What's good stuff and what is junk stuff? What to keep and what to toss? It has been painful selection process. I tell you all of this because I was forced to take a beekeeping walk through some of our history To fully understand, you had to be there on those quiet, cold days, looking through old filing cabinets filled with folders that were labeled with the names of bee people now long gone. Strangely, the event has made me a better beekeeper

The Past

I am not a historian, but as I grow older, I appreciate history more and more. Our beekeeping problems today are real and they are serious, but it is important to realize that we have always had pressing issues. Some of our issues are not new at all – they just seem that way.

In 1944, my predecessor, Dr Winston Dunham, wrote an Ohio beekeeping publication[1] in which he clearly stated the common concepts of beekeeping today. His opening sentence was, *"Fundamentally, the most important economic work of honey bees is pollinating plants. Thus, honey and beeswax must be considered by-products of pollination."* Wait a minute! For all of my university years, I have been telling anyone who would listen that pollination – not honey production – was the primary reason for keeping bees. Now I read that, at least, 64 years ago, scientists were already trying to explain that fact. But it is also fact that beekeeping has changed in those same 64 years. Right? I have boldly told my audiences that beekeeping is increasingly an urban/suburban undertaking and no longer is beekeeping primarily an agricultural enterprise. But quite by accident, I stumbled onto the comment, *"The honey bee population of the country is not what it might and should be. In the old days practically every farmer owned a few hives of bees."* The writers, Root and Deyell, in the same article[2] stated *"...wild bees were practically wiped out in some areas and that it will take several years for them to get re-established."* Were they referring to feral honey bee colonies or were they referring to the loss of the native bee population? I can't tell but they were documenting *a bee loss*, of some kind, in July, 1948, 60 years ago. So 60 years ago we already had bee hives leaving the farm and declining bee populations. Those changes really sound like the situation today

And what about our major recent Winter kill percentages? In the Winter of 1935/1936 and 1939/1940 Winter kill percentages were 35% and 30% respectively. It's interesting that a recent report stated that we suffered a 35% Winter kill during the most recent Winter (2007/2008). High Winter kills are not a recent beekeeping event. We've had them before.

Beekeeping has a vast, well-documented history, yet beekeeping has no assigned historian. I can only guess what else is buried in the old beekeeping literature that would be apropos to today's events. Does such information make our present problems any less severe or less important? Absolutely not. A major point that cannot be ignored is that we had so many more beekeepers and bee colonies all those years ago. For instance, in 1957, I can document that Ohio beekeepers managed about 120,000 colonies but today's Ohio beekeepers are managing hardly 20,000 colonies. At least in this state, that's a dramatic decline in colony numbers. Historically, I sense that beekeepers now long gone were just as concerned about their colonies as we are. I sense that they had problems that had no immediate answers and that fact worried them. In this regard, we are no different today than beekeepers now long gone.

The Present

Much of what I am as a beekeeper today is due to what others were as beekeepers before me. But while we should respect the past, we can't live there. Mites, Africanized honey bees, pesticides, and high prices for nearly everything are our present issues that don't have immediate answers. These issues worry us.

We have all been stunned by the unexpected loss of

[1] Dunham, Winston E. 1944. Bees: *Maintenance of Colonies and Control of Colony Population for Honey Production and Pollination.* Bulletin 254, The Ohio State University Agricultural College Extension Service. 32 pp

[2] Root, E.R. and M.J. Deyell. 1948. *Shortage of Bees Reduces Fruit Crop.* Gleanings in Bee Culture. July, 1948. Pp 441-442.

Keeping bees healthy is our biggest present challenge.

bee colonies in recent years. Some of the old, established recommendations don't seem as correct as they once did. I have felt embarrassed and threatened that I had as many bees dying as anyone else. Last year, I came up with a desperation plan for this spring that has worked so far – but not without a financial price.

Deep supering

Last Spring (2007), I only supered with deeps. Happily, my bees had a reasonably good season last year and filled many of those deeps. Last Fall, I left everything on the bees – everything. So all Winter, I had aberrant-looking colonies that were too tall and had an abundance of honey on them. Still, some of them died (25%), no doubt due to mite predation. In one of the strangest events of my career I took about 500 pounds of honey off dead colonies. Many of the surviving colonies still have too much honey on them from last year As the upcoming nectar flow nears, I will strip the honey from them and put empty equipment on the colonies and hope for a good honey crop this year, too.

Why deeps? Because I had used absolutely everything I had to give to the bees the Winter before last. I could only feed sugar or corn syrup and that has never worked well for me. Now I have abundant honey stores – in deep frames – for giving to the packages I bought or honey for giving to other needy colonies. Essentially, I have reserve food that can be used when I and my bees are once again caught short. There are down sides to supering with deeps. First, a full deep is back-breakingly heavy Second, even though the bees had a pretty good year, I didn't get a single drop of surplus honey. If I can recover some of my hive numbers and get them back to a vigorous state it will have been worth it.

Winter packed colonies (1940s).

Old queens

I don't mean to present the idea of re-using old queens as a recommendation, but rather suggest that we can reuse old queens as a temporary emergency procedure. In past articles I have lamented the selling price and availability of replacement queens. As have so many other beekeepers I have introduced queens only to find them dead or to find supercedure efforts a few weeks later It is outside my discussion here to explore why seemingly good queens are sometimes offensive to colonies, but they are. Too often, new queens are not eagerly accepted by colonies.

Last season I began to put old queens in cages and hold them until I was (somewhat) certain that the new queen would be tolerated. While I never had to reuse a single one of them I did have them in reserve in case something went awry with the new queen. I know that some of you are itching to ask why a queen that needed replacing would be made better by removing her from a colony and confining her in a cage. Bluntly, she is not made better In fact, she is probably made even worse for the event, but (1) she is a queen, (2) she is alive, (3) she is available, and (4) she is already mine. She could be used as a "stop-gap" or a "Band-Aid" queen. She could possibly help maintain the colony while I procure a new queen. Several seasons ago, following the hypothetical bee book I found the reigning queen, killed her and installed a new queen. Within a week, I found the new queen – dead – in front of the hive. I had no replacement queens so I had effectively set back the colony by making it queenless. Being able to reinstall the old queen would have been better than what I did to them. I am no longer quick to kill the old queen. She may still have some value to me.

Preparing for next Winter

We are barely through the spring season of 2008 and I am talking about the next Winter In just a few more weeks, I will have a good idea of how well this honey production season has been. Again, so far, so good. As I did last year, I plan to leave an oversupply of honey as stores. Such a surplus does not guarantee anything, but it certainly seemed to help last year I have been more conscientious about mite and disease control but outbreaks will seemingly always be a problem. But I do plan some changes for the upcoming Winter

1 Three deeps. I hope to be able to overwinter everything in three deeps. While some of the colonies were in triple equipment last Winter, not all were. I couldn't see any difference in survival rates in three deeps compared to two, but I want to be as certain as possible that honey shortages are not the problem.
2. Winter insulation. Just because a bee colony can survive the cold season does not mean that it is best for the colony to withstand cold weather Winter packing colonies was very common years ago; yet now it is essentially never practiced. If any of you insulate your wintering colonies, I would like hear about it.

3. Protein substitute. I have acquired enough protein substitute to feed colonies a longer time than just the early Spring. Normally, such materials are only fed in early Spring, but I want to see if pollen shortages during the Summer dearth are helped by an additional protein source.

Very simply, as have beekeepers throughout our beekeeping history, I am trying to have my colonies as healthy and prepared as possible for the upcoming Winter As strange as it seems, I must work on that now in preparation for the future.

The Future

What is "the future?" The upcoming Winter of 2008/2009 is the future or 300 years from now is "the future." The future is truly a vague time frame. In my opening comments I wrote that all time phases are important to us. We need to know our past and we must have a plan for the present, but what about the future? My short-term future plans are to keep colonies as healthy as possible. By keeping colonies vibrant and surviving – year after future year – I will do my part to impart a healthy, vibrant industry to future beekeepers. As I write this, since it will take about eight weeks for it to be published, as a reader, you are in my future. It seems to me some aspects of the future can be manipulated while other aspects of the future are completely beyond my control. I have no interest in taking a stab at what the more distance future holds. Bees that don't sting? Mystical pest control procedures? Alternative uses for honey? Better pollination techniques? I have no clue what the distant future holds, but I do know that if we don't have a positive future in beekeeping, then nothing in the past and present is terribly important either BC

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PROTECT YOUR HIVES

Jennifer Berry

Over the years, I have encountered all types of beekeepers. And like people everywhere, beekeepers (for the most part) also fall into three categories. First you have the type "A" beekeeper These are the ones who visit their colonies everyday and take temperature and humidity readings. They mix up the exact proportion of vitamins, minerals, sugars and amino acids into their pollen patties and syrup. Body measurements are taken each week to ensure the bees are getting a proper diet. There are landing lights laid out in their backyard to help guide the incoming foragers to their particular hive. Each queen, worker and drone is given a name. There are infrared sensory devices posted through out the yard to alert of any unwanted pests or people. Cameras are mounted inside the hive, outside the entrance and by the feeder to monitor all types of activities, 24 hours a day, seven days a week. They have pictures of their queen on their computer screen. Their website has images of every queen they have ever had with little gold crowns photoshopped onto each. The front door mat states, "Wipe your feet, all six of them." The back door mat that used to say "Hi I'm Mat" has since been replaced with "Got Bees." Every item of clothing has shapes representing a head, thorax, abdomen, six legs and wings either embroidered or stamped. Bumper stickers that read: "Bee Happy," "Too Bee or Not Too Bee," "Let it Bee," "Bee Kind to Your Bees," "Bees Happen," "Give Bees a Chance" (I actually have this one), "I Love my Bees," "Bees Aboard," and "I Am, Therefore Let Me Bee" litter every square inch on their bumpers. They attend beekeeping meetings and workshops every weekend. They log into chat rooms and discuss the latest about their bees. Every book ever written about *Apis mellifera* has been read and re-read. A portrait of their first colony hangs over the mantle and portraits of every colony since lines the hallway Anytime guests arrive they are offered a large array of foods prepared with honey, and pollen.

The other type of beekeeper, the type "C," is a bit more laid back; maybe a bit too laid back when it comes to beekeeping. They figure bees have been around for millions of years so they don't have to intervene too much. And hey, they read a book, so what's the big deal, right? Dump some bees in a box and let them do all the work. So, they buy their package and plunk the bees into the hive and walk away Then the following year they wonder out in the backyard to look for the hive they thought was over there by the Sycamore. "Hmmmmm? Well, maybe it's over here behind the shed. Nope." So after several hours of searching for the hive it is finally revealed. It is uncovered when a years worth of overgrown brush is cut away. It takes an extreme amount of effort just to open the lid. Once inside the hive all that is visible is wax moth webbing. It is so thick the frames won't budge without a fight. Frustrated, dirty and sweating, the type "C" beekeeper returns to the confines of his home turns on the computer, and googles "how to get started in pottery."

The Survivor.

Then there is the type "B" beekeeper, which most of us are. We love our bees but they don't consume our lives (except from February to July). We are saddened when we loose a colony but don't have a lengthy burial service where each bee's name is called while Amazing Grace is played live, on the bagpipes. We attend meetings, try to keep up on the latest information regarding the fate of our bees, and are so pleased when our bees make it through yet another year Some days we may even find ourselves taking a moment while going through a colony and just watching, in wonder, the activities of the hive. We do procrastinate sometimes and know we should check our colonies sooner than later, but our personal life seems to interfere more often than not. But when the day comes and we extract that first super of honey and our bees are thriving we're so proud to be a beekeeper

Being a beekeeper in the 21st century has its challenges and it seems new ones are popping up on the horizon each week. With all the issues facing beekeepers today (mites, viruses, CCD, viruses, mites, CCD, and all things that come with mites (viruses) and CCD) protecting your hives from thieves or vandals is not that frequently thought about. I mean, who would want to steal or bother honey bee colonies? But it may be something you want to think about, especially since bees are gaining more and more attention. Honestly, I never thought about it myself until last Fall.

We have numerous experimental apiaries scattered over three counties. Several of our sites are located on University property but others are on private property. One of our sites is located at the Full Moon organic farm. It is a great place for bees and I never once thought twice about hav-

A Casualty.

ing them there. This particular farm is located on the outskirts of Athens. The surrounding area is a hodge-podge of small farms, larger home tracks and smaller neighborhoods. Our bees were located at the back of the farm along an edge of a small forest. During the day the bees were in full view of the farm crew, but once the crew left for the evening the bees were on their own. The farm house was a good half mile away from where the bees were located.

Last year I received a call from the farm's owner explaining that there had been a fire at our apiary site and we may want to come by and have a look. When we arrived, three of the four colonies were gone. Incinerated. Burned to the ground. Nothing left but a pile of ash, wood chips, a few nails and bits of wire from the foundation. It was heart breaking to see. However, there was a sole survivor and it was amazing that it survived. The bottom board had been completely burned away The interior sides of the brood box and honey supers were scorched. The bottom bars of the brood frames were burned away and the wax from the bottom half of the frames had melted. Flames had actually seared the interior of the hive, but the bees and queen were still alive. Actually, the hive was thriving. But they were pissed off. As a matter of fact it was one of the few times I have had to walk away from a colony They were not happy and getting madder by the second.

The fire had not only engulfed three of our hives but also about half an acre of the surrounding forest. It was amazing though that the entire east side of Athens Clarke County didn't burn up and blow away that day We hadn't had rain in weeks and were facing the worst drought in decades. The forest floor was like kindling. But the forest remained along with that single colony.

After the bees had finally settled down we examined the surrounding area and found a lighter, a crumpled pack of Camels and a honey super about 30 yards from where the colonies were located. The super had been slightly burned and obviously tossed aside. All ten frames were scattered about but the honey was still capped and intact. So, Dan Harris and I concocted the sequence of events that occurred the day they burned ole Dixie down.

A couple of punks with nothing better to do were walking through the woods late one day and came upon some white boxes. One kid recognized the boxes and said they were honey bee colonies. "Honey bees, man we better get out of here" said one kid. "Nah, I say we get us some honey" said the other The third didn't offer any opinion as he took another drag off his cigarette and tossed his empty pack on the ground. So they walked over to the colonies and slowly took off the lid. Immediately several bees came out and greeted these unwanted guests. As they retreated, ball caps and arms were being flung about swatting away the bees that bombard their heads and torsos. Several hundred feet from the colony they finally stopped. No major damage, just a few stings but some severely wounded egos due to the fact that they all screamed like girls as they high-tailed it from the colony. After the embarrassment wore off and they caught their breath the anger set in and they wanted revenge. Finally the silent kid spoke. He said he had heard that smoke would cause bees to abandon their hive. "Let's light a fire and smoke the little &*$$#@ out" he said. They talked about walking back and retrieving a can of gasoline but decided that was too far and they didn't really feel like walking the distance. Then the silent one spoke again. "We will come from behind, through the forest. We will silently, but quickly make a pile of dry leaves and set it on fire. There is plenty of dry stuff around, so it should light up pretty quick. Once the bees have left we will take what we want." So they did just that. They lit the pile and within minutes the fire had engulfed the forest floor, hives and nearby trees. A wave of uneasiness ran through each kid but it quickly turned into excitement as they watched the fire growing in intensity When all four hives were completely engulfed they rushed in. They kicked over one of the colonies to break free the honey super Instantly the bees attacked. The silent one grabbed the super and they all took off running, his yellow Bic lighter falling out of his pocket. Hot on their tails were a few thousand very upset bees. About 30 yards from the colonies the one kid finally dropped the super to swat at the numerous bees stinging his face, neck, arms, back and legs. The others, also covered with bees, were frantically running in circles bumping into one another After a few minutes they all bee lined it for home and once again the high pitched sounds of girl-screams were heard for miles around.

Stolen and abandoned booty.

Protecting colonies from this kind of senseless destruction is hard. Unless we are watching our colonies 24-7 they can't be 100% protected. But there are a few measures we can do. First it's a good idea to have colonies in sight of your house but out of sight from your neighbors or at least the street. Of course high tech sensory devices can be used, but most of us aren't into the James Bond gadgets and gizmos. If you have colonies off site and in remote areas a solar powered electrical fence may not only ward off the bears but may also deter criminal activity Stealing colonies is also an issue. There's a GPS hive locator now on the market that will alert you by calling your cell phone if your colonies are moved or disturbed. This is a great idea, especially if you have a lot invested in your colonies. You should also brand your equipment and hive bodies. It's not a full proof measure but someone, somewhere may recognize your brand and call the police. I've always thought one of the best ways to deter

anyone from messing with my bees is to put up signs that read, in big red letters, "Africanized Honey Bee Quarantined Area. DO NOT ENTER" and then under that, in smaller black print, "Venom is extremely potent and deadly. Unfortunately, the sting kit is temporarily unavailable. If stung begin praying immediately"

To end, it's June and in central Georgia our nectar flow has ceased. Yet there's still plenty of nectar available to our north and south. If sourwood is your thing you better be moving colonies to your north Georgia Mountain sites sooner than later We're keeping our fingers crossed hoping that this year will be a good one even though the soils are still pitifully dry There's also nectar to be found to our south from a variety of cultivated crops. Wherever you or your bees may be, hopefully it's been a good year

See Ya! BC

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

a closer look

HONEY BEE IMMUNITY

Clarence Collison

There's lots that can go wrong.

The social nature of honey bees puts them at considerable risk of infection from parasites and pathogens. Specifically, the increased genetic relatedness and high population density that typifies honey bee societies can strongly favor pathogen spread and epizootic outbreak (disease epidemic) (Evans et al. 2006). Initial investigations into colony collapse disorder (CCD) found high pathogen levels and weakened immune systems in adult bees from CCD colonies (Pettis et al. 2007). To date, researchers have identified 18 pathogens in bees from CCD colonies (Williams 2008). Stress due to this heavy pathogen load, as well as other possible sources (poor nutrition, migratory stress, pesticides etc.) could compromise the immune system of bees, making colonies more susceptible to disease. *Varroa* mite (*Varroa destructor*) infestations have also been shown to depress the immune response in honey bees by reducing the transcription of genes encoding antimicrobial peptides (short chains of amino acid residues) and immunity-related enzymes (Yang and Cox-Foster 2005).

Bee pathogens are diverse, ranging from gram-positive and gram-negative bacteria to fungi, RNA viruses, microsporidia (protozoans) and amoebae. Parasitization by mites and other arthropods both raises the risks of pathogen infection and lowers the ability to combat disease. The study of the honey bee genome has revealed that bees have about 66 percent fewer genes involved in immune function than *Drosophila* (fruit fly) and *Anopheles* (mosquito) (Evans et al. 2006). Thus, in addition to a wide range of parasites and pathogens and tremendous losses associated with these pests, bees appear to have relatively diminished defense systems compared to other insects.

The insect immune system is comprised of cellular and humoral (hormonal) response mechanisms which are regulated by many immunity-related genes (Yang and Cox-Foster 2005). Cellular immunity involves direct interactions between hemocytes (blood cells) and invading organisms. When hemocytes respond to an invasion of the hemocoel (blood cavity) by an intruding organism, they must be able to distinguish the invader from the insect's own tissues. This requires the participation of two critical enzymes – phenol oxidase (PO) and glucose dehydrogenase (GLD). Although the exact function of either of these enzymes is unknown, PO is believed to enable the recognition of foreign bodies, and GLD is hypothesized to destroy pathogens during an encapsulation reaction.

Lysozyme (LYS) and glucose oxidase (GOX) are also important enzymes to insect immunity LYS hydrolyzes (breaks by adding water) bonds within the bacterial cell wall, causing the cell to rupture. The expression of LYS genes is strongly induced by the invading bacteria. GOX catalyses the oxidation (transforming by adding molecular oxygen) of ß-D-glucose to D-glucono-1,5-lactone and hydrogen peroxide. In honey bees, GOX is expressed in the hypopharyngeal gland and is secreted into larval food by the worker bees; this serves to sterilize the food and is thought to prevent many larval diseases. Thus, GOX provides immunological protection at the colony level as well (Yang and Cox-Foster 2005).

The mechanisms of cellular defenses include phagocytosis, nodulation and, for invaders too large for cellular internalization-- encapsulation. Nodulation and encapsulation are often accompanied by melanization (formation of pigment), catalyzed by (prophenol-) phenoloxidase (Schmid et al. 2008). Cellular immune reactions and prophenoloxidase (PO) activation are launched immediately after an infection is detected and are responsible for clearing most infecting microbes from the insect's body within the first hours. Both reactions make up the insects' constitutive immune system, which is active in any post-embryonic life stage of the honey bee.

Nodulation is an insect cellular defense reaction capable of clearing large numbers of bacterial cells from circulation during the first two hours of an infection. Bedick et al. (2001) determined that eicosanoids mediate the nodulation reactions to bacterial infections in newly emerged adult honey bees. Nodulation did not occur in older honey bee foragers receiving similar bacterial challenges. Cell spreading and prophenoloxidase activation, two distinct phases of nodulation, as well as another cellular defense reaction – phagocytosis, are also mediated by eicosanoids. Since they were able to chemically inhibit and reverse the nodulation reaction, bee tissues express the enzymes required for eicosanoid biosynthesis.

"In addition to a wide range of parasites and pathogens and tremendous losses associated with these pests, bees appear to have relatively diminished defense systems compared to other insects."

The humeral immune response of honey bees consists of the production of antimicrobial peptides- abaecin, apidaecin, hymenoptaecin, and defensin, which are active against fungi, bacteria and eukaryotic pathogens. Two main signaling pathways control the expression of genes encoding the formation of these antimicrobial peptides; these are the Imd and Toll pathways, which are activated upon the detection of microbes. The Toll pathway is responsible for defense against fungal and gram-positive bacterial infections, whereas the Imd pathway is primarily involved in defense against gram-negative bacteria. However, these two pathways do interact to co-regulate the peptide, defensin. Anti-microbial peptides are active at low concentrations and exhibit a potent and broad spectrum of activity. Most of these peptides act synergistically at the cell wall membranes by attacking different components of the cell envelope (Yang and Cox-Foster 2005).

Although maintaining immune competence is vitally important for honey bees, it is also a very costly physiological function. Previous studies in honey bee immunology demonstrated that foragers undergo a dramatic reduction in circulating hemocyte numbers, a reduction in hemolymph volume and an almost total loss of the capability to form nodules in response to a bacterial challenge. Schmid et al. (2008) further investigated this form of immune senescence and found that hemocyte numbers continuously decreased with age in worker honey bees; a similar observation was made with queens and drones. Tests with over-aged nurse bees and precocious foragers indicate that the loss of hemocytes in workers is age- rather than task-dependent; it is not linked to the physiological changes which occur during the nurse-forager transition and involve juvenile hormone and vitellogenin. Nevertheless, hemocyte depletion in adult honey bees might be regulated by other endocrine factors.

Hemocyte reduction in honey bee foragers may represent a colony-level strategy of trading off costs of immunity against energy reserves of the whole colony. As foragers already face a high mortality rate, reduction of their immune competence might not substantially increase mortality risks for the individual, and may be beneficial to the colony, by saving energy costs (e.g. stored food) needed to maintain cellular immunity. However, in queens which are long-lived compared to workers, high hemocyte numbers should be maintained throughout their entire lives.

Phenoloxidase-catalyzed melanization of pathogens is a very important component of invertebrate defenses, and may well compensate for the hemocyte losses. In contrast to hemocyte numbers, PO-activity changes in adult honey bees differ by sex and caste, correlating with the differences in longevity and significance to colony survival. Laboratory assays showed that PO activity in workers increased with age and reached a plateau within the first week of adult life (Schmid et al. 2008). In queens, however, PO activity increased with age and did not plateau. PO-activity levels in 1- to 2- year old queens were twice as high as those found in old workers. In contrast to the female castes, PO-activity in drones declined with age.

Assuming that hemocyte production and maintenance is physiologically expensive, and colonies with immense numbers of sterile workers and males would gain from a reduction of this cost, a plausible strategy would to be abandon hemocytic immunity in all individuals, except the queen; here immune competence should be maintained or improved. Schmid et al. (2008) suggested two plausible reasons for a reduced immune system in honey bees: 1) the enlarged social immune defense, including hygienic behavior and a highly antibacterial nest environment, and 2) a limitation in the number co-adapted pathogens.

Yang and Cox-Foster (2005) proposed from their research that *Varroa* mites may cause collapse of honey bee colonies as follows. *Varroa* mite infestation may reduce the expression of genes encoding anti-microbial peptides and immunity-related enzymes, eventually leading to depressed bee immunity for both cellular and humoral immune responses. Thus, the bee colonies may become more susceptible to various bee pathogens. Further research has shown that honey bees appear to mount a cellular immune response at wound sites caused by feeding *Varroa* mites (Kanbar and Engels 2003). They noted an aggregation of hemocytes in the center of the wounds. This observation suggests that hemocytes are involved both with deterring subsequent infections and with healing wound sites. Bees also possess a humoral immune response leading to an upregulation of several antimicrobial peptides in response to both wound infections and oral bacterial infections. Gregory et al. (2005) proceeded to explore whether the presence of *Varroa* mites affects the bee's humoral immune response, by examining transcript levels for two antimicrobial peptides, abaecin and defensin, that show activity against bacteria. It was found that bees exposed to low or moderate numbers of *Varroa* mites sharply reduce their immune-peptide transcripts when compared to both heavily parasitized and unparasitized bees. It is possible that mites directly reduce bee immune responses when they begin to feed, perhaps as a means of ensuring that feeding sites are maintained. Interestingly, the apparent suppression of immune-gene transcripts disappeared when bee pupae were faced with higher mite loads.

To explore immune system activation in honey bee larvae of four different ages, Evans and Lopez (2004), exposed them through feeding either spores of a natural pathogen, *Paenibacillus larvae larvae*, to cells of a diverse set of related nonpathogenic bacteria or to bacterial coat components. These larvae were then assayed for RNA levels of genes encoding two antibacterial peptides, abaecin and defensin. Larvae exposed to either *P. l. larvae* or a mix of nonpathogenic bacteria showed high RNA levels for the abaecin gene relative to the controls. First instar larvae responded significantly to the presence of the nonpathogenic mix within

12 hours after exposure, a time when they remain highly susceptible to bacterial invasion. This response was sustained for two successive instars, eventually becoming 21-fold higher in larvae exposed to probiotic spores versus control larvae. The mixture of nonpathogenic bacteria is therefore presented as a potential surrogate for assaying the immune responses of different honey bee lineages. They also proposed that nonpathogenic bacteria can be used as a probiotic diet additives to enhance honey bee immunity, helping bee larvae, and other life stages, survive attacks from pathogens in the field.

Several studies have shown that honey bees are able to mount both group-level and individual defenses against pathogens. As researchers continue to increase our understanding of how these immune mechanisms work, we will gain a better understanding of how the various honey bee pathogens and parasites attack and negatively impact their honey bee hosts.

Understanding the abilities of individual bees to inhibit pathogens/parasites through internal immune defenses is also important in bee breeding programs so immuno-competence (tolerance/resistance) in honey bee populations can be selected for and tested. BC

References

Bedick, J.C., H. Tunaz, A.R. Nor Aliza, S.M. Putnam, M.D. Ellis and D.W Stanley 2001. *Eicosanoids act in nodulation reactions to bacterial infections in newly emerged adult honey bees,* Apis mellifera, *but not in older foragers.* Comp. Biochem. and Physiol. C. 130: 107-117

Evans, J.D. and D.L. Lopez 2004. *Bacterial probiotics induce an immune response in the honey bee (Hymenoptera: Apidae).* J. Econ. Entomol. 97: 752-756.

Evans, J.D., K. Aronstein, Y.P. Chen, C. Hetru, J.L. Imler, H. Jiang, M. Kansot, G.J. Thompson, Z. Zou and D. Hultmark 2006. *Immune pathways and defense mechanisms in honey bees* Apis mellifera. Insect Molecular Biology 15: 645-656.

Gregory, P.G., J.D. Evans, T Rinderer and L. de Guzman 2005. *Conditional immune-gene suppression of honeybees parasitized by* Varroa *mites.* J. Insect Science. 5:7

Kanbar, G. and W Engels 2003. *Ultrastructure and bacterial infection of wounds in honeybee (*Apis mellifera*) pupae punctured by* Varroa *mites.* Parasitology Res. 90: 349-354.

Pettis, J., D. vanEngelsdorp and D. Cox-Foster 2007 *Colony collapse disorder working group pathogen sub-group progress report, Colony Collapse Disorder Workshop,* April 23-24, 2007 Beltsville, MD.

Schmid, M.R., A. Brockmann, C.W W Pirk, D.W Stanley and J. Tautz 2008. *Adult honeybees (*Apis mellifera *L.) abandon hemocytic, but not phenoloxidase-based immunity.* J. Insect Physiol. 54: 439-444.

Williams, S. 2008. *The case of the missing bees.* PennState Agriculture Magazine. Winter/Spring: 18-25.

Yang, X. and D.L. Cox-Foster 2005. *Impact of an ectoparasite on the immunity and pathology of an invertebrate: Evidence for host immunosuppression and viral amplification.* Proc. Natl. Acad. Sci. USA. 102: 7470-7475.

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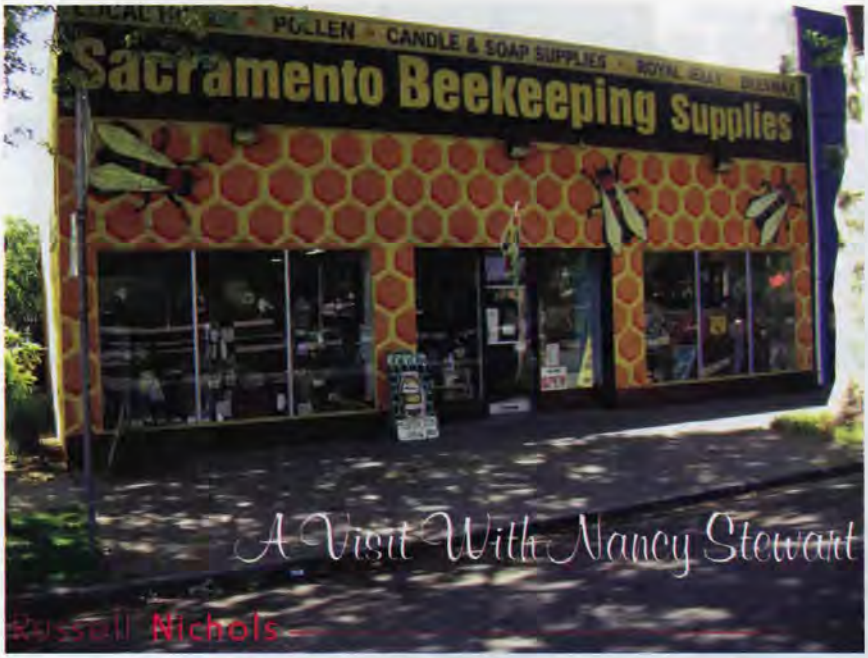

It's Nancy Stewart's Bee Day

And as the queen of Sacramento Beekeeping Supplies, a beekeeping hobbyist shop in California's capital city, that means she has work to do. She moves equipment around and sets up tables covered in nylon cloths. The phone keeps ringing as customers call to see if their shipments have arrived at the store. Bee Day is how Stewart and her family refer to the specific days, usually in the Springtime, when the shop will receive 75 packages of bees at three pounds per package for hobbyists to pick up.

"This is busy season," Stewart says between phone calls. "Beekeeping is a Springtime moneymaker "

And that says a lot considering the current beekeeping conditions of the region. In Northern California, many beekeepers are feeling the sting. They are spending thousands of dollars on medications to prevent diseases and infestations that were not present a few decades ago. The prices on colonies have risen 300 percent over the last three years and bees continue to perish for unknown reasons, a crisis known as "Colony Collapse Disorder (CCD)."

"We don't know what's happening," says Eric Mussen, a honey bee expert at UC Davis. "We can't easily blame agriculture or chemicals and it seems to be across the country. Beekeeping was relatively easy until a couple of exotic mites arrived in the 1980s. Now, it's much less predictable."

In the past 24 years, Stewart's beekeeping business has been equally unstable. She opened the store in 1984 with her husband, Fred, a longtime beekeeper who once had some 100 hives. Since then, it has developed into a full-fledged family business that has become the epicenter for the local and regional beekeeping scene. At Sacramento Beekeeping Supplies, you can buy beekeeping starter kits and live bees this time of year It also provides referrals to beekeepers that can capture Spring swarms, which has recently been a hot-button issue here. In the store, there is also a honey-tasting bar with squeezable bears, where customers can sample assorted flavors such as Orange Blossom, Clover and Sage.

But in the beginning for Stewart, the season for bees was not so busy. It all started 30 years ago when Fred Stewart started beekeeping. He bought a few hives and eventually started a pollination service. It was just a hobby. He worked for the state in a division of aeronautics and she worked in a diet program. But Nancy Stewart will tell you that it took some time for her to get bitten by the beekeeping bug. In fact, the whole process seemed too icky when her husband would do it.

"He would come into the kitchen with all the honey and beeswax and I didn't care much for that," she recalls. "It was a messy thing."

The idea to make it a business grew when they heard that a woman in West Sacramento was planning to sell her beekeeping store. After the owner opted not to sell it, Nancy and Fred Stewart decided to open their own store.

"It was supposed to be a kind of supplement when he retired," Nancy Stewart says. "We didn't have a business plan or any of the stuff we're supposed to have. We kind of just started blind."

Stewart's main competition was that store in West Sacramento. No one knew Sacramento Beekeeping Supplies existed and for the first two years, she says "I pretty much twiddled my thumbs." When their competitor sold her store in 1986, Stewart bought the inventory and suddenly Sacramento Beekeeping Supplies was generating buzz.

"At that point, we got real busy," Stewart says. "We were just lucky with that."

But the store would encounter its own challenges. They stayed in their first building for five years, outgrew it and moved into a used furniture store nearby But when the rent tripled, Stewart had to look for other options and money was tight.

"It really felt chancy," she recalls. "We were making about $25,000 at that time and we weren't taking home anything."

By 1993, the economy stumbled and Stewart had

It's Package Day!

the business relocated to its current location: a 2,000 sq-ft. building and former house across the alley, which she leases at five years at a time. Stewart hired her daughters and stayed up at night building beekeeping equipment. Her husband retired in the 1990s and now he volunteers at the store when he's not playing golf. The grandchildren help out too. Working with family is difficult, she says, because it blurs the line between the personal and professional relationship. But, she adds, there is a sense of "dedication and interest that you can't find with other folks."

Stewart also had the outside of the building painted yellow and gold by a local muralist to resemble a honeycomb. "I thought 'my gosh, that would sure make us stand out.'"

Honey is a popular seller

And it has. Despite the losses backyard beekeepers have suffered in the past few years, customers continue to come to Stewart's store by the swarms. Stewart says they serve about 1,500 residents in the Sacramento region. Customers come to buy sheets of beeswax, beeswax candles and cosmetics, mugs, jewelry, bee pencils, backpacks and books, dish towels, soaps, honeysuckle incense – any and everything bee-related that she can make herself or find at gift fairs. And of course, they have the supplies for first-time and veteran beekeeping hobbyists such as the suits, cages, arm-length gloves, hats and veils, and smokers. Stewart now even has a warehouse in West Sacramento, where they store extra boxes.

The store's most popular product, however, is the honey Specifically the local wildflower honey, which studies say can serve as an immune system booster and ease allergy symptoms. Stewart fills up their 600-pound dispensers on a regular basis. One day in April, Dera Lee walked into the store.

"Refill," she said, holding up an empty jar Stewart smiled and walked to the dispenser to fill her up. Lee, who lives in the South Sacramento area, was referred to the store by a friend about six months ago. Ever since she learned that honey could help her allergies, she has been coming.

"I kept sneezing," Lee said. "I still do, but it's much better Every morning, I drink a cup of hot water with lemon and honey I do the same thing every night, just a couple of teaspoons."

after folks get to taste it.

Oscar Cheuquian, who used to work for a honey-producing company in his native Chile, was just driving through Sacramento when he saw the store and decided to stop. He stood at the honey-tasting bar for about 15 minutes. He carefully tasted and savored each flavor, discarding the used plastic spoons in the bin afterwards.

"I've always been a friend of the bees," he said just before sampling another spoonful of Orange Blossom honey, which after many rounds took first place in his taste test. "This is my favorite. The taste is simple. I can taste the flower of the orange."

But the life of a beekeeping storeowner is never constant. It evolves like the bees themselves, Stewart says. As bees continue to disappear, more and more people have been attracted to beekeeping. Mussen attributes the rise in bee knowledge to TV stations such as the Discovery Channel, the internet and news reports, which have prompted people to try and help.

"It seems like there's no end, these poor bees are facing all sorts of difficulties," says Mussen, adding that the collapse could be a result of a number of factors including chemicals, bad mixes of pollens and malnutrition. "People who love bees and want to take on the challenge are doing so."

Even as people learn more about bees and start beekeeping, it is still hard to map out an exact future for the business. Stewart plays it by ear, working full-time and sometimes even on the weekends. But the most important part of navigating the business, Stewart says, is to always have a Plan B.

"I can't tell from year to year what will happen," Stewart says. "You never know what's going to change. It's a growth process." BC

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Russell Nichols is a free lance author in Sacramento.

The Honey Garden

Connie Krochmal

Combining honey bee pollinated garden crops with honey recipes. The best of two worlds.

Lima Beans

Beans remain one of the favored garden vegetables. Limas are outstanding not only for their unique flavor but for the fact that they're good bee plants.

Though some limas may be perennial in warm climates, they're generally treated as annuals in most areas.

Growing Conditions

Lima beans are much more sensitive to cold than most other New World beans, which are relatives. For that reason, wait until the ground has really warmed up – two weeks after the last expected frost date. The seeds germinate poorly in cold soil.

Limas need full sun. Preferring a sandy, well drained soil, this crop prefers a pH of 6.0 to 7.0.

Suitable for all regions of the country, limas need a growing season of three to four months. For short season areas, choose bush baby limas. These mature quickly.

Planting

If you've never grown beans before in the plot, consider using a bean inoculant. Sprinkle the inoculant powder over the seeds. Do this right before you plant. This product is available from seed stores and garden catalogs.

Planting depth depends upon the soil type. In sandy soils, plant limas 1½ inches deep. An inch is fine for other kinds of soil.

The planting distance varies according to the type being grown. Bush limas can be spaced two to three inches apart within rows that are 1½ to two feet apart. Pole varieties need a little more space – four to six inches between plants in rows that are two to four feet apart. Pole types can also be planted in hills spaced three feet apart. In that case, put four to five seeds per hill.

Pole limas need strong supports as some varieties can be very tall. Get these in place right after you plant. The seeds sprout in about seven to 10 days.

RECIPES

Ann Harman

Considering all the family of beans I would guess that lima beans, no matter what size, are not an inspiring vegetable either to grow or to cook with. Limas can be the small, tender baby limas or the large ones, frequently dried then used in soups.

I would also guess that most people are familiar with succotash – corn and baby lima beans. Although perfectly good it cannot be called very inspiring. Here are some lima bean recipes that are different and can make lima beans a good addition to your meals.

SIMPLE GARLICKY LIMA BEANS

4 cups fresh lima beans
2½ cups water
1 tbs. olive oil
2 garlic cloves, crushed
3 thyme sprigs
1 bay leaf
½ tsp. salt teaspoon
¼ freshly ground black pepper

Sort and wash beans. Combine beans and next five ingredients (through bay leaf) in a medium saucepan. Bring to a boil. Cover, reduce heat and simmer 20 minutes or until tender Discard thyme sprigs and bay leaf. Stir in salt and pepper Yield eight servings.

Cooking Light

That certainly got lima beans off to a good start. Now let's see what else we can do with them.

SHRIMP AND LIMA BEAN SALAD

1 10-oz. package frozen baby green lima beans
¾ pound fresh cooked shrimp
1 cup thinly sliced celery
1 tablespoon finely chopped onions
1 tablespoon chopped pimiento
¼ teaspoon salad herbs
1 tsp. Beau Monde or other mixed seasoning
½ tsp. paprika
¼ tsp. freshly ground black pepper
¼ cup basil white wine vinegar
½ cup salad oil
ripe olives and radishes for garnish

Cook limas and drain thoroughly. Combine with shrimp and celery, onion and pimiento. Crush salad herbs and sprinkle over salad. Combine Beau Monde, paprika, pepper and vinegar in a jar Shake until well blended. Add oil and shake again. Pour just enough dressing over salad to moisten well. Toss gently with fork to mix thoroughly Chill well and garnish with sliced ripe olives and sliced radishes. Makes six servings.

The Spice Islands Cookbook

Caring for Lima Bean Plants

Lima beans will need watering during dry periods. For best results, water thoroughly once a week if rains aren't sufficient.

Regarding fertilizer, lima beans require less than corn and squash. Compost is an excellent choice. For chemical fertilizers, select a formula that is low in nitrogen – the first number listed on the label. Apply an initial application at planting time. Then, add a top dressing around four weeks later

Control weeds by hoeing or using mulch. The advantage to mulching is that it also helps to conserve moisture.

Problems of Lima Beans

With lima beans, the most common insect pests tend to be beetles, including the Japanese beetle, bean leaf beetle, and the ever-present Mexican bean beetle. These can be controlled by hand-picking if you're vigilant.

Limas can suffer from various disease problems. In the South, anthracnose is more common. Powdery mildew often occurs in the Mid-Atlantic region. Other potential diseases include various viruses, blights, rusts, and wilts.

Most diseases can be minimized if you follow good cultural practices, which include the following. Rotate crops every three years or so in the vegetable patch. This discourages the build-up of disease pathogens. Water early during the day so that the foliage has a chance to dry off before nightfall. Never work around the plants when they're damp with dew or water

Pull up and discard diseased plants. Dispose of these in the household trash rather than in the compost pile. Whenever possible, select disease resistant varieties.

Pollination and Status as a Bee Plant

Though some sources report that lima beans are apparently capable of some self pollination, cross pollination results in much better crops. In studies, the yields were 30 to 35 per-cent higher with honey bees both in terms of the number and weight of the beans.

Lima beans are excellent nectar and pollen plants. In areas where enough acreage is available, there can be a good honey surplus ranging anywhere from 40 to 150 pounds or so per colony The plants give a reliable flow of nectar, especially during the first couple weeks when the plants begin flowering.

Typically, the honey is very light colored, almost white. With a heavy body, this is considered excellent quality It has a mild, pleasing flavor similar to that of clover This honey tends to granulate rather quickly If the weather becomes humid, it can ferment. For that reason, this needs to be taken off the hive as soon as it is ready

Types and Varieties of Lima Beans

There are basically two types of lima beans. The small-seeded ones are called butter beans or baby limas, while the larger seeded ones are known as Fordhook.

Over time, pole varieties yield more pods per plant. The bush types provide an earlier yield, bearing for about three weeks. Some pole limas will continue yielding until frost in some areas.

Recommended Varieties

Here are some of the best lima bean varieties.

Fordhook 242

Considered the standard of all lima varieties, this bush type produces large-seeded limas. Upright and vigorous, these plants have a uniform growth habit. An All-America Selections winner, Fordhook 242 adapts well to all areas of the country It tolerates heat and drought. A dependable, reliable variety, this provides a heavy yield in about 75 days.

Around four inches long, the pods contain three to ➢

Well, life with lima beans is definitely getting more interesting. Here is an easy dish to make after you have soaked the dried beans. At least soaking the beans does not require attention.

BAKED LIMA BEANS WITH HONEY

1 cup dried lima beans
2 cloves garlic, chopped
2 large onions, sliced
½ cup honey
½ tsp. cayenne pepper (optional)

Soak the lima beans overnight in enough water to cover Cover and bring to a boil. Reduce the heat to a simmer and cook until almost tender, about 1½ hours. Drain. Add the cayenne pepper to the beans if desired. Combine the garlic, onion and honey. Place half the onion mixture in a greased baking dish and cover with half the drained beans. Place the remaining half of the onion mixture over the beans and top with the remaining beans. Bake at 350°F for 45 minutes to one hour until beans are tender Serves six.

Mississippi Homegrown
Mississippi Beekeepers Association

If you liked that recipe you will like this one also.

HONEY-GLAZED LIMA BEANS

2 cups dried lima beans
1 cup chopped onions
¼ cup shortening
¾ cup honey
1½ teaspoon salt

Soak beans about two hours in water; drain. Cover beans with water and bring to a boil. Cover and simmer over medium heat for two hours; drain. Melt shortening and sauté onions until tender, Mix beans, onions, honey and salt together Pour into casserole. Bake in a 350°F oven until beans are glazed and tender, about one hour

The Honey Kitchen
ed. Dadant & Sons

Dried lima beans can indeed be interesting. This dish can be served hot or cold. It makes enough for eight to 10 servings.

LIMA BEANS IN TOMATO AND GARLIC SAUCE

1 pound large dried lima beans
3 tbs. olive oil
5 to 6 cloves garlic, crushed or minced
1/2 to 1 tsp. rosemary, crushed
2 cups thick tomato puree
3 peeled tomatoes, coarsely chopped

five, high-quality beans. These limas are tender and nutty. They have a greenish tinge.

Jackson Wonder Butter bean

An heirloom dating from 1888, this originated in Georgia. But, it does very well in northern areas as well. Despite hot, dry weather this continues to produce good crops in about 66 days. The pods yield three to five buff-colored limas with blackish-purple mottling. These dry well.

Christmas Lima Beans

King of the Garden

Ready in 87 to 100 days, this pole variety can reach 10 feet tall. King of the Garden is a large-seeded, butter bean type. The plants are reliable, yielding heavily over an extended season. Very popular, this heirloom variety has pods that reach eight inches in length. They have four to six, sweet, delicious beans. This variety also dries well.

Christmas lima bean

Ready in about 85 days, this is named for the large, maroon or red-speckled, flat beans. The vigorous vines tolerate hot weather This pole variety is an heirloom from the 1840's. The rich, buttery flavor is hard to beat.

Harvesting and Using Lima Beans

If at all possible, harvest when the foliage is dry To encourage the best yields, pick on a regular basis once the harvest begins.

Limas can be picked once the pods are well filled. At this stage, the beans are moist and tender Most pods should be light green at the time of harvest. However, butter bean pods will be creamy white. One way to tell whether the pods are ready is to squeeze either end. It should feel spongy

For dry lima beans, allow the pods to turn brown before you pick them.

A pound of fresh lima bean pods will yield about eight ounces of edible beans. If refrigerated, these keep for about five to seven days.

Lima beans are prepared as a hot vegetable in various ways. They're sautéed in butter, mixed with corn and squash for succotash, creamed, baked, and added to casseroles. Once they're cooked, they can be added to salads. BC

1/3 cup dry red wine
1 tsp. salt
¼ cup lemon juice
1 tsp. honey
fresh-ground black pepper to taste
3 tbs. minced onion

Put the lima beans in a large pot with about two quarts of water and some salt. Bring the water to a boil, then reduce the heat and simmer the beans until they are tender, but don't let them get mushy Drain them, and save the broth to use in a soup – it's delicious. Heat the olive oil in a very large skillet and sauté the garlic and rosemary for a few minutes. Add the tomato puree, chopped tomatoes, red wine, salt, lemon juice, honey and a generous amount of black pepper Simmer the sauce, stirring often, for about 15 minutes. Add the drained lima beans and continue simmering, stirring now and then for another five or 10 minutes. The sauce should be quite thick. If you want to serve the lima beans hot, stir in the minced onions shortly before serving. If you want to serve them cold, as a salad, allow them to cool before stirring in the minced onions and chill for a few hours or overnight – the flavor improves. Serves eight to 10.

The Vegetarian Epicure
Anna Thomas

All right, you still like succotash. Why not make it a superior succotash? I don't think you will go back to plain succotash once you have tried this version.

AUTUMN SUCCOTASH

2 slices thick-cut bacon (about 2 ounces), chopped
1 shallot, finely chopped
1 10-ounce package frozen baby lima beans, thawed
1 pound frozen corn kernels, thawed
¼ cup water
¼ cup chopped fresh Italian parsley

Heat a heavy large skillet over medium-high heat. Add bacon and sauté until fat begins to render, about one minute. Add shallot and sauté until bacon and shallot begin to brown, about three minutes. Add lima beans, corn and 1/4 cup water and cook until vegetables are tender, about five minutes. Transfer to bowl and sprinkle with parsley Makes eight servings.

Bon Appetit

Now lima beans can join the rest of the bean family as an interesting vegetable. BC

GLEANINGS

JUNE, 2008 • ALL THE NEWS THAT FITS

CCD SURVEY RESULTS

Prepared by: Dennis vanEngelsdorp, Jerry Hayes, and Jeff Pettis.

Note: This preliminary report was prepared for those stakeholders participating in the "Pollinators and Agricultural Security: An Update on Research, Conservation and Legislative Opportunities" round table called by members of the U.S. Senate. A more detailed report is being prepared for publication later.

The Apiary Inspectors of America (AIA) commissioned a survey to estimate colony loses across the country between September 2007 and 2008. The USDA-ARS Beltsville Honey Bee Lab conducted a similar survey of beekeepers pollinating almonds in CA in February 2008. In total nearly 18% of the country's estimated 2.44 million colonies were surveyed. A total loss of 35.2% of managed honey bee colonies was recorded. This represents a 3.2 point or 10% increase in total losses as compared to last year. The 327 operators surveyed in 2007-2008 lost on average 31.4% of their colonies.

Forty two percent of surveyed beekeepers reported having higher than normal losses. Those reporting abnormally high losses reported having a total loss of 43.7%, while those reporting normal losses reported a 22.9% loss. In other words, beekeepers believed that loosing close to one quarter of their operation over the Winter was "normal."

One of the symptoms of Colony Collapse Disorder is the complete absence of bees in dead colonies or in apiaries. The AIA survey was not able to differentiate between true cases of CCD and colonies lost due to causes that share the "absence of dead bees" symptom. However, the 36% of operations that reported having at least some of their colonies die with this symptom had a total loss of 41.3% of their colonies. This compares to the 17.5% colony loss reported by beekeepers not reporting losses with this symptomology. At least 71% of all colony deaths can be attributed non-CCD causes, underlying the need for research, not only into CCD, but into pollinator health in general.

BEE VENOM ALLERGY

Doctors at Birmingham Heartlands Hospital are conducting a survey to establish, for the first time, how common bee venom allergy is in the UK beekeeping community and how historically it has been managed.

The survey is being conducted through a specialized web site and is subject to all the ethical controls of any medical study.

The survey is not just about severe reactions to stings and all beekeepers are being asked to take part in the national survey.

The survey includes questions about where a beekeeper is, number of stings a year and details on reactions to stings and treatments.

OBITUARIES

Veteran University of Manitoba entomologist **Cameron Jay**, whose work helped western Canadian beekeepers retain their colonies over Prairie winters, has died aged 79.

Cameron Jay

Jay was a faculty member at the university's department of entomology from 1961 to 1991 and was department head from 1981 to 1987. He received the university's distinguished alumni award in 1984 for outstanding professional achievement.

The university said Jay's contributions to entomology and the beekeeping industry in Manitoba, Canada and internationally including in Jamaica, Kenya, New Zealand and Australia - had been recognized with a number of provincial, national and international awards.

"His work on bee orientation is often cited, and his pioneering studies of how bees can be overwintered in Manitoba set Prairie beekeepers free from the need to purchase new colonies from the U.S. or further afield every spring," the university said.

John (Jack) Robinson of Weston, Ontario, Canada died April 20. He was 89 years old.

Jack was the beloved husband of the late Lorna. Both were heavily involved in the beekeeping industry. Jack was a past Director for the Eastern Apicultural Society and served as President in 1992 when EAS was held in Guelph, Ontario. He also served as Director of the Ontario Beekeepers Association and the Toronto District Beekeeper Association.

Jack and Lorna's joys were the TDBA, the RAWF Honey & Education Booth, their Georgian Bay cottage and Condo in Florida.

Jack is survived by his daughter Cheryl and grandson Dilan.

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By 2:30 a.m. on April 1, it had already been a tough week. First Slim gave me my pink slip. She had her reasons, don't you know, but that didn't make it any easier on this old fool. I bravely told her, "You gotta do what you gotta do, but thanks for the memories, you little darling!"

But this time it was bees, not a broken heart, that woke me in the night. A tied-down load of 'em on that one-ton flatbed in the driveway got me tossing.

Every Spring I haul honey bees to Grand Junction and Palisade to pollinate the orchards – first apricots, then sweet cherries, then pears and J.H. Hale peaches. That's three loads 150 miles roundtrip from my place in Peach Valley, mostly on I-70. You could call it a risky trip on good roads in a bad truck.

The Fords I drive are both notoriously unreliable. They just are. They're ancient. The newer one is over 20 years old. Don't ask me why I don't invest in a decent rig, because I'm just too cheap.

I like to take the pickup, as opposed to the flatbed, because it's lower and easier to load. I put a ramp up to the bumper and pull a hand truck.

But once I got the pickup loaded with 11 hives, it wouldn't start. This wasn't the first time the beast had let me down, but every time I repair it, I think, "The engine's sound. I don't drive that many miles. Investing in a newer truck is crazy, considering what I'd have to pay " But it's always some little relay or computerized component – not the engine – that fails. I never learn.

In the twilight I moved my bees from the pickup onto the flatbed, but that old wreck has its problems, too. It's a hard starter, and that's what got me up that brutally cold Spring night. I'd just got that truck back from the shop and hadn't had a chance to see if the cure took. It was 15 degrees outside, and I wanted to be sure I could get it going. When I turned the key, it protested mightily, then finally coughed and sputtered. Five minutes later it purred.

I'd ordered a bee net, but it hadn't arrived. The prospect of breaking down on the Interstate with an uncovered load of bees was not a happy thought. I had no backup truck and no cell phone. I could picture the highway patrol turning a bee truck breakdown into a full-blown crisis.

I was on the road by 4:30. You don't expect to deliver bees when it's 15° outside, and only 70 miles away, the apricots are blooming. But that's Colorado for you. It was so cold I could have departed at a civilized hour The bees would have never stirred until late in the morning, if then. But I'd agreed to meet a new customer at seven, after I dropped off my first two loads. The cold snap caught me by surprise, but I wasn't about to call my guy in the middle of the night to re-schedule.

I actually like to be on the road in the wee hours. The traffic was all headed the other way, making the big commute from Rifle, Debeque and Grand Junction to the natural gas wells and the money towns of Aspen and Vail. Some folks spend three and four hours a day on the road. I can't imagine it.

Natural gas rigs lit up the whole Colorado River Valley You don't comprehend the magnitude of the boom until you see it at night. Lights stretched from Battlement Mesa clear up to the Roan Plateau.

I thought about Slim leaving, and I can honestly say I was at peace with it. Not to be maudlin, but I can see the rainbow's end. I told myself (and I'll tell you!) that I'm on the Ten-Year Plan. I'll play the cards I'm dealt, but if the Good Lord goes along with the Plan and gives me ten more years of health and vigor, I'll have drunk the cup and found it pleasing. There won't be any grandchildren bouncing on my knee in the last days, but perhaps I might still decline with some measure of grace.

I wasn't afraid to explain this to Slim. I'm too old to be shy There isn't time. I told her she could be part of the Plan. Or not.

The stars were only beginning to fade as I rolled into Grand Junction. The thermometer read 23 at Roger's place.

A retired physician and a kind and learned man, Roger likes sweet cherries, and bees. He wishes I'd leave mine all Summer A devout Christian, he recently visited India, where he spoke to the Dalai Lama. "The Dalai Lama has an interesting perspective," Roger said carefully.

His half-acre of sweet cherries lies completely surrounded by the city Town grew up around that little oasis. It unnerves me leaving bees there, because the neighbors are too close, but the good doctor is so appreciative. I hid the little darlings behind a bush.

I made the rendezvous with my new customer and dropped off four hives in a cherry orchard set against stunning cliffs by the Colorado National Monument. The grower said he forgot his checkbook.

Now the sun was up. At breakfast in Palisade, I kidded the waitress a little. She called me, "Honey " On the road again, the world looked right.

Ed Colby

Slim And The Dalai Lama