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Laying workers can appear in a colony during any time of the year. All it takes is a colony to be hopelessly queenless for about three weeks, plus or minus, and the extended absence of queen pheromone allows development of ovaries in some workers. Of course these workers have not mated so produce only drone eggs; and they do not discriminate when choosing open cells and several eggs may be deposited in a single cell. Laying workers may also begin to produce some aspects of queen pheromone and thus be treated as queens by other workers. The Ultimate end of this drama, of course, is a colony that perishes because no new workers are produced. A laying worker colony at this time of year is considered a lost cause, and rather than expend time and energy trying to save what few bees are left, dispatch any stragglers and protect the equipment for next season. (photo by Bill Mondjack)

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

SEPTEMBER 2006 VOLUME 134 NUMBER 9

FEATURES

DEPARTMENTS & COLUMNS

Back To Bee Culture

I first kept bees in 1972, when I was 12, and one of the first things I did was subscribe to *Gleanings In Bee Culture*. My interest was diverted as I approached my twenties; my bees died out, and my subscription lapsed. In 2002 I perceived a void in my life. I had a career in the restaurant industry, and had recently earned a master's degree in psychology, but something was not right.

Under the guidance of unseen forces, I subscribed to *Bee Culture*. I guess the word "gleanings" has become rather quaint or archaic, but I still find myself using it when mentioning the magazine. Anyway, it wasn't long before I realized what was missing, and Christmas 2002 I had my mother get me a complete hive kit from Mann Lake. Spring 2003 I was back where I needed to be – among the bees.

Right now I have about 60 colonies and see no end. I am interested in developing and selling a locally adapted (SE PA) strain of honey bee, and have accumulated several parent stocks which are happily open-mating, creating a wonderful assortment of crosses from which I will select the most promising for I.I. when I can afford the equipment, hopefully in the next year or two. Then I will become a breeder, as opposed to simple producer, of bees for sale.

Bee Culture is the one publication I receive which is never discarded, and in fact is referred to quite frequently to refresh my memory or to simply be entertained once more by great stories.

Thanks for a wonderful magazine and for your insightful editorials, as well as your advocacy for the great passion in my life.

Tim Moran
Point Pleasant, PA

IBRA Reprint Update

As you and many of your readers will be aware the International Bee Research Association (IBRA) has undergone a number of radical changes to make it leaner, fitter and adapted to survival in the 21st Century. I am satisfied that all possible has been done to safeguard the library, museum and journal. Indeed, soon they will all be more accessible than ever before. However, I do have one outstanding dilemma.

There are about 70,000 scientific reprints at IBRA. These range from articles that have just appeared in the latest technical and scientific journals – and not just bee journals - including ground breaking papers from world scientists in their native languages and in English translation. Some of these date to the beginning of the 19th Century. I feel certain that today there are post-graduates writing PhD theses on material that is already in the IBRA library! They are not doing this in a wilful disregard of academic ethics but because they honestly do not know that this material exists.

Researchers and bee extension workers are re-inventing at least parts of the wheel everyday. Often using hard won funding and grants to prove the proven and not to discover the new. This is simply because most have not done a full literature search at the commencement of their project. But they are not to blame for this as the bulk of that specialist literature

is in fully catalogued but rather old-fashioned hard copy archives at 18 North Road, Cardiff and as such may be unknown to them and difficult to access.

The sheer bulk of it is quite incredible: nine, solidly packed, cubic metres (30, four drawer steel filing cabinets) of paper-based information. I know quantity is no substitute for quality but we are fortunate to have both quantity and quality – believe me that is a mountain of information.

My assumption is: people do not know what is at IBRA and therefore they do not turn to IBRA for information. Of course, and rather more depressingly, it could be that people are fully aware of what is here and have deemed it irrelevant to their work in the 21st century.

Do we have a chicken and egg situation - if they could access what is here would it be used?

If the answer is "Yes" then who will help me make it accessible which means, this day and age, online accessibility?

If the answer is "No" then perhaps the best place for over one million individual pages of paper is the incinerator. Solutions in a brief to the above address, please.

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More On Cane Toads

It is a shame I didn't know you were writing about Bufo marinus in a recent issue as I could have given you more photos to chose from, and perhaps corrected a few mistakes

before they were printed, e.g. Australia didn't get their "sugar cane toads" from South America; they got them from Hawaii. With nothing to do but eat and mate on the voyage, by the time the shipment cleared Australian customs, there were 35,000 Bufo marinus!

Then it gets interesting. The Australians noticed something which "slipped past" the Hawaiians, i.e., Bufo marinus lives on the ground whereas the beetles these toads were supposed to eat lived up on the sugar cane. As in Hawaii, Bufo marinus had no natural predators and quickly multiplied in Australia, but Australia has small, medium, and large kangaroos which influenced some Bufo marinus into evolving larger rear feet to make longer leaps. Meanwhile, back in Hawaii, Bufo marinus has remained true to the islands and just eats, sleeps and mates without seeing any need to change.

The airline industry made it unnecessary for the Hawaiian Bufo marinus to evolve longer feet. In only a few hours, it can be at Miami airport (where Bufo Mmarinus is a major pest) or leaping its way to a Texan beehive.

Rico Leffanta
Honolulu, HI

Bufo

Plastic Vs. Natural

In support of Editor Kim Flottum's position on plastic foundation, I have to agree with Kim. There are many good reasons to use plastic foundation. Wax moths can't damage it, it won't collapse in the extractor like wax foundation does. It's easier to install. Just snap it into the frame. If the bees make a mess out of the frame you can scrape it off and pressure wash it if you want and use it over again. It has been my experience that if you add beeswax to the foundation the bees will readily draw it out. I use wooden frames that have to be assembled (I enjoy assembling them, it helps pass the time in our long Michigan Winters) and buy unwaxed foundation and add my own wax. Both will cut the cost of the frames and foundation. I am sold on plastic foundation and will never go back to natural wax foundation.

So Kim, keep pushing the plastic foundation. I'm on your side.

Brent Bean
Sawyer, MI

Vinegar Treatment

Thanks for including my article on "Vinegar Treatment" in the July issue.

A number of beekeepers have called asking for a bit more testimony.

I'm a hobbyist of 31 years standing – all 18 of my colonies made it through last Winter. This was an exceptional event, as I'm surrounded by beekeepers who suffer losses regularly in the 30% range. We have all strong hives (double brood chambers, six to eight supers of honey each) and no discernable Varroa levels.

We did not treat for mites in the Spring because our August 05 "Cyclone" Treatment (and a chaser of Formic Acid for Tracheal mites) left the hives so parasite-free they marched through the Winter and stormed into Spring 06.

It's been over a decade since we've seen our bees this strong. Because we had no Apistan or Checkmite+ in the hives, we supered up for Maple honey in March, Poplar and Blackberry in April and extracted to make room for Sourwood in June.

I gave frames of brood from burgeoning hives to neighboring beekeepers instead of looking for early package bees from beleaguered suppliers.

Steve Qubeck
Waynesboro, TN

Absconding From Fire

I'm a backyard beekeeper and writer researching a particular aspect of beekeeping, and I could use the help of your readers. We've all been told that beekeepers use smoke at least in part to pacify bees since the bees will think there's a fire nearby and fill up with honey in preparation for leaving the hive. But my question is, has anyone actually "seen" honey bees abscond from the hive in the face of an oncoming fire? It's amazing, but I can find nothing involving an eyewitness account of this.

If anyone out there has actually seen or heard of this happening, or can point me toward a description of such an event in any of the beekeeping literature, I would love to hear about it! Thanks very much in advance for your help; my email address is apasas@comcast.net

Lisa Hutchins
Littleton, CO

Kudos From Iraq

Just received my July copy of Bee Culture over here in the desert and was pleasantly intrigued by the cover. It makes you laugh and brings back nostalgic moments reliving the hive life. It was entertaining and just plain fun to set and savor all the various and different personalities surrounding the beeyard.

Good job, Lela – hope you'll come up with some more. Be nice to have them suitable for framing.

In God's service, a fellow beekeeper – temporarily serving those who serve our great Nation.

God Bless America!

Paul A. Burch U.S. Army (Retired)
Camp Victory, Iraq

INNER COVER

Global warming? Kind of hard to convince most folks otherwise after this Summer I think. And in too many places it's been too much dry, where just a little bit of rain would have made a million dollar crop. But mostly, that million dollar crop just dried up and blew away.

Ron Phipps' analysis on page 13 paints an international picture, and when updated just a bit with late August harvest numbers it looks like there's going to be an honest and significant global honey shortage for awhile. Quite awhile in fact.

And late August reports of surprising colony crashes due to "*Varroa*-out-of-the-blue" infestations are running rampant. Crawlers, weird wings and far too few bees, along with the now classic PMS symptoms are everywhere, and speculation abounds that domestic bees for pollination will be as short as domestic honey come January.

Treating – legally treating – is tough too. Strips, where they work will help when you can afford them. Formic pads are legal and available everywhere, fortunately. ApiLifeVar is available where permits exist, and not where not.. but that may be changing. ApiGuard isn't to be found on any shelf because they ran out I hear, and after that...it's IPM all the way home.

Nutrition, honey bee nutrition that is, gets short shift too often. We neglect to think of it if the colony has honey, is heavy enough, and seems reasonably healthy (that may be a stretch this year). If there's 'some' pollen, then, the protein component gets forgotten. That may be a big mistake.

Some wise beekeepers and far-sighted scientists are beginning to think perhaps nutrition has been grossly overlooked as a necessary colony health measure. They are even beginning to think that Summer protein feeding has a place in the scheme of things. Definitely Fall, Winter and early Spring protein feeding hasn't faded – or haven't you been doing that? – as a necessary management task.

There's no doubt *Varroa* mites are at the bottom of many of the problems we have with late season colonies. But if you laser-beam focus on just controlling those mites, you may be missing some important stress and health management issues. Take a look this month. Feed a bee.

•

Honey bees make their living between the ground and God. Everything between those two absolutes is their fair game and all the things they touch, touch most everything else in the scheme of our universe.

In a corner of my gravel driveway a small patch of milkweed plants eke out a living every Summer. They sprout in the Spring, grow, blossom, produce and release their seeds for the next generation. Then, their work done they make way for Winter, leaving tall gray stalks in the snow and empty, split-winged pods to the wind. It's between sprouting and Winter that milkweeds shine and play their many roles.

Early on some years aphids feed on the undersides of their tender new leaves. Lady beetles and lace wings hone in on these soft green snacks. They'll eat some, then lay eggs in the midst of this dining event and move on to fresher fields. The young emerge, finish off the aphids or eat until they, too, mature and must move on.

Soon other milkweed dwellers appear. Monarch butterflies migrate in and survive only because of these coarse, ill tasting plants. Eggs laid become the distinctive yellow and black striped caterpillars that in turn spin those gem-like green-gold cocoons. These are a delight to behold and often a first insect lesson for grade school kids every Fall everywhere.

About then milkweed beetles, those slow moving, dull red and black, teddy bear-like leaf eaters appear, closely followed by hordes of striking black, gold and white fuzzy tufted moth larvae that, on a good year can strip a plant naked in a matter of days. They soon finish feeding and move on to the next part of their lives.

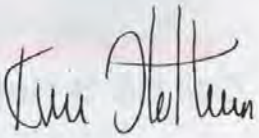
Of course when milkweeds bloom those fragrant flowers are loaded with bees from morning to night, and the honey collected is as delicate and wonderful as any you can imagine. While in the honey making process, though, those same busy bees make the seeds that fly away on silken wings to begin a milkweed patch in a driveway somewhere else; there to feed and shelter more generations of bees and beetles, bugs and butterflies.

Later, just before those now-formed seeds can escape, milkweed bugs show up to feed on those seeds hidden inside the plump green pods. These black and red bugs are also the focus of thousands of students each Fall in college labs across the land. They are as easy a lesson in metamorphosis as most professors can find. That's where I first met them.

Aphids and lace wings, lady beetles and monarchs, moths, bugs, bees and beekeepers all make their living in that milkweed patch. And honey bees make all the small parts of the big whole happen when they pay their pollinating respects to a milkweed's blossom.

Bees make their living between the ground and God, and everything between these two absolutes, everything in the scheme of things is on their menu of things to do.

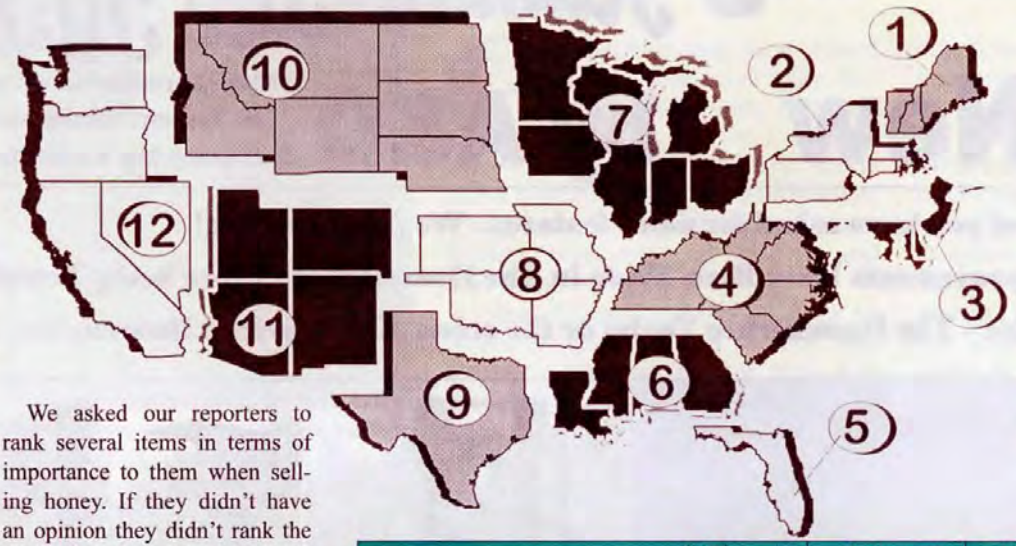
We too often forget the critical role in everyday life our charges play when talking to people who do not know of bees. Real life dramas are easy to understand, and easy to convey.



Nutrition; and,

Between The Ground & God

SEPTEMBER – REGIONAL HONEY PRICE REPORT



We asked our reporters to rank several items in terms of importance to them when selling honey. If they didn't have an opinion they didn't rank the item. The chart shows the percent that had an opinion, and, for those that did, the percent that felt that item was important, moderately important or not important. Look especially at Labels, especially those that have the name of the producer and that this honey is Local. Price and location are important also.

The take home message here is that, as you probably already know – letting your customers know absolutely that your honey is local is important. This is especially true if you're not standing behind the counter selling it directly.

Pure, too is important, but we didn't elaborate on why. Is 'cheaper' more important? Is 'expensive' detrimental?

Putting your name on the label – in fact putting lots of information on the label is important – how to reach you, the variety of honey in the bottle, the fact that it's local, and the price are all information tidbits customers need, and more importantly want to know.

	% That Had Opinion	Important	Moderately Important	Not Important
My Label	100	78	14	8
Glass Container	97	39	31	30
Plastic Container	87	20	40	40
12 oz. Size	76	42	37	21
1 lb. Size	86	64	19	16
2 lb. Size	77	45	25	33
5 lb. Size	73	31	28	41
Quart Jar	88	56	9	36
Pint Jar	77	43	16	41
Price	90	68	27	5
Local Honey	94	97	3	0
My Name On Label	92	71	18	11
Time of Year	91	42	29	29
Store I Sell In	75	64	10	25

	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	1.00	1.01	1.00	1.18	1.16	0.75	1.02	1.00	1.00	0.95	0.91	1.00	0.75-1.18	1.00	1.02	0.99
55 Gal. Drum, Ambr	1.07	0.85	1.05	1.22	0.80	0.95	0.91	1.07	1.00	1.07	1.05	1.00	0.80-1.22	1.00	0.94	0.85
60# Light (retail)	108.33	113.00	125.00	97.54	115.71	106.67	88.38	96.25	180.00	115.71	120.00	164.00	88.38-180.00	119.22	105.91	104.08
60# Amber (retail)	97.50	109.67	120.00	94.75	114.81	95.50	81.83	105.00	140.00	115.00	29.00	136.33	29.00-140.00	103.28	101.05	95.52
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	42.12	53.32	40.80	38.79	48.12	48.00	37.77	48.12	48.12	35.76	33.50	59.87	33.50-59.87	44.52	38.29	51.31
1# 24/case	60.16	65.28	62.40	56.88	72.00	66.00	59.80	62.40	50.40	63.12	89.00	86.64	50.40-89.00	66.17	65.80	62.20
2# 12/case	63.34	62.32	60.60	53.90	72.00	55.50	53.07	66.00	48.00	57.84	27.00	74.50	27.00-74.50	57.84	55.13	54.06
12.oz. Plas. 24/cs	58.56	64.22	58.17	48.21	58.17	60.00	47.56	51.60	51.60	47.64	66.00	65.00	47.56-66.00	56.39	49.84	53.05
5# 6/case	63.13	68.99	70.50	57.70	66.20	66.20	58.73	50.00	57.00	56.43	23.00	79.00	23.00-79.00	59.74	59.18	59.85
Quarts 12/case	99.55	120.75	99.55	82.44	99.55	85.00	88.80	78.00	84.00	110.88	89.40	107.00	78.00-120.75	95.41	85.60	84.00
Pints 12/case	57.07	60.98	57.07	50.38	57.07	52.75	48.00	44.50	54.00	49.50	22.00	60.00	22.00-60.98	51.11	53.90	53.14
RETAIL SHELF PRICES																
1/2#	2.70	2.54	2.19	2.54	1.79	2.36	2.27	2.60	1.97	2.58	2.39	3.76	1.79-3.76	2.47	2.51	3.03
12 oz. Plastic	3.88	3.51	3.50	3.24	2.99	3.37	2.90	3.70	3.09	2.93	3.19	4.29	2.90-4.29	3.38	3.17	3.21
1# Glass/Plastic	3.89	4.19	4.20	3.98	3.50	3.75	3.48	4.31	3.50	3.62	3.70	5.40	3.48-5.40	3.96	3.91	3.94
2# Glass/Plastic	7.46	6.59	7.80	6.01	5.49	6.12	5.53	7.91	6.31	5.64	5.88	9.00	5.49-9.00	6.64	6.49	6.51
Pint	6.27	7.58	6.27	5.03	5.99	4.93	5.50	5.24	5.00	6.14	5.18	7.00	4.93-7.58	5.84	5.90	5.93
Quart	10.41	10.65	10.41	8.33	7.89	8.05	9.25	9.50	8.88	10.24	8.34	11.90	7.89-11.90	9.49	10.17	9.39
5# Glass/Plastic	13.83	13.66	15.29	14.41	15.00	10.99	11.86	16.00	15.00	13.80	11.14	18.25	10.99-18.25	14.10	13.66	13.62
1# Cream	5.70	5.69	4.95	4.68	5.77	3.59	5.24	4.19	5.77	4.64	4.74	5.88	3.59-5.88	5.07	4.98	5.88
1# Cut Comb	6.13	5.15	4.95	4.74	7.24	4.83	6.16	4.66	7.24	6.00	7.75	8.10	4.66-8.10	6.08	5.98	5.48
Ross Round	5.50	3.98	4.00	5.51	5.96	5.96	5.77	4.25	5.96	6.00	5.83	7.50	3.98-7.50	5.52	5.40	5.07
Wholesale Wax (Lt)	2.44	2.40	1.50	1.63	2.47	2.58	2.26	2.25	2.50	2.47	1.44	2.67	1.44-2.47	2.22	2.45	2.38
Wholesale Wax (Dk)	1.81	1.99	1.40	2.10	2.35	3.13	2.09	1.50	2.00	2.35	1.79	2.35	1.40-2.00	2.07	2.14	2.13
Pollination Fee/Col.	55.00	67.50	52.50	40.00	78.82	40.00	45.33	60.00	35.00	78.82	24.00	85.00	24.00-85.00	55.16	52.09	45.66

International Honey Situation

Exerpts From The July 2006 Report

Ron Phipps

The international honey market is facing a major supply shortage. This has prompted increased crises for honey on the international market and promises to sustain that tendency. Though there are always ups and downs, this tendency of stronger prices is more likely than not to be sustained over a longer term.

This view is a reflection of realities in Europe, Asia, North America and South America. On the global scale, as reflected in the media in the U.S., Europe and Asia, there is growing concern about several factors:

1) The global climate;

2) The inflationary impact of higher petroleum prices and shortages of petroleum;

3) The unsustainable large trade and national deficits in the U.S. which will prompt global inflationary pressures relative to U.S. pricing for commodities; and

4) The increased pricing for the alternative sweeteners with which honey competes.

Argentina

The 2005-2006 crop was significantly reduced from the preceding year's large crop of almost 110,000 metric tons, to which was added the burden of carryover from the preceding crop. Additionally, in 2005, Argentina's honey exporters had to compete with Chinese new shippers who were not paying their antidumping duty liabilities and were burdening the international market with terribly low prices.

Market conditions have changed dramatically in Argentina. Their crop was about 75-80,000 metric tons with no carryover. Argentina exported over 50,000 metric tons as of June of this year. New crop Argentine honey, which may be subject to increased antidumping duties, will not happen until February-March.

Argentine beekeepers are very reluctant sellers of their remaining inventory. They sense a rising market. They fear a declining U.S. dollar. They also know that if the North American honey crop is below average, there will be another surge in prices, hence they are waiting.

Offers from the beekeepers are going to be few and far between until they have an accurate and objective assessment of the crops in the northern hemisphere in general and North America in particular.

China

According to the FAO's report in May, 2006, large swathes of north and west China suffered food shortages due to prolonged drought. China's 2006 honey crop began late and was short. The early crop is predominantly rapeseed, which produces a white and fast-crystallizing honey. The rapeseed is also used as the base for China's ELA which is typically blended with other honeys. Interestingly, it was hard to obtain offers and to have shipments effected from China during the first half of 2006. A major reason for this difficulty was the shortage of cane sugar. Guangxi Province in the southwest had a severe drought in the late Summer and early Autumn of 2005 which resulted in the devastation of China's sugar crop. The Chinese government had to dip into their sugar reserves. The price of sugar soared and its availability shrunk. It has been reported that this caused approximately 22,000,000 pounds of honey to be purchased by food manufacturers within China, who had to replace sugar with honey. The purchase of this large amount of honey to replace sugar caused the cancellation of perhaps hundreds of containers that had been purchased, albeit at terribly low prices, for export, including to America.

What happened in China this spring may be a harbinger of the future, i.e. a reformulation not away from honey but to honey, due to rising prices and the scarcity of alternative sweeteners. Also, Brazil is claiming energy self-sufficiency achieved through the conversion of its massive sugar fields into ethanol. Biofuel factories are being established in mid-America and Canada for the conversion of sugar, corn and canola into biofuels.

This increased demand for canola, corn and sugarcane is likely to significantly increase the prices for sweeteners, including high fructose corn syrup. If and when this happens, we may see major manufacturers in America not merely using the name honey but actually using quantities of honey.

The May-June acacia crop was a huge failure in China. The few containers of acacia honey that were offered in early July were offered at $1.25/lb. Even industrial honey from China had risen to price levels of about $.80/lb. which is about 60% higher than the prices from new shippers just one year ago. It remains very difficult to get Chinese honey, just as it remains very difficult to get Argentine honey.

China, with a population which is more realistically estimated at 1.3 to 1.5 billion people, is consuming more honey, especially as it is incorporated as a sweetener in more food and beverage products. Chinese honey companies are promoting honey through advertising in China, which will increase domestic demand.

China's currency is under pressure from the U.S. government to re-value its currency, which will add to upward price pressure.

Vietnam, India & Southeast Asia

The short 2006 Vietnamese honey crop, estimated at 13,000 metric tons, has been virtually sold out.

The Vietnamese government and the Vietnamese beekeeping association, realizing that Chinese exports

to the U.S. may be cut off toward the end of this year, have issued rules to prevent the importation of Chinese honey and thereby prohibit Vietnam being used as a point of transshipment for China.

Considerable attention has been paid to the unexpected surge of Indian honey which arrived in the U.S. during January to March, 2006, of about 9,000,000 pounds, compared to the preceding year, in which there was less than 1,000,000 pounds imported for this period.

There is concern that Thailand, Malaysia and Indonesia, which have large Chinese speaking business communities, as well as Taiwan and India, may be or are being used for transshipment.

United States

The U.S. honey crop is most certainly going to be below average, Florida had a poor orange crop. California's year began with drought, followed by rain, which prompted hope for a good orange and sage crop, but beekeepers reported that even in April, when the bees should have been making honey from a good nectar flow, they were going in to the fields to feed the bees. The temperatures in April were very low, and the rainy season, which is typically December to February, was unusually late, the latest since 1921. The same phenomena occurred in June in the Dakotas.

By May 1, there was a surplus of only 7,000,000 pounds of honey beyond normal levels. Since the U.S. crop is both late and short, that surplus can quickly disappear.

The clover belt by the West River in South Dakota was yellow and brown in June. The clover crop in South Dakota will be significantly reduced. Clover has sold as high as $1.25/lb. in the last few weeks. For many beekeepers, whatever the price, there is no clover because there is drought. By May, one third of the U.S. was experiencing drought.

Some have said that there is so much honey under the loan program that it doesn't matter what this year's crop is. The facts are that by the end of May, much of that honey was already sold. Some packers who store honey under that program had no honey from the previous crop in May. Additionally, the high pollination prices had provided adequate cash reserves for many beekeepers, whose need to unload honey in the face of a rising international market was thus eliminated.

The late rains did not help as much as anticipated. The sage crop is poor and spotty, the orange crop was less than 50%. Many California beekeepers left for the north a month earlier than usual. The Chinese Tallow crop in Texas was below average. North Dakota, Kansas, Colorado, Mississippi were very dry. In a general way the bees left California, Texas and Mississippi for the north in a very weak condition. Beekeepers had to feed their bees as late as the end of June. The large clover belts in eastern South Dakota were very dry. Florida had virtually no orange honey crop.

Antidumping

In December, 2006 there should be an announcement of new antidumping duty rates for the major exporters from Argentina. An increase will exert additional upward pressure. In December, 2005, several Chinese new shippers obtained duty rates that increased from 115% to over 200%. This sent a warning to other Chinese exporters. However, 93% of the duties owed on Chinese products under antidumping orders for the period 2003-2005 went uncollected by U.S. Customs.

Argentine honey exporters, who lost their appeal, are now subject to expensive and time consuming cost investigations by the DOC.

In May we learned that the bond loophole may not be closed as imminently as expected, due to partisanship in Congress, which may persist until after the November elections. Both the house and the senate have voted to support the bills that would close the loophole. The House Ways and Means Committee, however, currently wants to do other things as well. Therein lies the rub.

Fortunately, the period it was open problems with honey crops in China and Argentina prevented honey exporters from using the loophole to depress the honey market. The loophole closed in mid-August.

Global Honey Standards

The fluctuating crops of the world's honey producing countries make it necessary for international honey trade to provide the quantity and quality needed to satisfy the major honey consuming nations. Additionally, we all know that bees are not invulnerable to disease. As a consequence, beekeepers throughout the world must protect their bees. Honey cannot be produced in a mythical state of absolute purity.

It is necessary, in my view, that we work to find better ways to protect our bees, and establish standards with detection levels and action levels which are reasonable and realistic. Our goal is to protect people and to protect bees, not to create standards which represent the extremes of scientific analysis. If we used the extreme testing capacities of modern test instruments, and ignore the statistical problems in complex mediums, then human beings could neither breathe the air, drink the water, nor eat the food that they eat.

Either low prices or extremist standards can destroy any industry.

Conclusion

Hopefully the market trends and conditions described above will result in a healthier market. BC

RESEARCH REVIEWED

The Latest In Honey Bee Research

Steve Sheppard

"These papers demonstrate continued progress in our understanding of mechanisms that are likely to play a large role in the future of honey bee/mite interactions."

With the establishment of both tracheal and *Varroa* mites in U.S. honey bee populations, beekeeping as it was previously known underwent major changes. In the last two decades or so, beekeepers have learned about the use of pesticides inside beehives and, in the case of *Varroa destructor*, have also learned about the ability of rapidly reproducing parasitic mites to evolve resistance to those pesticides. Even those with only moderate "crystal ball viewing" or "handwriting on the wall" skills can appreciate that the long term solution to these pests will more likely involve something other than a chemical solution. In fact, most recently the bulk of the promising news seems to come from the bees themselves, as breeders incorporate selection for increased mite tolerance or resistance into their honey bee breeding program. This month's column will take a look at two recently published papers, one on *Varroa* and one on tracheal mites, that provide further insight into this unfolding story of the interactions between honey bees and mites.

Within the world of bee breeding strategies for resistance to *Varroa* mites, selection for the trait known as SMR (suppression of mite reproduction) is well-known. This has been understood to be a heritable trait of bees, whereby an associated population of *Varroa destructor* is much less able to reproduce on SMR bees than on bees that have not been selected for the trait. As the verification of the trait typically relied on an examination of mite-infested cells to determine the proportion of mites that were reproducing, the mode of action of this trait remained somewhat obscure. Was there something about the bees that simply caused them to be less suitable as hosts for reproduction; i.e. some nutritional deficit in the bee brood? The answer now seems to be clearly...no. Two USDA researchers from Baton Rouge recently demonstrated that the mechanism involves an aspect of adult behavior whereby bees preferentially clean out cells where *Varroa destructor* are reproducing, something that could be referred to as "*Varroa* hygiene" (Harbo and Harris, 2006).

In their experimental design, the researchers took two frames of capped brood infested with *Varroa destructor* from infested "source colonies" and placed one frame in each of two colonies, a normal (control) colony and a colony selected for expression of the SMR trait. A total of nine SMR and eight control colonies were used. After an additional seven to nine days, the researchers examined the colonies to determine mite reproduction. What they found was that the rate of infestation was 2.2 infested cells per 100 capped cells in the SMR colonies and nine infested cells (per 100 capped cells) in the controls. Of the cells that were infested; in the SMR colonies only 20% of them contained reproductive mites (mites with offspring that would be mature enough to survive at the expected emergence date) compared to 71% in the control colonies. These differences were statistically significant and the researchers concluded that it was the adult bees within SMR colonies that affected the mite population after the mites entered the cells. That is, the adult SMR bees effectively detect reproducing mites under the cappings and then open the cells and remove the infested bee larvae. The authors point out that although the fate of the mites that were removed is unknown, the "removal of reproductive mites is a concise mechanism of resistance that can be traced to a specific behavior of the bees." Interestingly, this form of "*Varroa* hygiene" has some parallels with what is widely known as "hygienic behavior." If further study could provide us with simplified methods to assay or select for *Varroa* hygiene, similar to that reported by Spivak (1996) for hygienic behavior, then widespread inclusion of selection for SMR in honey bee breeding programs would be encouraged.

Tracheal mites spend most of their lives inside the breathing tubes of honey bees and are therefore not very susceptible to outside influences. However, early in their life, adult female tracheal mites actively seek out and transfer to young adult worker bees and during this time they are perhaps most susceptible to the defense mechanisms of bees. In recent years, the role of grooming by honey bees as a defense against transferring tracheal mites has become more clear, thanks especially to research by scientists at the USDA-ARS honey bee laboratory in Baton Rouge, Louisiana. In a recent paper, Jose Villa of the Baton Rouge lab demonstrated that a specific type of

self-grooming (autogrooming) was fundamental to the tracheal mite defense of resistant honey bees (Russian strain) and that, although they were less "attractive" to mites, aging workers also managed to use autogrooming to reduce the chances of being infested (Villa, 2006). In setting up the experiments, Villa prevented autogrooming activity of individual adult honey bees by gluing together their middle pair of legs. The assay involved placing the marked test bees into colonies with high mite levels (inoculation colonies) for five or six days, followed by dissection to establish their infestation status. He found that, when autogrooming was prevented, both susceptible and resistant strains of honey bees had significantly higher infestation levels of mites than the control group (bees with legs left unglued). In the control bees, the resistant Russian strain had lower levels of mites than in the susceptible group. In experiments testing the effects of worker age, the infestation rate of bees that were introduced at an older age into the inoculation colonies was reduced (as was expected), but the effect of preventing grooming (by gluing the legs) could still be detected. The author concluded that "grooming with the midlegs to remove female tracheal mites is the primary mechanism of resistance in Russian bees." He pointed out that the mechanism of resistance in older workers may involve chemical changes and therefore be more involved than simply grooming. However, given that the autogrooming trait occurs at some level even in susceptible strains of honey bees, Villa makes the argument that selection for autogrooming by breeders may be an efficient way to produce tracheal mite resistant honey bees.

Taken together, these papers demonstrate continued progress in our understanding of mechanisms that are likely to play a large role in the future of honey bee/mite interactions. That is, at some time to come there is reason to imagine that honey bees and these parasites will reach a point where the bees can tolerate the parasites and the parasites will not kill their hosts. Clearly not a return to the old "pre-mite" days for U.S. beekeeping, but of all the possible outcomes, still highly preferable to continuing to run along on a pesticide treadmill. BC

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Harbo, J. R. and Harris, J. W. 2005. *Suppressed mite reproduction explained by the behaviour of adult bees.* Journal of Apicultural Research. 44:21-23.

Spivak, M. 1996. *Honey bee hygienic behavior and defense against* Varroa jacobsoni. Apidologie. 27:245-260.

Villa, J. D. 2006. *Autogrooming and bee age influence migration of tracheal mites to Russian and susceptible worker honey bees* (Apis mellifera L*).* Journal of Apicultural Research and Bee World. 45:28-31.

Malcolm T. Sanford

The FOURTH Individual In A Honey Bee Colony

"Keen insight on the honey bee/Varroa relationship from a queen breeder in Argentina."

On my visit to Argentina, I was fortunate to link up with one of the most progressive queen producers in the country, Mr. Martín Braunstein. Trained by several U.S. queen breeders, including the legendary Wilbanks in Claxton, Georgia (a town known for its fruitcakes as well as honey bees), Mr. Braunstein and his partner, Sonia Verettoni, have developed a healthy international market for their stock. A visit to their website reveals direct marketing of queens to the Caribbean, North Africa, Eastern and Western Europe and Asia.[1] Clearly Malka queens, "four-wheel drive bees without borders," have found a good following among the world's beekeepers. However, they have not yet been able to crack the U.S. market in spite of a long-lasting petition directed toward USDA/APHIS/PPQ. Justification for this request was published in a letter to the American Bee Journal in March, 2004, which in part stated:

"After suffering the importation of mites through illegal smuggling, and unwanted genetics, pests and disease through other actions, American are understandably concerned about allowing the importation of ANY foreign bee imports. All the bad consequences of foreign imports have already happened, but none of the potential benefits have ever been realized. We are sure that the legal importation of our MALKA queens would represent the other side of the equation. Among the lines of bees that we work with we breed a very productive, but little known, hybrid cross between Caucasian queens and Italian drones which are known as **Caucasit**."[2]

Subsequent to visiting Mr. Braunstein's operation in La Plata, a town on the River Plate (Rio de la Plata) just to the south and east of Buenos Aires, the capital, I can say that clearly MALKA queens are produced under the same rigorous standards as found in the United States. Now that Australian honey bees have been admitted to this country, perhaps APHIS will take a second look at the MALKA queen petition.

While discussing queen producing techniques and other issues about beekeeping in general, Martín asked me the simple question, "How many individuals are in a honey bee colony." The stock answer I gave was something every beginner is taught: "Three of course: drone, worker and queen." There are four Martín countered his eye twinkling. When he saw my initial confusion (he had caught the "professor" off guard), he continued that any discussion of a honey bee colony must now include the ever-present *Varroa* mite.

Later as I thought in depth about this, I could see Martín's point more and more clearly. But what first popped into my head was the "12th Man" in an American football game. Here's information from the Wikipedia "open encyclopedia" about that subject.

"The **12th Man** is a tradition at *Texas A&M University* regarding its *football* team. The Texas A&M student body acts as the "12th Man" for the football team and stands throughout the entire game, ready to help the team should the need arise (now through the use of "yells" led by *Yell Leaders*, in an effort to pump the team up). The term has been trademarked by Texas A&M (U.S. Reg. No. 1948306). In January 2006, A&M filed suit against the *Seattle Seahawks* to protect the trademark. In May 2006, Texas A&M and the Seattle Seahawks settled the dispute out of court. In the agreement, Texas A&M will allow the Seahawks to continue using the phrase '12th Man' provided the NFL franchise acknowledges that the trademark on the slogan belongs to the school.

"The effects of the '12th Man' vary widely, but can be put in two categories. The first is simply psychological, the effect of showing the home team that they are appreciated, and showing the away team that they are somewhat unwelcome. The second seems far more important, and it directly relates to the deafening effects of a loud crowd."[3]

Immediately apparent is that the 12th Man is always present in a game, especially one with high stakes, and the other side must take this into consideration. And often this provides enough "home advantage," which is in fact just that little extra teams need in order to win.

That the *Varroa* mite provides an apt analogy as the 4th individual in a bee colony, just as does the 12th Man in a football game, might be a stretch for some. But this is not the case when one takes into consideration what I have seen as a prevailing attitude among the beekeeping industry, that the mite is transitory, and can be looked at as something that can be eliminated (eradicated) at will through use of management and/or chemical treatments.

Looking deeper into the subject other thoughts come into focus. The mite is not a run-of-the-mill parasite, for the honey bee has little answer to its depredations it seems, just like any team has for the other side's 12th Man in a football game. The mite is locked into the honey bee life cycle in ways we still don't fully understand. It is obligated to the honey bee, and thus cannot live isolated from the bee for much time. A résumé of the mite's biology found in the book Mites of the Honey Bee[4] reveals that the *Varroa* mite's life history is made up of two separate phases, both intimately connected to the life cycle of its honey bee host.

The phoretic or "carrying" phase

Martin Braunstein, left and Malcolm Sanford in one of Martin's queen yards.

is characterized by female mites hitching rides on honey bees as they fly among and enter different colonies. Male mites die after bees emerge from a mite-infested cell, but mated, mature females are extremely well suited for life on adult honey bees. They are flattened and often can be found hidden between the armored plates (sclerites) of the honey bee abdomen. The thin membrane between armored segments found in the honey bee is pierced by the mite's specialized knife-like mouth part, which then gives it access to the bee's blood (haemolymph). The mites' carapace is also hardened just like that of the bees to reduce water loss from the body, and they have specialized claws to grasp the many hairs found on a honey bee. There is evidence that the chemical makeup (cuticular hydrocarbon profile) of the *Varroa* mite skin is very similar to the honey bee's, such that the bees may not be able to distinguish themselves from the mites, making it more difficult to find and dislodge them during routine grooming. Finally, the mite can survive a long time on adults while brood is absent, biding its time until reproduction becomes possible.

Varroa mites are distributed via phoresis through three behavioral mechanisms shown by honey bee colonies. Those weakened through starvation or predation, which provoke robbing, are a prime source of mites for otherwise healthy, strong hives. Not only are robber bees themselves infested, but workers abandoning weak colonies are prime sources of *Varroa* mites.

Drifting honey bees, those that may visit a number of colonies, also spread mites. This particularly involves drones, which are universally accepted into colonies, and can enter a large number during their lifetimes.

Finally, although of minor importance, swarming certainly contributes to the distribution of mites. This behavior also coincides with peak populations of honey bees and brood, and, therefore, results in more mites.

The reproductive phase of mites also shows how tightly they are interwoven into the fabric of honey bee colonies. Not only are certain cells more attractive to female mites, but also the ages of the larvae and workers involved. Mites prefer drone brood, which allows them a longer time for reproduction because of the increased post capping time than found in workers, and also are attracted to younger workers (nurses) over older adults (foragers). The latter behavior means that mites will have a better chance of encountering a brood cell with a suitable occupant. Once a female mite enters a cell, it hides itself in the brood food and has specialized structures (peretrimes) that allow it to breathe while encased in a liquid environment.

Evidence suggests the timing of the mite's first feeding is critical if the female is to reproduce. Because the entire reproductive process must take place within a certain time frame (and this is dictated by the bee's developmental cycle), observers have concluded that *Varroa* has greatly compressed its early developmental stages, actually eliminating a normal "six-legged larval stage" found in most other mites. Proteins from the bee's haemolymph also show up unaltered in mite eggs, a phenomenon known to occur only in a few other parasitic arthropods.

Mites establish feeding sites by pushing aside bee legs. Defecation areas are also developed, which provide places for "resting" in between feeding, and also are used during copulation. Mite young (protonymphs) require maternal care in order to survive, suggesting that *Varroa* in fact shows some evidence of prenatal care and, thus, a basic sociality similar to its host. The mite has not yet adapted fully to its new host, however, for population development occurs at a similar rate in both drone and worker cells, and in different races of *Apis mellifera*. It appears the mite could greatly increase its reproductive rate, for example, by decreasing by two the number of eggs laid in *A. mellifera* drone cells and decreasing by one the number laid in worker cells.

Beyond basic biology, the honey bee colony's health is directly related to predation (existence) of *Varroa* mites in several ways, including challenges from other organisms. What has become a mantra for bee inspectors and others is that one must control *Varroa* BEFORE any other disease management strategy can possibly hope to be effective. This particularly includes the newest problem facing more and more colonies and beekeepers in the United States, the small hive beetle Aethina tumida (SHB).

Management of mite populations, therefore, becomes paramount in honey bee management. This of course has transformed beekeeping around the globe. Techniques and tips written in the older literature that worked for what seemed time memoriam must now be modified based on the presence of *Varroa*. One that comes to mind is population manipulation for mite control besides

that for buildup and swarming.

And let's not forget the transformation of the beekeeper from someone with a revulsion for of all pesticide use to an avid practitioner. The insertion of chemicals inside a living beehive and the potential management problems this practice creates in an effort to eradicate or remove *Varroa* has had a mixed history. Yes, mites have been killed and their population reduced, but at what cost? Potential contamination of the world's beeswax supply and possible effect on honey quality because of this practice continues to concern everyone involved with the beekeeping industry. This is especially important because the mites have shown themselves extremely adaptable by exhibiting high rates of developing pesticide tolerance and/or resistance, meaning not only increased dosages are needed, by also more toxic compounds are required.

The full results of what either hard or soft chemicals do inside a beehive are still out. It seems increasingly important that what are known as "sub-lethal" effects (those not actively killing bees, but impacting colonies in some way that cannot be readily detected) of pesticide treatment should be analyzed more rigorously. Given what we know about beeswax as a sink for many pesticides and their carriers, and the exquisite pheromonal balance of a honey bee colony, it seems reasonable to suggest that continued application of chemicals, whether hard (Apistan® or CheckMite+®) or soft (essential oils and organic acids), must be having some kind of effect on overall honey bee productivity. It is known, for example, that even minor manipulation of colonies can affect resultant honey production.

The use of chemicals, therefore, in an effort to remove *Varroa* from a colony is a philosophy that many have counseled, often with limited success, must be changed in a fundamental way. Thus, a shift in thinking is in order from ridding colonies of mites to living with them, the essence of what many now call integrated pest management or IPM. If others such as Martin. Braunstein would insist that the 4th individual in a bee colony, like the 12th Man in a football game, is here to stay, and each and every bee colony and beekeeper must contend with this fact from now on, the desired effect might be achieved. BC

References:
1. www.malkaqueens.com/, accessed July 19, 2006.
2. www.malkaqueens.com/espanol/prensa/ambee/ambeecarta2004.htm. accessed July 19, 2006.
3. en.wikipedia.org/wiki/12th_Man_%28Texas_A%26M%29, accessed July 19, 2006.
4. Webster, T.C. and K.S. Delaplane, Eds. 2001. *Mites of the Honey Bee*, Dadant and Sons, Inc.

FOOD SAFETY AND HACCP

These HACCP costs would be easier to justify if beekeepers were assured that they would be paid a higher price for any honey produced consistent with a voluntary HACCP plan.

Sylvia A. **Ezenwa**

The United States honey industry has been heavily impacted in recent years by bulk honey imports, especially from China. But the enormity of the impact, perhaps, only truly became apparent six years ago with the filing of an unfair trade claim by several U.S. honey producers. That claim, filed in September 2000, by the American Honey Producers and Sioux Honey Associations, alleged that honey imports from Argentina and China were being illegally dumped onto the United States market. Basically, U.S. honey producers were accusing foreign manufacturers and domestic importers of selling Argentine and Chinese honey in the United States at a price below the cost of production, or below the price that it was being sold in the foreign home markets. Why? So as to gain U.S. market share or maximize profits and minimize losses in production in their home countries.[1] The U.S. International Trade Commission (I.T.C.) and the U.S. Department of Commerce launched an investigation into the allegations; and, in May 2001, the Commerce Department made a preliminary determination that the U.S. Customs Service should collect antidumping duties on honey imports from certain Chinese companies. Later that same year, in November 2001, the I.T.C. made a final determination that the U.S. honey industry – made up of beekeepers, beekeeper-packers, and packers – was being materially injured, both by the subsidization of honey imports from Argentina by the Argentine government, and by the sale of Argentine and Chinese honey imports in the United States at less than fair value.[2] The unfair trade case ended with the Commerce Department imposing antidumping and countervailing duties on Argentine honey imports and antidumping duties on Chinese honey imports, and increasing the duty rates between 34 and 184 percent. [3]

Soon after, the U.S. Customs Service (Customs) was informed of a scheme designed to evade the antidumping duties, involving the illegal transshipment of Chinese honey imports into the United States through third-party countries, including Australia, Mexico, Malaysia, Thailand, and Vietnam. In June 2002, Customs began investigating the illegal transshipments; and, in the process, tested samples of bulk Chinese honey from containers seized and detained at U.S. ports. The samples were contaminated with low levels of chloramphenicol, an unapproved food additive and an antibiotic of last resort, mainly used to treat potentially fatal infections in humans when other treatment alternatives are unavailable. Chloramphenicol use in food or animal feed products is illegal in the United States because the potential side effect – a condition known as idiosyncratic aplastic anemia – though rare, is life-threatening in a few susceptible individuals.[4] Customs immediately notified the U.S. Food and Drug Administration (FDA) because of the serious public health issues associated with chloramphenicol, where further analysis of the seized samples by FDA laboratories confirmed the presence of chloramphenicol in the imported Chinese honey.[5] So, in an August 28, 2002 joint Customs/FDA press release, the enforcement agencies announced that:

> *Since the discovery of chloramphenicol in the Chinese honey imports, Customs has been stopping all suspect bulk imports of honey for the FDA to test for the presence of chloramphenicol. The FDA has developed a method to confirm levels in honey at one part per billion. . . .*
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> . . . .
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> *The FDA and Customs are continuing to coordinate their enforcement strategies and will be detaining or seizing any honey imports that contain chloramphenicol to ensure that they are not released for human or animal consumption in the United States.* [6]

Apparently, just as FDA testing for chloramphenicol has begun, a new threat to the U.S. honey industry has emerged – ultrafiltered or "UF" honey. As reported in a July 21, 2004 article in the United Kingdom newspaper, The Guardian, UF honey was first noticed in the U.S., and is:

> *according to most honey experts, not honey at all. Instead it is "a sweetener derived from honey" – honey that has been diluted with gallons of water, heated up to a high temperature, passed through an ultra-fine ceramic or carbon filter, and then evaporated down to a syrup again. In the process, every trace of impurity – including, some believe, traces of chloramphenicol – are removed.* [7]

The Guardian article goes on to say that:

> *Bruce Boynton, chief executive of America's National Honey Board told the Guardian: "I am not aware of chloramphenicol-contaminated honey entering the U.S. any more. Now it looks like they have found a way to remove the contamination. At least some of the stuff coming in from China appears to be something other than honey." In a test by the board earlier this year, nine out of 69 samples taken from American supermarket shelves proved to be UF honey.* [8]

The potential risk of chloramphenicol-contaminated Chinese honey, and now, actual UF honey, in the U.S. retail market has honey packers concerned about how to reassure American consumers about the safety and purity of the hive product. And with the U.S. Customs Service stopping only "suspect" bulk honey imports for the FDA's chloramphenicol testing, that leaves non-suspect (presumably, non-Chinese) honey imports, as well as U.S.-produced honey that may harbor other contaminants, unmonitored. But if not the federal (or state) government, who is to ensure the safety and purity of this unmonitored imported and domestic honey? Apparently, honey packers, who are increasingly requiring beekeepers to develop and implement voluntary HACCP (Hazard Analysis and Critical Control Points) plans for their honey production and processing facilities or "honey houses."

Identifying Honey and Bee Product Contaminants

Despite the continued focus on chloramphenicol, it is by no means the only source of contamination for bee colonies. Contamination sources for honey and bee products can be either apicultural or environmental.[9] Apicultural contaminants are substances used by beekeepers to control bee pests, including: (i) acaricides for *Varroa* control; (ii) antibiotics against American and European foulbrood; (iii) pesticides for wax moth control; (iv) pesticides against the small hive beetle; and (v) bee repellants used during the honey harvest.[10] Environmental contaminants are substances that reach the raw materials of bee products (e.g., nectar, honeydew, pollen) through air, water, plants, or soil, and which are collected by bees and carried back to the hive.[11] Environmental contaminants include: (i) residues of pesticides used in agriculture; (ii) heavy metals (e.g., lead in the air from automobile traffic, and cadmium in the soil from the metal industry and incinerators); (iii) radioactivity, either of natural or man-made (i.e., atomic power) origin; (iv) pollen from genetically modified organisms, such as canola and corn; and (v) pathogenic bacteria such as *Clostridum botulinum* in honey, which can cause infant botulism.[12]

Identifying which of these honey and bee product contaminants pose hazards to the safety of honey produced and processed in your honey house is the first step in developing a HACCP plan.

Developing a HACCP Plan

In 1996, the U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS) issued a HACCP rule requiring all federally regulated and inspected meat and poultry plants to:

> *develop a HACCP plan to identify and control pathogens in their products, meet targets for the reduction of microbial pathogens, conduct microbial testing to determine compliance with the targets, [and] establish and follow written sanitation standard operating procedures. Plants and FSIS share responsibility for verifying the effectiveness of the HACCP system . . . .*
>
> . . . .
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> *In December 1995, FDA announced a rule requiring seafood processors to identify hazards that, without preventive controls, are reasonably likely to affect the safety of seafood products. If at least one such hazard can be identified, the seafood firm is required to adopt and implement an appropriate HACCP plan. . . . Seafood processors using a HACCP plan continue to be monitored under FDA surveillance and inspection programs . . . .*
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> . . . .
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> *January 18, 2001, FDA published final regulations requiring that all domestic and foreign fruit and vegetable processors use HACCP procedures to prevent, reduce, or eliminate hazards in juices.* [13]

Unlike federally regulated meat, poultry, seafood, and fresh and processed juice plants, there are no mandatory, federal HACCP rules for honey houses. And in the absence of federal regulations, private sector honey packers have begun – and are entitled – to include as a key component of their corporate food safety policies, a requirement that certain or all of their honey suppliers develop and implement voluntary HACCP plans to monitor and control honey production operations.[14]

To develop a HACCP plan for your honey house, you must:

> *first identify food safety hazards and critical control points in [your] particular production, processing, and marketing activities. [You] must then establish critical limits, or maximum or minimum levels, for each critical control point. [You] must list procedures for monitoring the critical limits to ensure they are met and the frequency of [your] monitoring activities. HACCP also includes steps for recordkeeping and verification.*[15]

Honey packers, like most businesses, are self-interested, which means that they may continue to buy cheap imported honey figuring that the benefits of increased profits will outweigh the minimal consumer safety risk of contamination and/or adulteration.

Confused? Fortunately, numerous resources are available to help you with your HACCP plan, including:

- From the U.S. Department of Agriculture, Food Safety and Inspection Service, *HACCP-1: Guidebook for the Preparation of HACCP Plans* (September 1999), available at http://www.fsis.usda.gov/OPPDE/nis/outreach/models/HACCP-1.pdf (last accessed July 18, 2006).
- From the National Honey Board, *PRIDE: Honey's purity is in your hands*, available at http://www.nhb.org/download/industry/PRIDE99.pdf (last accessed July 15, 2006).

• From the Canadian Food Inspection Agency, Food Safety Enhancement Program, *HACCP Generic Model: Pasteurized Honey*, available at http://www.inspection.gc.ca/english/fssa/polstrat/haccp/honmie/honmiee.shtml (last accessed July 15, 2006).

Voluntary HACCP Plans and Domestic Producers

True, a honey packer may ask all of its domestic suppliers to develop and implement a HACCP plan, but it is almost certain that some beekeepers will either be unable or unwilling to comply due to the cost involved. After all, it will cost considerable time and money to: (i) hire an outside consultant to help develop and implement a HACCP plan tailored to your specific honey production operation; (ii) hire qualified staff to conduct HACCP recordkeeping, and to manage the entire plan, including verification that HACCP procedures are being met; (iii) upgrade and maintain production and processing equipment and facilities consistent with the plan; (iv) implement a reliable product identification, tracking, and recall procedure; (v) retain a third-party firm to perform regular plan audits; and (vi) educate current employees about the plan, including good manufacturing practices and sanitation standard operating procedures. [16]

These costs would be easier to justify if beekeepers were assured that they would be paid a higher price for any honey produced consistent with a voluntary HACCP plan.[17] But those assurances can only come from the honey packer, preferably, within the sales contracts between the packer and each individual beekeeper. Remember, price is an essential term of any sales contract, and contractual terms should, ideally, be negotiated in good faith by both parties to the agreement. So, when dealing with a packer, do not simply accept at face value the packer's standard contract offering a uniform (and what you may perceive to be too low) payment for all U.S. honey produced consistent with a HACCP plan; if a packer insists upon higher food safety standards, ask for a higher price for your honey to compensate you for your increased production costs. And even if alone you do not succeed, enough beekeepers just making the request might persuade the packer that an increase in payments to domestic producers is reasonable, fair, and timely.

In the absence of federal regulations, private sector honey packers have begun – and are entitled – to include as a key component of their corporate food safety policies, a requirement that certain or all of their honey suppliers develop and implement voluntary HACCP plans to monitor and control honey production operations.

Voluntary HACCP Plans and Foreign Producers

Because of the effect of cheap honey imports on the U.S. market (i.e., an overall reduction in honey prices), U.S. beekeepers would certainly like to see honey packers either: (i) impose the same HACCP plan requirement on foreign producers, so as to increase the production costs (and hence, the price) of foreign honey; or (ii) refrain from buying imported honey from foreign countries without comparable food safety programs or with lower food safety standards.[18] However, both options are problematic for two reasons. First, honey packers, like most businesses, are self-interested, which means that they may continue to buy cheap imported honey figuring that the benefits of increased profits will outweigh the minimal consumer safety risk of contamination and/or adulteration. Second, even honey packers who would like to impose HACCP plan requirements on foreign producers may find it cost-prohibitive to hire qualified third-parties to inspect foreign production and processing facilities.[19]

The bottom line is that, although a packer may have a policy requiring adoption of a HACCP plan by certain or all domestic producers, and offering uniform payments to those who do, the packer may still purchase bulk honey imports from foreign producers without comparable (or with lower) food safety standards at prices below those paid to domestic producers. And with no federal HACCP rule regulating foreign and domestic honey production and processing plants, this apparent inequity between domestic and foreign producers will continue to exist, resulting in a long-term decline in domestic honey prices, and difficult times for the U.S. honey industry ahead. BC

References:

1. Sylvia Ezenwa, Esq., *Country of Origin Labeling*, BEE CULTURE vol. 132, no. 8, at 36 (August 2004); Joint Press Release, U.S. Customs Service/U.S. Food and Drug Administration, *Dumping Investigation Uncovers Contaminated Honey from China (Inquiry also covers Australia, Malaysia, and Thailand) (1310)* (August 28, 2002), available at http://canberra.usembassy.gov/hyper/2002/0828/epf305.htm (last accessed July 15, 2006).
2. *Id.*
3. *Id.*
4. *Id.*
5. *Id.*
6. Joint Press Release, U.S. Customs Service/U.S. Food and Drug Administration, *Dumping Investigation Uncovers Contaminated Honey from China (Inquiry also covers Australia, Malaysia, and Thailand) (1310)* (August 28, 2002), available at http://canberra.usembassy.gov/hyper/2002/0828/epf305.htm (last accessed July 15, 2006).
7. Michael Durham, *A bitter taste of honey*, THE GUARDIAN, July 21, 2004, available at http://www.guardian.co.uk/food/Story/0,,1265708,00.html (last accessed July 16, 2006).

8. *Id.*
9. Stefan Bogdanov, *Contaminants of bee products*, 37 APIDOLOGIE p. 1 (2006), available at http://beebase.csl.gov.uk/pdf/contaminants.pdf (last accessed July 18, 2006).
10. *Id.* at 2, 7.
11. *Id.* at 2.
12. *Id.* at 2-7.
13. United States Department of Agriculture, Economic Research Service, Briefing Rooms, *Government Food Safety Policies: HACCP* (November 21, 2003), available at http://www.ers.usda.gov/Briefing/FoodSafetyPolicy/haccp.htm (last accessed July 12, 2006).
14. *Id.*
15. *Id.*
16. *See* Ron Rudiak, Canadian Honey Council Representative, Manitoba, *Honey House Inspections*, available at http://www.saskatchewanbeekeepers.ca/pdf/2005_spring/2005-spring_honey-house-inspections.pdf (last accessed July 13, 2006); National Honey Board, *PRIDE: Honey's purity is in your hands*, available at http://www.nhb.org/download/industry/PRIDE99.pdf (last accessed July 15, 2006).
17. *See* Rudiak, *supra* note 16.
18. *See* Rudiak, *supra* note 16.
19. *See* Rudiak, *supra* note 16.

BIOGRAPHY: Sylvia A. Ezenwa is a lawyer, author, and freelance writer based in Superior, Colorado. She is licensed to practice law in the State of Texas. She writes legal articles for trade and consumer publications.

DISCLAIMER: The information in this article is not intended to constitute legal advice. Please consult an attorney regarding your specific situation.

Some Non-Beekeeping Aspects of Keeping Bees

Minimal-labor grass maintenance.

James E. Tew

It's no secret

Those of you kind enough to read the articles I write know that I tend to write about things I am currently doing in beekeeping. I have said that most of beekeeping has nothing to do with keeping bees, but is rather a long, long list of non-beekeeping tasks that make my apiculture project possible. At the risk of boring you, I would like to write about some of those tasks and list some of the equipment that makes beekeeping both easier and possible.

Grass

Grass in the beeyard cannot be ignored for long – in most parts of the U.S. A better word would be vegetation rather than grass for much of what I must remove is not grass at all.

This past Spring has been extraordinarily wet. I mean really wet and really hot. My vegetable garden has been completely under shallow water three times. To keep up with my neighbors I have had to mow my yard about every three days. And the grass (weeds?) in my beeyards has been vigorously growing. I maintain four yards. Two are in public view on the Ohio State (Wooster) campus while the other two are out of sight. Guess which two I have tried to keep neat.

Common grass control procedures

Matting or landscape quilts

In years and yards past I have tried landscape matting or plastic quilts that go down on a bed of chemically-killed grass. On that foundation goes the hive stand and all is covered by mulch or pine straw (or whatever). That should be the beginning and end of the grass problem in yards prepared like that – right? Well, yes, for a while, but not indefinitely. It has been my observation that with anything other than professional landscape matting, which has a lifespan of about eight to 10 years, I get at most a year and possibly less from the labor-intensive procedures. So things look good in early Spring and slowly degrade as the weeks pass and seed germinate beneath the covering. Then what? More herbicides?

Herbicides

I have no idea if it's true, but I have read that the average homeowner uses 10 times the amount of chemicals per acre than the average commercial farmer. Many beekeepers use herbicides to keep grass down in the beeyard. For many years, I did, too, and to some extent, still do. But for the past two years, I have used less herbicide and cut grass more often.

Herbicides are expensive. They have a fairly short duration requiring frequent re-application. They require application sprayers and they are not complete. Said another way, some plants are resistant and can hang on even after being sprayed. So I keep this procedure as an option, but not my primary one.

Mowers

Give me just a minute to get this off my chest. In this country, we seem to be in the golden years of yard maintenance. Everyone wants (and will pay for) a green, weed-free lawn. Dandelions, which are edible, and clover, which fixes nitrogen, are examples of colorful and bee-friendly "weeds" that are hated by most grass-loving lawn owners. This Summer, as I have done in years past, I mow my bees when I cut the white clover that is abundant in my yard. Why? Because all of my neighbors do it. I have about ½ acre for a front yard that I do nothing more than mow. As I have ridden my old Cub Cadet mower (circa 1968), I have wondered how it would look if I had a textbook garden in my front yard – something useful rather than just grass. But knowing me, my garden demonstration would be mostly weed production – for all to see. So I mow, as does everyone else.

Mowers in the beeyard are usually of limited value. In one of my yards I have wide isles that are conducive to riding mowers, but in most of the yards the layout is wrong and moving the mower to the yard is a hassle. This season I bought a riding mower. As expected, it is helpful in some instances and limited in others. It is not the final solution.

In large beeyards push mowers are essentially useless, unless you keep the grass short by cutting regularly. Brush mowers do a much better job, but these mowers are heavier and more costly to buy and operate. I have a hard time justifying the investment of such a specialized mower.

String trimmers

String trimmers (Weed Eaters) – no bee operation should be without one (or two). I use this device a lot. I bought a commercial unit that could stand the abuse of heavy grass and inexperienced labor. I get mine professionally serviced and store it correctly during Winter months. I really want it to dependably start and run when

Some weeds survive.

I am in the yard. I experimented with different cutter heads this past Spring. The plastic knife head whacked the hives so hard that bees came roaring out to find out just how stupid I really was. The brush cutting blades were no better – scarring and damaging the hive boxes. After all these tests, I simply reverted to the original string cutter head. I have the following personal suggestions and observations.

1. Trim fast and be gone. The bees don't care for these devices and will finally find something to sting. Suit up, make the cuts and get away. If all is not perfectly neat, get it the next time. A smoker helps.
2. Equipment damage. If I really try to get close to hives, the whirling string will mar the hive boxes. After a few cuttings, the equipment can begin to show damage. Use common sense. Some weeds just survive. Don't try to get them all.
3. Carry a knife. You will need a knife or cutter pliers to snip the twine when you reload the device in the field. Bees are flying and stinging. You're hot and in the middle of the job and you really want to finish. Don't forget the knife (as I have obviously done in the past).
4. Don't buy a trimmer with a large protective hood over the cutter head. It's too clumsy working between close hives.
5. Top off with gas before you start. Fill the trimmer tank or take extra gas, but DO NOT forget that that gas is around when you light or use your smoker. I have never heard of a single person getting into trouble with trimmer gas and smokers, but I have been shocked when I would get distracted by daytime heat and flying bees and find that I was dangerously close to my gas container as I manipulated my smoker.

Where I am now

Okay, I have accepted the compromise. There will always be grass and weeds somewhere in my yards. I try to keep the hives accessible and allow free flight for the forager bees, but I no longer try to kill every last weed in the yard. I haven't used one drop of herbicide this year, rather relying on what I could get with my mower and my weed trimmer. The yards are not perfectly manicured but my labor input has been lowered. I would say that it's a stand-off.

Ratchet straps

Ratchet straps have nothing to do with mowing, but they are one of the improvements (like converting from the old metal five-gallons cans to the modern plastic five-gallon buckets) that have made my bee life considerably easier. Depending on the number of colonies you maintain, buy a bunch.

In years past, beekeepers used hive staples that are still available. People such as I gave detailed instructions on how to correctly staple hives together for moving. As you would expect, the bees took a dim view of all the banging that went on as the staples were driven into the hive bodies. After using these a few times, your equipment acquired staples holes along the staple sites. Rot began there. Finally, I also gave instructions on how to get those same staples out of your tire after you dropped them in the yard. I don't use staples any more and I don't miss them (neither do I use eyelets and wire frames – something else I don't miss).

An alternative was for beekeepers to use wooden slats nailed along the sides of the hive to hold them in place for moving. Obviously, you had to cut the slats, get the proper nails and then remove the entire piece at the new location. In the dark, it was easy to step on the nails in the up-turned slats. I don't miss slats either.

Then, for a short while, beekeepers used metal banding. Banding could only be used once and gloves had to be worn to prevent cuts on the hands of the beekeeper. Banding worked well, but was one-time-use and the start-up devices were costly.

The first ratchet straps I used required a wrench to tighten them. The present–day ratchet strap has incorporated a handle eliminating the need for tools for tightening. I still have a few of these old models, but I never use them.

Are these gadgets perfect for beekeeping? Absolutely not! But they are such an improvement over anything else that I have a bucket full of them. Therein is one of the problems. Try to untangle them at night – even better with bee gloves on. Neatly arranging them during the day before the move is one of those good ideas that never gets done. Also, the ends of the straps will fray with use becoming increasingly difficult to push into the ratchet device. Most of the time, this is not a problem as the strap halves

The ratchet-strap downed Survivor colony.

are never pulled apart, but many times tangles require separating the halves and then reassembling them.

Getting the straps underneath the hive can be a challenge. (Remember the weeds against the hive that I recommended you ignore? Now they are in the way as I try to work the strap underneath and around the hive.) When doing this procedure in Alabama, I wear gloves to reassure me against snakes and poisonous spider bites. Once the strap is around the hive, hook the ends together, pull all the slack out and tighten the ratchet. Be sure that all the slack is pulled out and ratchet tight. Common straps will withstand about 300#. I have never had one break. If a longer strap is needed, tie two together. The tension is released by opening the ratchet handle and pressing the release device with your thumb.

Combined with propolis, the straps do a good, but not perfect job of holding the equipment together; however, it is not unusual for the hive bodies to slip a bit allowing bees to escape during the move. At this point, I choose not to go into the subject of entrance-closing devices. For those of you moving colonies that are open, the slippage is inconsequential.

Your truck or trailer bed should be smooth. Truck bed liners prevent the hive from smoothly sliding into the truck. My bee truck has a welded floor. The welds need to be smoothly finished to prevent tearing the strap as I push the hive onto the truck bed. The standard floor in the bed of my personal pickup – the bed with raised ribs – works nicely.

The "Survivor" hive – remember?

Late last Winter, I found and subsequently wrote about a hive that was apparently full of bees and had been completely untended. No mite treatments, no re-queening, no Terramycin treatments, no supering, no honey removal – nothing for as long as sixteen years. I asked you what to do with it. To a beekeeper, you all said to leave it alone. It has survived all these years without beekeeper intervention. I, the beekeeper, was simply not needed. You suggested that I put a bait hive near there for swarms. I did that. You suggested that I check the colony periodically for no other reason than simply reporting. I have been doing that, too.

One of the reasons that the colony has been so untended is that it is difficult to get to. Four-wheel drive is normally needed and I must drive through a crop – usually soybeans or wheat. I rarely check it. On a four-wheel drive whim, I stopped by last week. Disaster had struck.

About a month ago, a freakish thunderstorm blew through Wooster, Ohio. We received comments from as far as Kansas that weather news had reported the storm. While not a tornado, general high winds – combined with rain-drenched soil – resulted in the destruction of thousands of trees in my area. Out of sight – out of mind.... I didn't think of the survivor hive or even consider the other remote yard I keep. When I stopped by the Survivor hive, I found that the large Maple beside it had blown over, uplifting the landscape timbers on which the Survivor was sitting. The hive had toppled forward while the tree fell in the other direction. The hive, due to extreme propolization, did not break open--even the outer cover did not come off. It was essentially laying facedown in the mud and muck. Ants had eagerly colonized the side

The Survivor hive – back on its feet.

on the ground and swarms of bees were flying from top cracks. My Survivor hive needed me for the first time in 16-17 years.

I'm telling you this update for two reasons: (1) you asked for an occasional report and (2) I used a ratchet strap to hold the hive together while I up-righted it. I also have the following observations: (1) the swarm box remains empty, (2) the Survivor is dead-weight heavy, (3) there is essentially no bottom board, and (4) the bottom deep is seriously rotted.

The hive and colony seemed to have withstood the forward fall very well. The bottom deep was slightly displaced, but otherwise all was in position. The ratchet strap worked perfectly. The hive sat back up, but rocked. I put wood underneath, but I must tell you that this hive equipment really needs to have some bottom work done. It will, one day soon, fall forward again. But until that future day, it is once again good to go. I noted that the hive seemed to have withstood the storm, falling into the storm wind rather than falling with the wind. It was only a fluke that the tree root system disrupted the timbers on which the hive was sitting. At this point, I will once again give you a chance to comment. Are you, as a group, okay with me removing the bottom deep and replacing it with a firmer foundation? Even though it fell forward, it still remains my all-time marvel colony. BC

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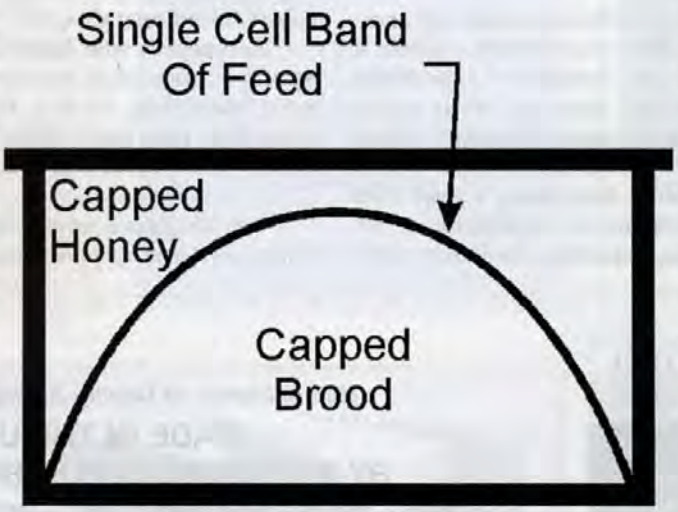
BACKFILLING

Walt **Wright**

It's a word. Properly used, it replaces a whole sentence and describes a key process in colony development toward reproductive swarming. The sentence replaced is variations of the following description: To reduce brood nest size, upper reaches of cells in the brood nest are filled with nectar or pollen as capped brood emerges. It should be obvious that a single word replacing that mouthful has its advantages.

The term is borrowed from construction jargon. When a residence with basement is built, an oversized excavation is made. When the floor and walls of the basement are complete, the oversized excavation has served its purpose. Dirt removed is then backfilled against the basement walls to bring the adjacent area up to grade level.

That temporary space usage has similarities in brood nest size adjustment in the honey bee colony. In the Spring quest for reproduction, the colony expands the brood nest to the maximum safe limit. They need the extra bees to populate the reproductive swarm. When the expanded brood nest has generated sufficient bees for division by the swarm, the extra brood cells have served their purpose. Then, the colony needs to reduce the brood volume to a level that can be maintained by the population remaining after swarm departure. They do this by filling from the top with nectar or pollen. Nectar is preferred – it is easier and quicker, but if nectar is scarce and pollen is available, they will use pollen. As brood emerges at the top, available forage fills those cells to reduce brood volume. That's the process that we call "backfilling."



Dr. Winston's "Congestion"

As best I can tell, the literature sees backfilling as "congestion." Along with overcrowding, nectar in the brood nest is another form of congestion. Correct me if I'm wrong, but you are not told in the popular literature what congestion really is. I have yet to see a clear description of congestion in all its forms. Most accounts make it plain that congestion is only relevant "in the brood nest," and other areas of the hive can have empty space.

Mark Winston, in his '05 EAS presentation on swarming showed a slide that surprised me. It was a perfect picture of maximum brood nest expansion. On a deep frame, the brood was all capped. The solid, capped brood was shown inside the typical arch of the brood nest expansion dome, and reached nearly to the top bar at the peak of the arch. Separating the brood from capped honey outside the arch was a single band of liquid feed only one cell wide. The honey outside the arc of brood was the reserve that limits expansion. Although the slide was a classic picture of maximum brood nest expansion, Dr. Winston said it depicted congestion. That floored me. If that was congestion, it was a meaning of congestion that I had not considered. Peak brood nest expansion is the point in the swarm process where backfilling (brood nest reduction) starts. In two weeks that frame of brood will still have the capped honey outside the arch, and the inside will be filled with nectar.

"Room for the queen to lay" keeps coming up in the literature, but descriptions of that concept are rather nebulous also. That expression, to me, implies empty cells. Observation of the internal workings of the colony suggests that the colony can't tolerate empty cells within the cluster perimeter. Within the constraints of field forage availability, and flying weather to collect it, empty cells are filled on a priority basis. Given the opportunity, there are no empty cells within the cluster most of the time. Brood nest expansion is accomplished by consumption of honey/nectar in the direction of the anticipated growth. When those cells are emptied and prepared for eggs they are soon occupied with brood. Very little "empty" time.

Backing up a notch, Dr. Winston's slide of peak brood nest expansion had no "room for the queen to lay." All cells occupied. If that is another type of congestion, who knows what else that term means. Open to interpretation, both "room for the queen to lay" and "congestion" mean different things to different people.

I take no pleasure in consistently knocking literature inaccuracies or the experts who perpetuate them. It's an ugly job that generates more adversaries than friends. But misinformation needs to be corrected by somebody. Otherwise, a hundred years from now, we'll still be applying, or trying to apply, bum data in our management of honey bee colonies. Wrong is wrong, no matter how you slice it, and I can take the heat. I didn't hire in to beekeeping to fill a vacancy in the nice guy department. Some senior members of my home association still consider me a crackpot. Some of my observations are contrary to what they "know" to be true.

Tip of the Month

Forget inspection for swarm cells. That literature recommendation is ancient history. When swarm cells are started, the colony is committed to swarm, and it takes a major upheaval to turn them around.

Instead, monitor for backfilling. If your colony count exceeds memory limits place a stick pin or small mail through the comb at the peak of the expansion dome of brood. If nectar shows up below your marker, you have about two weeks to take corrective action before swarm commit.

You have the right to challenge my credentials as a dissident to conventional wisdom. There are no credentials relevant to beekeeping; no degree – not even a single course of study in entomology. But a self-taught skill in electrical/electronic trouble-shooting more than compensates for the lack of formal training in the specific discipline. Problem investigation skills are not discipline unique, and I know of no courses of study where those techniques are taught. There is a heavy dependence on observation skills – no data is considered irrelevant until the problem is solved.

In the past communications with beekeepers my aerospace work history has been deliberately down-played. If the beekeeper learned that I had "hands-on" experience with man-rated launch vehicles since the early moon rocket days, he was nearly always more interested in that period than what was learned about honey bees.

When I started beekeeping, everything I read said swarming is inevitable. To someone confident in his trouble-shooting skills, that's a sporting challenge. Getting to the bottom of the swarming process was a very early interest. Beginner's books and the reference books treat the mechanics of beekeeping – building hive parts, hiving a package, etc. There is almost no definition in those books of how the bees run their shop. Learning what is going on in the colony with season change took several years. Data comes slowly. Variations in seasons, colony strength and mite effects need to be distilled down to what most colonies do, most of the time. In spite of the data scatter, by year five a hypothesis was developed on the swarm process. But nobody wanted to hear about it. So, another five years was spent on demonstrating the validity of the hypothesis. During that period we studied ways to improve honey production and colony wintering. The point of the above filler material is that what has been learned about colony internal activities did not come easy. A lot of box shuffling and comb reading went into the effort. I should be entitled to call a process not previously described in the literature anything I choose. And I choose backfilling.

Backfilling is not restricted to swarm prep brood nest reduction. Any time the brood volume is reduced backfilling is applied. That happens all the way through the Spring season and the main flow. It's also applied in the Fall locally, but further north forage can terminate before brood nest closeout.

Beekeepers who have tuned in to my recommended Spring management approach have no trouble using the word backfilling. In fact, they seem pleased to demonstrate that they have a good grasp of the swarm process. Try it – what harm can it do? BC

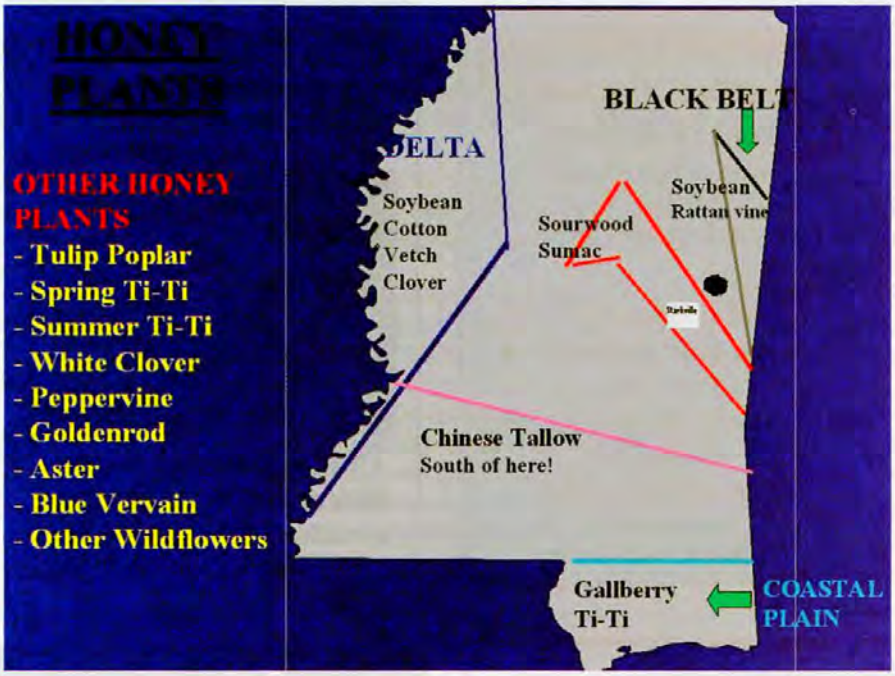
Walt Wright is a retired engineer and a hobby beekeeper in Tennessee. He is a frequent contributor to these pages.

Getting A Honey Crop

More Mississippi Examples

Harry Fulton

Check just down the road for more honey.



In my previous article I hopefully convinced some *Bee Culture* Magazine readers to check just down the road for good bee yard locations. Depending on soil type, land use and other environmental factors "the pasture may be greener there."

This time I will talk about two other major regions of Mississippi and explain the nectar producing plants and the honey crops associated with them. They are the coastal plains and Mississippi Delta regions. I have mentioned the central Mississippi region; however, except for localized areas it is not the most ideal region to keep bees in the state, so I will not go into any detail.

Let's start along the coast in an area that includes the lower six counties and extends northward approximately 60 miles. The coastal plains region is ideal for overwintering colonies to be moved later in the Summer or for making splits for colony increase because pollen is available in early January and significant nectar becomes available for build-up later in January from maple, *Acer spp.* and Spring/black ti-ti or buckwheat tree, *Cliftonia Monophylla*. Spring ti-ti should not be confused with Summer ti-ti, *Cyrilla racemiflora*, also called ironwood or leatherwood. It blooms in late May and June and is a significant nectar producer. Colonies should build-up enough to take advantage of extended Spring ti-ti bloom beginning in mid-February and lasting into April. Hives should be supered because it could yield 10-15% of the total honey crop. Other minor plants also bloom during this period: fruit trees, willow and crimson clover.

After Spring ti-ti a succession of very important nectar producing plants bloom on into May and some will overlap in bloom time. One must realize that the soil is sandy in this area and ground moisture and rainfall play a key role in how much nectar will be produced from these shrubby type plants. The following list shows the important plants in order of bloom with some overlap:

(1)- High-bush gallberry, *Ilex coriacae*, blooming the first week of April for a two week period. It, unlike low-bush gallberry, tends to grow mostly in low-lying areas. It will produce about 10% of the honey crop.

(2)- Yaupon holly, *Ilex vomitoria*, blooms almost at the same time as high-bush gallberry. It along with high-bush gallberry comprise about 10% of the honey crop.

(3)- Black gum, *Nyssa sylvatica*, blooms for a week starting in the second week of April.

(4)- Chinese privet, *ligustrum sinense*, blooms from mid-April through mid-May. It will produce about 15% of the honey crop.

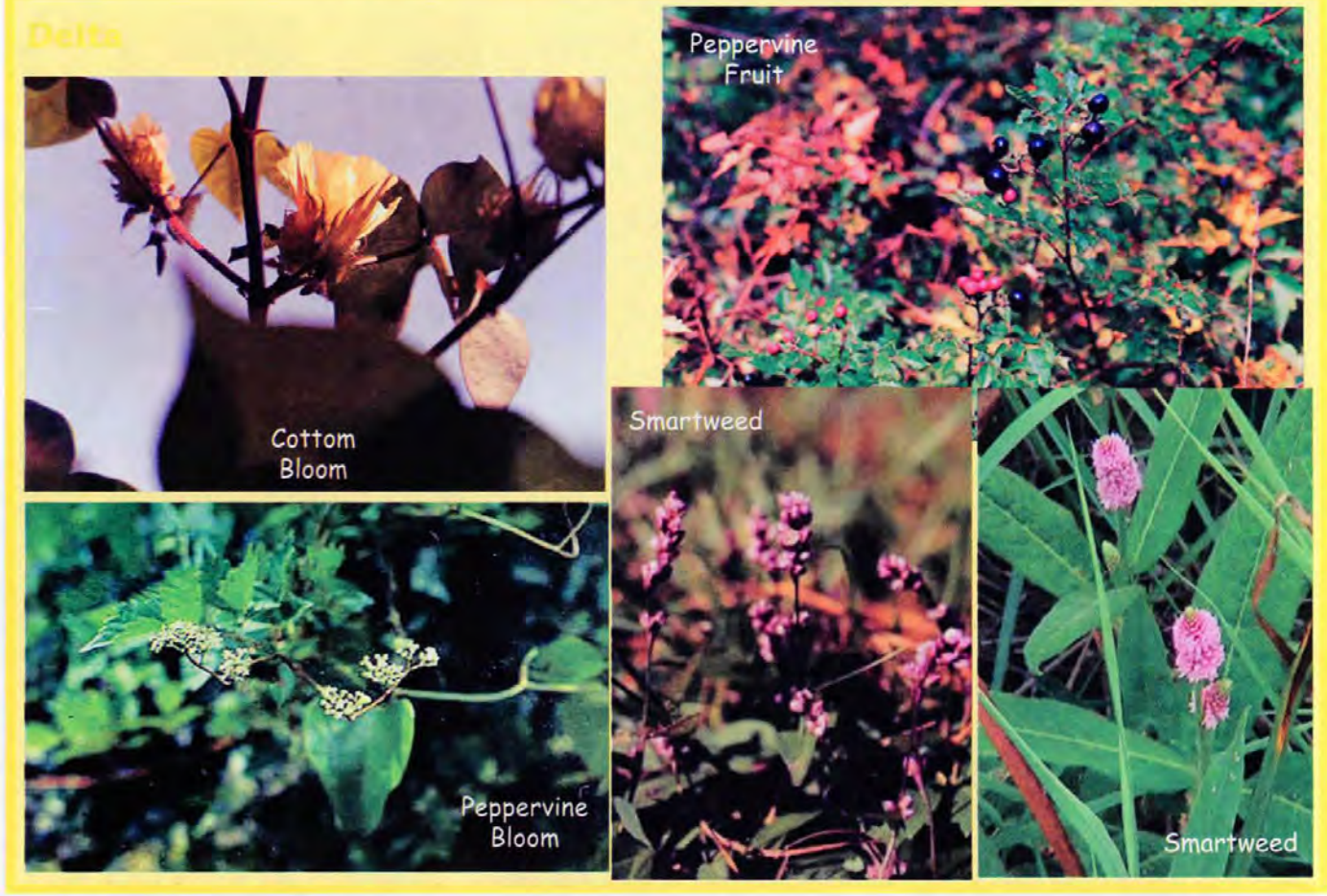
(5)- Low-bush gallberry, *Ilex glabra*, blooms from May 1 to May 20th. It, unlike high-bush gallberry, prefers to grow on higher ground and not in wet areas. Several other varieties of wild holly also bloom during this period which extends the flow. Together these *Ilex spp.* will produce about 15% of the crop.

The above plants are those responsible for the Spring flow in the coastal plains area. A combined crop up until this point of over 100# per colony average can be expected. Beekeepers should extract three times a year: the first being the spring ti-ti crop which will tend to granulate in the comb if not extracted in April; the

second being in mid-May to get the higher quality gallberry and yaupon honey; and again in late June to remove the final crop of Chinese tallow, also called popcorn tree, *Sapium sebiferum*, and Summer ti-ti honey. Popcorn tree is probably one of the most important nectar producing plants in this area, producing upwards of 50# per colony. Overall average honey crops in the coastal plains should be 150 lbs. per colony.

One disadvantage of keeping bees in the coastal plains is the lack of any significant nectar flows after June. Beekeepers must be vigilant in making sure the bees have adequate stores for survival during this time and for Winter. They often feed several gallons of syrup to insure adequate Winter stores. Migratory beekeepers move their colonies to other honey producing area, both out-of-state or within the state for Summer crops.

Now let's look at the Mississippi Delta, which is the flood plain for the Mississippi river, the Tallahatchie, Coldwater, Sunflower and Yalobusha rivers. The levee system along the Mississippi river prevents the river from flooding; however, the other rivers which help feed the Delta often flood in many areas. The Delta covers a large area from Vicksburg northward almost into Memphis and at points is 90 miles wide.



The Delta area is a great honey producing area. Being a delta, the soil is the most fertile of the state, and is a major row cropping area. In many areas, there is not much forage for bees in the early Spring and Fall because only a few areas are uncultivated. Bees must be maintained along the river flood plains near areas that are not highly cultivated so bees can get pollen early and have access to areas that produce good fall nectar flows. With the success of the boll weevil eradication program and the new BT strains of cotton, beekeepers are finding that they can keep bees near cotton in many areas without them being significantly damaged. Cotton honey can be a very important part of the crop now and produce several supers of light amber honey.

However, the soybean situation is changing rapidly due to concerns about the possible onset of the new fungus disease, soybean rust. Farmers are planting early maturing varieties to beat any possible rust outbreaks. Soybeans need record high temperatures, a high pH soil and moisture stress to really make a bumper crop. The early maturing varieties are blooming in late June and July now before the most ideal conditions for nectar secretion occur. Also, no research has been done since the early 1970s on the nectar producing capabilities of the newer soybean varieties. Consequently, soybean honey production seems to be on the decline. This Summer will tell the tale, since is extremely hot and dry.

The number of major honey plants is limited in the delta; however, bumper honey crops can be made starting in late April with willow along the rivers and marshy areas. Vetch blooms in April. White clover blooms April through June if adequate moisture exists; however, it will only be found in areas where cattle or horse production occurs or in urban areas. Cotton, blue vervain in CPR/fallow fields, and peppervine on ditch banks bloom from June through mid August. Soybeans bloom mostly in July and early August. A good Fall crop from smartweed/heartsease can be expected in locations near flood prone areas. Overall average crops of 150+ lbs. have been documented. Some beekeepers move from the coastal plains area to the delta after removing the coastal honey.

Mississippi can compete with most states in quantity but not in quality. If beekeepers move to Mississippi to produce white or water white honey they will be disappointed. Mississippi honey varies from dark amber to extra light amber, but some very good table grade honey is produced. Very seldom can white honey be produced in any significant amounts. Soybean honey and popcorn tree honey are known for high moisture and must be dealt with accordingly, occasionally ranging above 20% moisture. Soybean honey has been known to ferment in the combs before extraction and should not be held very long in the honey house before extraction. Cotton honey, Spring ti-ti and some Fall honey granulates quickly and must be extracted immediately.

With this article and the previous one, I assume I have informed readers about the types of honey produced in Mississisppi, areas of major production and provided some photos for reference. Moving bee colonies, whether is just down the road, throughout

the state or even to other states, to catch the flows will pay dividends in golden honey. But, you must study the flows, work out the logistics of removing honey between moves, and palletize for easier and speedier moves. But don't forget to make sure colony moves are legal and permits obtained where necessary. BC

Acknowlegements: Thanks goes to Shirley Denton for allowing the use of several photos. Her great photos of many plants may be found at http://simple-grandeur.com/plants/plantindex.php. Appreciation goes to long time friend and beekeeper Bob Strickler from Hurley, MS for providing information on the honey plants of the Mississippi Coastal plains.

Harry Fulton is the Chief Apiary Inspector fort he State of Mississippi, and an expert on local honey plants.

Best Laid Plans

Larry Connor

More Queen Problems, And Other Things

It's easy to blame the weather for a rash of queen problems that have been reported again this Summer. The biggest problem seems to be inside the mating nucleus, where reports say the queen cells are being torn down and the queen killed. Even queen cells in cell protectors have experienced rejection. Sometimes the bees raise their own queen, and other times they don't. The latter is a serious problem for the future of the mating colony.

So let's blame the weather. Parts of the country should put in for a change in their climate status. Some should become temperate rain forests (like much of the Northeast), and other parts apply for desert status (much of the west and parts of the plains). Such change, such great extremes, undoubtedly affects the success of queen cell production, and success in the mating colony.

In the moist parts of the country where I am getting queen cell complaints, we can speculate (and that is all this is) that there may be some factor affecting the queen pheromone/queen replacement behaviors of the hive, even in mating nuclei. Just what this is, or how it may work, remains a mystery. Somehow the bees are tearing down queen cells that are added to new nuclei from one to three days after they were established. Northern queen producers are reporting only 50% maximum acceptance in their cells during June and July this year.

Maybe this will correct itself and the cell acceptance will improve. For the record, these are experienced queen producers who know when a cell has been destroyed and a "side comb virgin" is in production – virgin queens that are produced from brood and may or may not end up as desirable queens. But if you are desperate for queens in your own operation, you will often accept these queens, especially when there is nothing else available.

This reminds me of many commercial queen producers who wear a quiet smile on their face whenever they hear beekeepers who boast that they will raise all their own queens. "Just wait until you try and you will see how difficult it can be," they are thinking. Queen rearing can be exciting, rewarding, frustrating and mysterious all at the same time. That should not discourage any experienced beekeeper from trying his or her hand at queen rearing, but remember: those larvae are not laying queens yet. You know what they say about counting chickens when dealing with unhatched eggs.

Role of a queen's chemical fingerprint

Several of the beekeepers reporting queen cell acceptance problems have indicated that they are producing queen cells using a different stock to graft from than found in their bees. So I feel it important to repeat my warning about using different bee stocks in your apiary – the bees are remarkably skillful at picking out unrelated queen bees and destroying them. And this can happen at any stage of a queen's existence – as a larva, a queen cell, as a virgin, in the mating nuc, and in the colony in acceptance and as early supercedure.

I wonder if bees respond to queen pheromone as a type *of chemical fingerprint*. The queen substance is actually a complicated mixture of nearly three-dozen molecules, of which five or six have known biological roles. If these major and minor molecules appear in a set pattern for certain genetic types, then is not too hard to speculate that the worker bees, with their enormously sensitive and receptive antennae, are able to immediately recognize a queen larvae, pupae or adult that is producing a *different* chemical fingerprint. And perhaps, just perhaps, there is one molecule in the pheromones of some queens that triggers a destroy response. This would explain why some queens of some bloodlines are widely rejected by another unrelated group of bees.

Or, the queen pheromones may be out of balance. Or, there may be a molecule missing from the chemical perfume that helps bees in the cell replacement behavior.

What else would identify a queen in all stages as being different other than her pheromone? If a virgin queen demonstrates a different behavior, this might be a factor, but how does a queen cell have a behavior? Is the pupa within producing something other than pheromone (vibration, sound) that we do not know about? Has anyone tested for this?

The sensitivity of bees

Dr. Bob Danka spoke in early July at the Heartland Apicultural Society meeting in Vincennes, Indiana, about the "former" SMR strain of bees developed by Drs. John Harbo and Jeff Harris (USDA/ARS Baton Rouge) in cooperation with Dr. Roger Hoopingarner (Michigan State University). The SMR moniker came about when researchers noticed that there were *Varroa* mites in worker cells that did not reproduce. This lead to the name of Suppressed Mite Reproduction. But the researchers could not explain how this was happening.

Recently Dr. Marla Spivik and others (University of Minnesota) showed that SMR bees were actually demonstrating a form of hygienic behavior – the worker bees detected those worker larvae where *Varroa* mites *were* reproducing – and opened the cells and cleaned out the contents. This form of hygienic behavior has been *renamed*

Varroa Sensitive Hygienic (VSH, not to be confused with the cassette tape you put into your old *VHS* player).

Now we have a tricky situation. If we give an established VSH colony of bees a frame of emerging brood loaded with *Varroa* mites in the worker brood cells, and return in a few days, we might expect to see a nice brood pattern. But because we have a hygienic VSH queen and bees, instead we see a very spotty pattern where many cells have been emptied and the queen may have returned to lay again. Ordinarily this would condemn a queen to replacement. With the VSH bees everyone is doing their job, and we want the queen and the bees to continue this hygienic housekeeping. The adult *Varroa* mite population continues to infect the worker brood, but the VSH bees are killing the worker pupae and their co-habitating mites when they open the cells and clean out the contents. This does not help the brood buildup of the colony, of course, at least not in the short period (but then neither does a mite infestation). But in a few brood cycles the VSH bees should have eliminated a large percentage of the *Varroa* mites and the brood pattern should appear more normal.

Such a hygienic approach to mite population management is what we need in this industry, from the hobby beekeeper to the largest commercial operators. Yet both Drs. Harbo and Hoopingarner are retired, leaving a smaller group of scientists to carry out the follow-up on this research. I certainly hope all the scientists working on SMR/VSH stocks of bees get more than enough funding and industry support to keep this line of investigation growing and expanding.

photo by Jim Connor

Two thoughts

Many beekeepers who produce queens should be looking at SMR/VSH hygienic bees as potential grafting stock and/or as part of their drone supply. These genetic tools may fit into an overall mite integrated pest management scheme.

Second, this may explain what we were discussing at the top of this article – the rejection of queen cells by bees this Summer. If beekeepers are using grafting mothers containing some very different genetic materials not found within their own operation, then queen cell rejection may be just one of many difficulties they will experience. [Note: queen cells do not contain *Varroa* because of their short developmental time]. I would predict that they will have difficulty introducing these bees into colonies, and may experience a higher rate of supercedure when and if the cells are accepted. My suggestion, then, is to try introducing cells and queens into smaller groups of bees, or trying bees of different genetic backgrounds, or both. Eventually they will have bees with the desired genetic information in their own operation and this problem will abate.

Such sensitivity!

Back up a minute. These VSH-endowed workers are able to tell that a worker bee has *Varroa* mites feeding on it inside a sealed cell, and they respond to this by cleaning out the cell contents, destroying both pupa and parasitic mites. In the beehive the workers only have contact with the wax capping they placed over the larva just before pupation. Inside the cell the larva spins a silk cocoon (like a moth, but thinner), and goes into a "quiet on the outside, busy on the inside" pupal stage.

Do you find this as remarkable as I do? It amazes me that worker bees can touch their antennae to the top of the capping of a cell and "read" what is going on inside. Or maybe the *Varroa* mites are creating feeding vibrations that set off the workers. Then does this stimulus result in cell cleaning behavior?

Is something missing? Is the absence of a key chemical initiating the behavior? Or is something present that should not be there (some odor or vibration) that triggers this response. There is no doubt this work must continue.

I have put many miles on the car again this Summer. My self-imposed wanderlust to see the country has taken me nearly coast to coast this year, and I have at least one more huge drive planned for Ohio, Kentucky, Missouri and Texas. Not knowing how high gasoline prices are going (but I was amazed at the corn alcohol plant I passed in Nebraska – one of many in production and under construction) I continue to drive as I am able. I have long felt that this country would be so much stronger if it had complete energy Independence from all other countries.

The travel takes me to remarkable places. My brother Jim took the photo of me posed with an ancient tree growing into a huge boulder in the mountains of Idaho. This tree answers the question: How does a tree split a huge rock? With a tiny seed, a bit of soil and moisture, and an enormous amount of time.

And I travel to see the country before it changes even more. I fail to see Wal-Mart box stores as progress at the expense of small communities. The sprawl is scary in parts of the country, as farmland becomes residential. As a society I feel we should stop this suburbanization of the countryside and start building local communities again. It is nice to drive into bustling towns in Vermont and not see the sprawl I observe of other states. But this takes energy and alas Vermont is growing too, and it has box stores of its own. Yet in my western most reach of my trip

this Summer and last, Challis, Idaho, along the Salmon river and 90 miles from Sun Valley, the only strong deterrent to that small town's rapid urbanization is the lack of immediate critical care medical treatment.

Okay, I am on a rant again, but has our country's planning become a function of box stores and the availability of medical care?

My travel is predicated by invitations to speak from beekeeper groups, a fact I appreciate and find necessary for my personal economics. Whenever I can, I link various groups together to make the trip a bit more profitable. So I strive for future invitations and good coordination so I can visit both local and regional groups as I move from one part of the country to another.

As I reported in a prior issue, in June I went with Cecil Sweeney to a bee yard in Kansas where the queens in spring splits had all superceded and the farmer had plowed under the sweetcover. Later that month Cecil reported that the bees had pulled it together, and he hoped to get 60 pounds of honey from each hive, and things were not as dismal as I suggested. Perhaps that is why beekeepers are such optimists about the future – we are like rats in a lab and we work hardest when the rewards are randomly given for the hard work we do. Beekeepers seem to get the greatest satisfaction from chasing a honey crop, rather than actually getting one.

As a publisher, my "crop" was late too – but *Increase Essentials* is finally printed and is ready to send out to loyal readers everywhere. The book contains the basics on making new bee colonies, including some of the work I have presented in these columns on making Summer increase and wintering nuclei. I continue to see this as the future direction of northern beekeeping. Huge thanks go out to Kim, Kathy and Sharon at *Bee Culture* who helped in the technical production aspects of getting the book to the same printer that prints this magazine. BC

Increase Essentials is Dr. Connor's new book on starting and maintaining beehives. The price is $15 plus $3.95 postage. Order from Wicwas Press, 175 Alden Ave, New Haven, CT 06515 or ebeebooks@aol.com.

SNEBA November 18 Meeting

Back at home in Connecticut, I have been working with the Connecticut Beekeepers Association and the Back Yard Beekeepers Association to organize a one-day program we call the Southern New England Beekeepers Assembly (SNEBA). This is a one-day seminar-type event featuring four noted speakers discussing queens, drones, mites and the fate of beekeeping. The speakers are Dr. David Tarpy of North Carolina State University, Dr. Diana Sammataro of USDA/ARS, Tucson, commercial beekeeper Mike Palmer of St. Albans, Vermont and myself.

We are meeting at the Unitarian Society of New Haven located in Hamden, CT, and convenient to the interstates and the Parkway. There is a registration fee of $35 to cover speaker travel costs and refreshments and other costs. For information and a registration form go on line to www.sneba.com, or contact me at ebeebooks@aol.com or 203 397 5091. Email is better – remember my travel schedule? Please register by November 1st to allow our volunteers to plan the event.

After The Flow Is Over . . .

Nicholas Calderone

Take these final steps to insure your bees overwinter and stay healthy.

By the third week of September, the goldenrod is browning and the Fall flow in Ithaca is waning; it's time to harvest the crop and prepare the bees for Winter. Sounds simple enough, but successful wintering in the north is anything but simple. A colony needs a young, vigorous queen producing high quality brood. It needs a large population of young, healthy workers, ample supplies of pollen and honey, proper ventilation, a good location, and, in some areas, a Winter wrap. In addition, it must be free from damaging levels of pests, parasites, predators and pathogens. What follows are some thoughts on wintering bees that will hopefully put you in the mood for the tasks that lie ahead.

The colony inspection

In last July's issue of *Bee Culture*, I talked about getting bees ready for the Fall flow. Our pre-flow inspection is really the beginning of our wintering process. As part of that inspection, we looked carefully for American foulbrood (AFB); since there is little chance of contracting AFB during the Fall flow, we do not conduct another disease inspection at this time. Same goes for queen quality. We checked before the flow and requeened as needed. If a colony is strong at the end of the Fall flow, there is little reason to check again. After the flow, we limit our inspection to assessing colony strength, mite levels and the amount of Winter stores present. Weak colonies and colonies that sound queenless are two exceptions that merit more thorough inspections.

Removing the crop and treating for mites

Mite populations are often soaring at this time, and it is imperative that you harvest your crop and treat before they damage your bees. If you pull your honey while there is still a bit of a goldenrod flow underway, you will have less trouble with robbing, and you can start treating for mites sooner. A week or two in the Fall can make the difference between a colony that survives the Winter in good health and one that suffers serious damage from parasitic mites and dies before next Spring. So, make early treatment part of your mite management program.

Unfortunately, treating for mites is becoming a complicated affair. You need to know if you have Apistan® or CheckMite+™ resistant mites before treating. If you treat with the wrong one, you don't get a second chance. The Pettis Test will increase your chance of selecting the proper miticide; but it takes some effort, and you may not want to use it if you have a lot of colonies. Alternatively, you can treat with both Apistan and CheckMite+. That way you are pretty sure of using the right one. Of course, this will double your costs, increase the pesticide load in your honey and wax, and eventually, produce mites that are resistant to both pesticides. So, I don't recommend doing that.

Mite-Away II™ (formic acid), ApiLife VAR® (thymol, eucalyptus oil and menthol) and Apiguard® (thymol) are seen by many as less of a threat to human health than traditional pesticides; however, while resistance to these products has not yet been

Colonies inside a bear fence.

Individually wrapped colonies in a beeyard with an evergreen wind break.

reported, they have their own limitations. These products provide good control under certain conditions; but, they are less effective under others. If the ambient temperature is outside the range stated on the product's label, or if there is a lot of brood rearing underway, you will probably not get the desired results. Since you cannot predict the weather, the reliability of these products is less than one would like.

Of course, if your mite levels are low enough, you do not need to treat with anything. We check mite levels with a 300-bee ether roll. If the count is 0 or one, we do not treat. If it is two or more, we treat. You can increase the number of colonies with mite levels that fall below the treatment threshold by using mite resistant stock and drone comb traps. Check with your local extension specialist for thresholds for your region.

So, pick your poison and good luck. Just be sure to read and follow all label instructions, and be sure to wear the proper personal protection equipment outlined on each pesticide label [see the May issue of *Bee Culture* – "Safe Use of Pesticides"].

Colony strength

After removing the Fall crop, our bees are in two deeps. Colony strength is evaluated on a day with temperatures somewhere in the 60s. Gently remove the inner cover, using as little smoke as possible to avoid driving the bees down. Look down on the top bars and determine where the bees are located. Crack the upper chamber free, slide it forwards an inch, and then tilt it up and back and determine how deep the cluster goes. A colony going into Winter in Ithaca should have the equivalent of 12 - 15 full combs of bees. If it is weaker than this, we combine it with another colony or a nuc to bring it up to specification. This is a good reason to run several nucs in your operation. They will never be wasted. Combine healthy colonies, not sick colonies. A colony that is weak because of a poor queen still has healthy workers that can be used to boost another healthy colony. A colony that has been weakened by mites has sick workers and should be destroyed.

Upper entrances serve well when the bottom is clogged with snow or ice. These double wrapped, well insulated colonies will do well in harsh environments, as long as pests and predators inside have been handled.

Winter stores

In Ithaca, a strong, two story colony (w/o the outer cover) should weigh 135 lbs in mid-October. The upper brood chamber should be full, about 55 - 60 pounds of capped honey, while the lower chamber should have 10 - 15 pounds of capped honey. For every nine pounds the colony is light, we feed one gallon of sugar syrup (two parts sugar to one part water, w:w). If you don't want to feed, you can take combs of capped honey from your supers and move them into the brood chambers. With large numbers of colonies, we find it easier to strip all the colonies down to two deeps and then to feed where needed. Plastic pails and hive top super feeders work best.

A colony should also have about 500 sq. in. of pollen for late Winter and early Spring brood rearing. If you placed a couple of combs of pollen in your supers before the Fall flow to be filled in with honey, this is the time to move them down. Otherwise, select two combs of pollen, place them in the center of the upper brood chamber and feed two to three gallons of syrup. You can combine Fall feeding with a Nosema treatment (see below).

Nosema

Nosema is a parasite that infects

the bee's stomach (the *ventriculus* where digestion occurs, not the *crop* where nectar is stored). Although this parasite can severely damage a colony, there are no obvious symptoms; and without a microscopic examination, you cannot tell if your colonies need to be treated. Since there have not been any surveys lately, I cannot comment on the prevalence of Nosema. If you want to treat, feed two gallons of Fumidil-B or Fumigilin-B in sugar syrup per the manufacturer's instructions. It will cost you between $2.00 and $6.00 per colony, plus the cost of the syrup, depending on how much antibiotic you purchase. You will need half that much again in the Spring.

Terramycin

Little is as frustrating to an extension apiculturist as seeing a new beekeeper quit because their first colony contracted AFB. So, I recommend that new beekeepers use prophylactic treatments of Terramycin® in the early Spring and again after the Fall flow to **prevent** AFB. These are the times when your bees are at highest risk. Never medicate colonies with AFB. When you find AFB, destroy the colony and burn the bees, honey and equipment as soon as possible. As your beekeeping skills grow, you will become more adept at identifying disease, you will understand how to better protect your bees from disease, and you will be better able to assess the actual risk in your area. Armed with knowledge and experience, you can then make an informed decision about the need for antibiotics. Hygienic stock may help.

If you did not check for mites before the Fall flow, or if you failed to treat colonies with high mite levels at that time, you may have sick colonies that cannot be salvaged. Colonies with any sign of parasitic mite syndrome at the end of the Fall flow are worthless. You can still treat and kill the mites, but with sick workers, they will not survive long into the Fall. There simply is not enough time after the Fall flow for you to treat a colony with a serious mite infestation and for that colony to recover and rear two or three generations of healthy workers. Don't waste your money treating them, and don't combine them with good colonies. That is why it is essential to control mite problems before the Fall flow starts.

Location

Ideally, an apiary serves as both a Summer and Winter yard; however, some yards serve one purpose better than the other. Air drainage, southern exposure, and protection from the prevailing winds are important characteristics of a good Winter yard. A Winter yard can handle a lot more colonies than a Summer yard; so, you can move bees from several Summer yards into an exceptionally good Winter yard. If you do, be sure that you have access in the Spring when the weather may be poor and access limited.

Final details

Colonies Winter best with a mouse guard, a reduced bottom entrance, an upper entrance and some form of insulation. Mice can do considerable damage to combs during the Fall and Winter while the bees are clustered. Since a standard entrance reducer will not keep mice out of a hive, you need a mouse guard just for this job. Ventilation is also essential. The upper and lower entrance configuration allows the colony to vent moisture produced during the Winter as the colony consumes honey. It also ensures that bees can come and go during warm spells should the bottom entrance become obstructed with dead bees, ice or snow. Access to the outside for cleansing flights is absolutely essential for good wintering. Wrapping is optional and can range from nothing more than a sheet of Styrofoam insulation under the outer cover to more extensive Canadian-style wraps and packs.

Bears

Most bear damage occurs in the Spring and Fall, right through Thanksgiving in our area. If we have a warm Fall, bears may not hibernate until well into December. Be sure to maintain your electric fences until the bears are in their Winter quarters. Check the physical integrity of the fence, keep the grass around the fence mowed, and check for a good ground. You should be registering 7,500+ volts. Our solar chargers consistently register 11,000+ volts. We leave them in the field year round; so, if there is a warm spell, the fences are always hot. BC

Nick Calderone is the Extension Apiculturist at Cornell University, Ithaca, NY and a frequent contributor to these pages.

Bumblebees & Blueberries

Kathy Birt

Capturing and raising local bumblebees may be a new strategy for pollinating PEI's ever increasing blueberry crop.

With 240 acres of blueberries to pollinate, David McNearney of Brudenell, Prince Edward Island (Canada) is one grower who is opting to do just that. Armed with a bee rearing business he purchased privately from a beekeeper in Quebec, McNearney has already captured local queens to begin the process.

"My strategy is to use a combination of bumblebees and honey bees, (for pollination)" says McNearney.

He explains some of the different advantages between the two species.

Although fewer in numbers, the bumblebees are more efficient pollinators that will fly at lower temperatures and higher wind speeds. "So if we get marginal weather, the bumblebees will still get out and work," says McNearney.

On the other hand, he says honey bees like a lower wind speed and warmer temperatures. They are not as efficient (as bumblebees) but the numbers in the field are usually greater.

"So I have 50 honey bee hives with, say a population of about 30,000, of which 10,000 would be field workers. Theoretically, I've got 500,000 honey bees working in my fields," explains McNearney.

Whereas he has 50 bumblebee colonies of which there would be 200 workers, and only 150 of these would be field workers. "So a bumblebee would have to be 50 times more efficient – which they may or may not be – no one really knows the number," says McNearney.

Essentially, McNearney, who is just going into his second year of harvesting blueberries, is going with a little bit less than the recommended bees (for pollinating).

He has rented about 50 honey bee hives this spring at about $100 each and purchased 50 ready-made bumblebee colonies, which are produced at Biobest. But he says with his fields just being developed, he is still getting good pollination. "As time goes by, I'll have to increase my numbers," he says.

With the purchase of his bee rearing business McNearney says, essentially, he is maintaining bumblebees in captivity their entire life. "So you control the mating and take the mating queens and trick them into thinking it's Winter, so they will hibernate. Then trick them into thinking it's Spring (early) to break the hibernation."

At this point the bumblebees are fed pollen and nectar that allows them to build up a population just prior to the blueberry blossoms. "So when I put the hives in the fields, they'll be full-strength," he says.

Wild bumblebees generally look for a nest in the early Spring and would begin to reproduce later than the pollination requirements.

McNearney says he will not have his own reared bumblebees until next Spring, but notes, "I will have lots of (bumble) bees at the end of the Summer from the ones that I bought."

His plans are to use the virgin queens from his purchased bumblebees with the captured bees for genetic diversity. With his captured bumblebees, McNearney says he will run through a couple of generations throughout the Winter and take the queens from that process for reproduction.

Initially, McNearney is just looking to produce 500 bumblebee colonies for his own pollination requirements. "The bulk of the business I bought will be consumed by my farm," he says and adds, "If I'm wildly successful, I'll have some for sale." BC

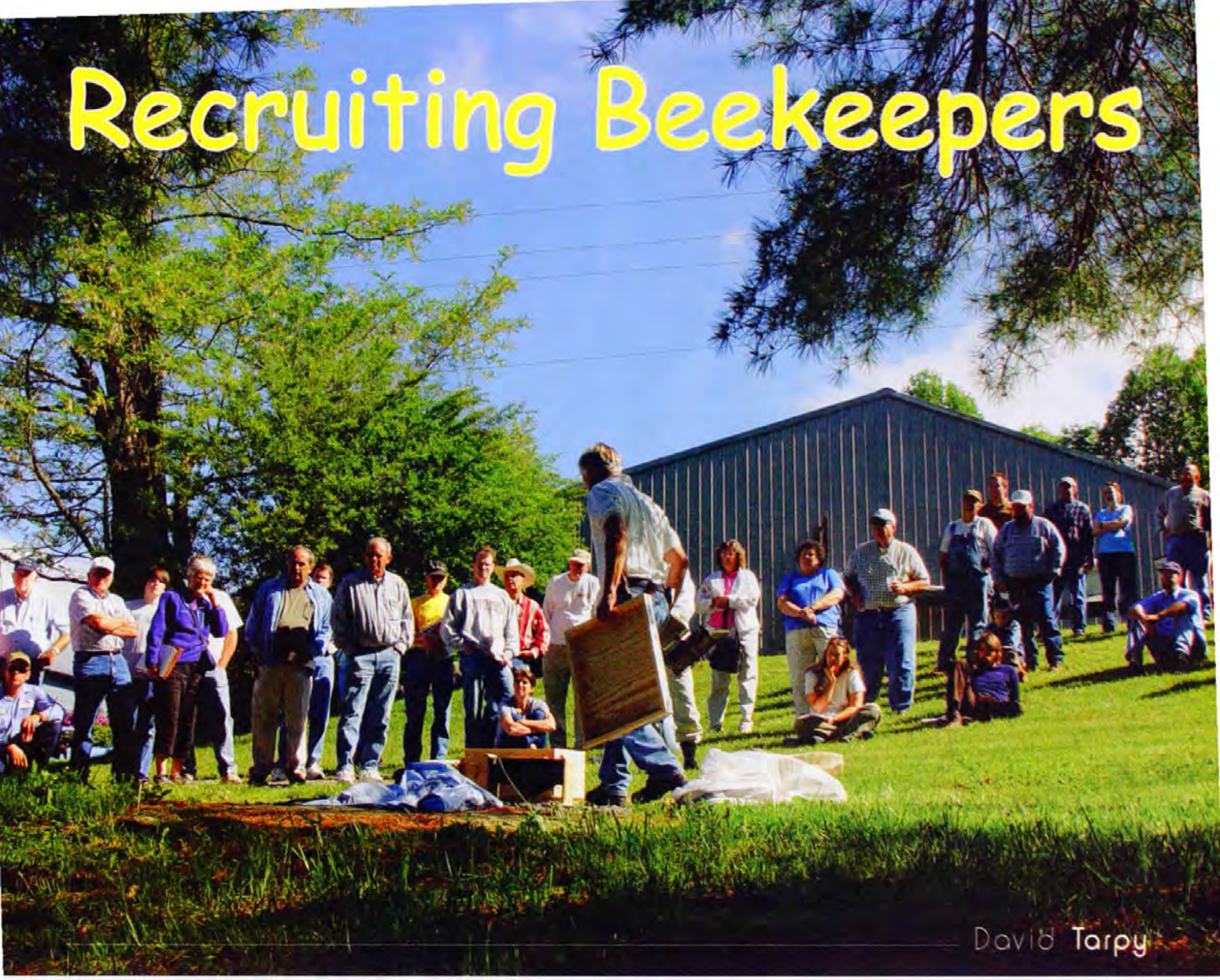
Kathy Birt is a freelance writer living in Prince Edward Island.

A Biobest Bumblebee box.

Inside one of these bumblebee nests.

David McNearney.

Recruiting Beekeepers



The North Carolina New Beekeeper Cost Sharing Program: An overview of a successful approach to Beekeeper Recruitment.

The post-modern era of beekeeping was ushered in with the arrival of the tracheal and *Varroa* mites in 1984 and 1987, respectively. Now, one must be an active beekeeper in order to keep colonies alive and healthy. This necessitates a high level of vigilance and intensive management, both of which place a huge premium on continued education and awareness about proper bee management. One of the most effective means of obtaining such information is to actively participate in beekeeping organizations. But a decreasing number of beekeepers means decreasing membership in many associations.

We decided to address these important issues by conducting a state-wide program to create new hobby beekeepers in North Carolina. The 'New Beekeeper Cost-sharing Program' was funded by the Golden LEAF Foundation, an institute whose mission is to "improve the economic and social conditions of North Carolina's people". Our approach was to provide to 250 North Carolina residents who had not previously kept honey bees with a pair of pre-assembled starter hives (each with a bottom board, one deep brood box, 10 assembled frames with foundation, a hive-top feeder, an inner cover, and a lid) and two three-pound packages of bees with mated queens. Additional equipment was the responsibility of each participant.

Implementation

We received notification of the award in November 2004 and began coordinating our efforts to advertise the program and solicit applications from potential new beekeepers. Eventually the program was publicized in USA Today, NPR's All Things Considered, AOL News, and CBS Radio. As a result, we received almost 2,800 applications by the deadline on February 11th 2005, well over 10 times the number of potential participants in the program.

To select the final participants a

Pick up your new packages today. Don Hopkins, NC State Inspector in the blue shirt, stands alert, keeping an eye on things.

committee was formed of apiculture officials from NC State University, the North Carolina State Beekeepers Association (NCSBA), and the North Carolina Department of Agriculture and Consumer Services Apiary Inspection Program (NCDA&CS). We decided to implement a lottery selection process somewhere in the middle of the two extremes of random choice and geographical distribution where for each county we randomly selected one applicant that had some prior beekeeping instruction (such as attending a bee school) but had not previously kept bees, but the remaining positions were subjected to a straight-up lottery among all eligible applicants. We performed follow-up phone calls to each applicant selected by the lottery process to verify that they would be active participants.

We notified each applicant of his or her final status by the middle of March. We informed them of the logistics of the program and how to acquire their bees and equipment. We also provided them information about how to paint their hives, detailed step-by-step instructions about how to install a package of bees, some trouble-shooting tips for common problems of newly installed packages, and other helpful information. We required each to return a signed agreement for participation. Part of the agreement was for each participant to join and participate in a local beekeeping club, of which the NCSBA has about 50 across the state. This requirement was included for the benefit of the participant, so that they may learn from experienced beekeepers about how to manage their new beehives. We asked each chapter to do as much as they could to help mentor the new beekeepers. This collaboration was designed to support local beekeeping organizations while simultaneously educating the participants about honey bees and beekeeping by attending their monthly meetings. To help the participants link up with a local chapter, we sent each county chapter the names and phone numbers of participants in their area, and we sent each participant the contact information of each county chapter.

We held two beekeeping field days where the participants picked up their hive equipment and packages. The participants were split into two groups by geographic location, one on the eastern half of the state (April 30th) and one on the western half (May 21st). The field days were held at Raleigh and Moravian Falls (at Brushy Mountain Bee Farm), which are central locations in each of the two halves of the state. We conducted hands-on demonstrations on how to install a package of bees, and we answered any and all questions about how to get started in beekeeping. There were many, many people who assisted during these field days, and we can't thank them enough for their help.

Our original plan was to provide each participant with two packages of Russian honey bees with Russian queens (to make it easier for them to control *Varroa* and tracheal mites). However, our original order for packaged bees fell through in late January, so we had to scramble to locate 500 packages of bees with queens. Fortunately, we were able to locate 500 packages of Italian bees, but we were only able to secure an order for 250 Russian queens. We decided, therefore, to provide each participant with one Italian and one Russian hive. There were two benefits of this initial set back: (1) the participants could compare the two stocks for themselves to see which they prefer, and (2) it enabled us to perform follow-up surveys to determine how well each stock performed over the course of the season.

Results

The New Beekeeper Cost-sharing Program was just one of several new initiatives that was introduced in the North Carolina beekeeping community, thus it is difficult to determine the direct effects of any one. Nevertheless, it appears that the results of the program were quite positive (see also Box 1). In addition to the 250 new beekeepers that participated in the program, many other applicants who were not chosen by the lottery process also became new beekeepers. The result was an increased enrollment in the state association, where the NCSBA went from 1,194 to 1,954 paid-dues members in 2005, an increase of 760 members or 61%. Moreover, many local chapters doubled or even tripled their membership, and the number of would-be beekeepers in short courses went up all across the state.

We also found some interesting trends when we asked each participant to compare their Russian and Italian colonies. We asked each to perform standard 'sugar shake' and 'sticky board' tests for mite levels (after providing them information about how to conduct them), and we found that the Russian colonies had significantly fewer mites, on average,

At the end of the beekeeping season, each new beekeeper was sent a questionnaire about the program. We asked them to rate several different aspects of the program on a scale of one to five, one being "strongly disagree", three being "neutral", and five being "strongly agree". Here are some of the answers we received from the participants.

Question	Average score
Were program administrators helpful?	4.59
Was your mentor helpful?	4.19
Was your local chapter helpful?	4.24
Do you enjoy being in your local chapter?	4.16
Did you feel welcomed by your chapter?	4.32
Do you enjoy beekeeping?	4.60
Will you remain a beekeeper?	4.67
Did you enjoy participating in the program?	4.73

As you can see, the response to the program was very positive across the board. In fact, only 1.7% of the responders thought that the program was unsuccessful and do not plan to continue beekeeping.

Looking a bit deeper into the numbers, we see that almost all of the responses were correlated. This means that those who answered one on one question usually answered one on another question (as opposed to a five), and those who answered five on one question usually answered five on another question (as opposed to a one). Some of the strongest indicators of program success were mentor helpfulness, welcoming of the local chapter, and learning about beekeeping. We interpret these results to mean that the more we help new beekeepers, the more we mutually gain.

than the Italian colonies. We will be reporting these results in detail at a later date.

Advice

What is clear from our experience is that at least in North Carolina there was a large, untapped pool of people out there who are interested in becoming beekeepers. The impediments for them doing so are that they just don't know how to get started or they need a little encouragement and support. The simple offering of some free equipment appears to be an effective lure for those who are on the fence to take action. Moreover, it makes for a good story for local media: free bees to address the shortage of beekeepers. Take advantage of such free advertising.

Of course, no program is without its shortcomings, particularly one of this size and scope. In hindsight, there are many things that we could have done better. For example, it would have been more effective to choose new beekeepers by dovetailing the program with beekeeping short courses. Because of timing constraints, we selected the participants semi-randomly and provided them with hives and bees only a few weeks later. Perhaps a better approach would have been to select participants, have them attend beekeeper training, and then provide them equipment. If we ever repeat this type of program in the future, we would likely follow this sequence of events.

We should note that such a program does not need to be on a large scale. Local clubs or chapters of state associations may also take advantage of (disease-free!) donations from current members to offer to new members. All it takes is a little planning, coordination, advertising, and a lot of hard work.

We hope this cost-sharing program will encourage other groups to stimulate their beekeeping organizations at the grass-roots level. Just like a honey bee colony, we are stronger in larger numbers.

Acknowledgements

There are too many people to thank to fit in these pages. Thus we have opted to provide our sincerest appreciation to all those who helped make this program a success by doing so online at: http://entomology.ncsu.edu/apiculture. We can't thank everyone enough for their hard work and support of this program – particularly the participants and their mentors, the members of the NCSBA and their local chapters, the NCDA&CS Apiary Inspectors, and the NC Cooperative Extension Service – for it never would have materialized without their efforts. BC

David Tarpy is the State Extension Specialist in Apiculture for North Carolina, and that state's EAS Director.

MEET KEN SCHRAMM

Master of Mead

Dewey Caron

I recently participated as a judge in the "World Series" of Mead – the 4th International Mead Festival. For the judging event and festival I had the pleasure to meet and interact with fellow Mead judge Ken Schramm. Ken is an experienced mead judge and author of the most recent (and best) book on mead making. Ken is a Master of Mead.

Ken got started in home mead making in 1988 after being inspired to make a Barkshack Ginger Mead promoted by Charles Papazian, a legendary figure in home brewing, author of the *Complete Joy of Home Brewing* and president of the American Home Brewers Association (www.beertown.org). He credits this recipe not only for his interest but also "as an entry point for thousands of homebrewers into the pleasures of Mead."

Ken has been a major supporter of mead competition. In fact, he teamed with Ray Daniels, editor of *Zymurgy*, magazine of the American Homebrewers Association, to co-organize the first festival in 2002, termed Planet Buzz, held in Chicago. Twenty-two commercial meaderies entered their best for the competitive show. He served as competition director of the Mazer Cup Mead Competition, hosted in the Detroit area, a recognition of commercial mead excellence for several years. For the last two International Festivals he has been a commercial mead judge. He has written articles on mead (for old American Mead Association, now defunct) and Zymurgy.

In 1993 he teamed with Microbiologist Dr. Dan McConnell, of University of Michigan, to understand the role different honey and yeast sources have on the final product. The information gleaned from this experience led him to put together the most recent complete and easily readable book on the basics of mead making, *The Compleat Meadmaker*. The book has become a best-seller, already in its third reprinting. It is published by Brewers Publications and can be purchased from their website and many other places.

Ken believes a mead judge should know some of the technical process in mead making and then learn from the mistakes of others. Good judging is a mixture of knowing the technical aspects but also comes from mead-making and judging experiences. To properly judge some categories, you should know what happens when mistakes are made and what flavors or additions should contribute to the final product to properly assess how well the entry stands to the ideal standard. Judging mead, like honey, is knowing what might have been done to give it that uniqueness as well as what the honey itself should have contributed.

Ken's day job is as telecommunications specialist working with distance learning communications of K through 12th grade teachers for their educational certification and "No Child Left Behind" program through a statewide communication system. He was television production manager for the Detroit Pistons prior to that. He is not a beekeeper but is a serious fruit culturist, professing to raising 110 fruit varieties on his suburban location. He is additionally quite knowledgeable about honey sources and the role the honey plays in producing the best meads. He recommends someone starting to use orange blossom honey as a "standard" but to use their own or local honey to expand and investigate what they like best for a mead product.

Ken is seeking to perfect his own mead product and is thinking of entering commercial sales. His mead, Royal Coachman, is excellent. He offered Festival patrons a

taste during his presentation on "Pushing the limits of Melomel." In his talk, he emphasized paying close attention to the important components of mead, especially the fruit source (melomel is a honey and fruit combination) and how to chose the proper honey for a melomel. He believes the mead maker seeking a consistently good mead needs to pay closer attention to the cultivation and selection of ripe fruit to produce a quality product with consistency. Part of the key to using fruit, shared during his talk, is to keep "punching down" the pieces of fruit into the must and to seek an even fermentation of about 21-28 days.

For honey source, Ken recommends cultivation of beekeepers by the mead maker. The honey source, which we know varies by year and location, will have a great influence on the final product – less so in melomels and metheglins (honey fermented with herbs or spices). He recommends getting in touch with local beekeepers via associations or extension service and then tasting and smelling the product. The taste and smell will be carried over into the final product – "if it doesn't start with adequate taste and aroma, the final wine product will lack those essentials." For heavier tasting fruits such as berries, cherries and cranberries, Ken recommends a honey with authority.

The key to a worthwhile product is control of the key ingredients. He recommended mead makers throw tradition out the window. Use taste and smell, depth of flavor and mouth-feel of the mixture, then balance sugar, acidity and tannin. A good mead should be age-worthy (up to 5-10 yrs of cellaring), should have food friendliness and a long aftertaste of 25 seconds to over a minute in the mouth.

In discussing melomel quality he inquired "How far are you willing to go to get fruit at peak of perfection or to get just the right honey for the fruit used?" He acknowledged it is difficult to sometimes duplicate a good mead but careful notes and attention to details help. If you do not grow (and therefore can't pick) your own fruit, look for a local pick-your-own farm or buy from a local farm market.

Ken gives talks to help promote mead making and promote his book. He talks about half the time to bee groups and the remainder to home brewer groups. He spoke last Fall to the Cider Day festivities in western Massachusetts. He believes the education value of competitions like the International Mead Festival, and his Mazer Cup competition before that, to be a good way to learn to perfect the craft of home wine making including the making of mead. Mead maker events (such as this International festival, Mead Day of the Home Brewers Association, the Meadllennium held in January in Florida and in local/regional events such as the Mead contest at EAS) are great opportunities to listen and share with a variety of makers. By comparison tasting and asking the right questions, mead makers reveal their secrets of success. Ken says mead makers as a group "tend to be very open and very willing to share."

Ken views mead's uniqueness a marketing challenge. It is an industry trying to find the right niche. He likens mead to something like "port wine – not for everyone but it serves as a unique and enjoyable product for those that like this kind of beverage."

The commercial mead makers might strive for consistency and are not able to age traditional meads. For the amateur or the smaller companies that pay attention to the details, it may pay to produce such a valued wine. Honey source might be the most important part of such ageing and, if a melomel, the fruit itself, along with the honey, will need attention to produce an aged mead that could be sold for higher than average price in the market. When he gets his fine mead to market it will be targeted to this niche market.

In the meantime, Ken, master meadmaker and mead judge seeks to increase the popularity of mead. If you ever wanted to try to produce this product I recommend you get his book and then produce something you like. He encourages entering your best for judging as a way to advance from novice toward mead master. BC

Dewey Caron is a Nationally recognized mead judge, and Program Chair for EAS 2007, in Delaware.

The Honey Garden

Connie Krochmal

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

One doesn't need a special occasion to enjoy luscious, aromatic, home-grown cantaloupes. Any time of day is suitable.

It is certainly true that cantaloupe plants require a generous amount of garden space. But the rewards are many. Unlike commercial growers, home gardeners can give the fruits all the time they need to ripen on the vines.

Growing Conditions

Cantaloupes thrive in rich, well drained soils high in organic matter. Though most types of soil are suitable, the plants don't perform as well in heavy clay or peat. Sandy soils tend to warm up sooner, resulting in earlier crops. A slightly acidic pH is recommended with 6.0 to 6.5 being ideal.

Also known as muskmelons, these melons require full sun and warm conditions. They're very sensitive to cool temperatures. Use floating row covers to protect them from late frosts.

Choose a good spot for your melon patch. Plant in open areas away from trees, shrubs, and buildings so the plants will have good air circulation. When selecting a planting site, rotate the crops so that cantaloupes aren't grown in the same location for more than three years in a row.

Planting Conditions

In general, if it is warm enough for tomatoes and peppers, it is safe to plant cantaloupes. Wait until the temperature is at least 70°F. In locales with long growing seasons, the seeds can be direct sown. Gardeners in other regions often begin their seeds indoors around 2½ weeks before the last expected frost date. These germinate in about a week. If you grow or purchase transplants, don't fret about their size. Studies indicate that this has little bearing on the eventual outcome.

Cover the seeds to a depth of an inch. Most varieties need spaced about four to seven feet apart within the row. Allow four to five feet between rows.

Many gardeners find it convenient to plant through plastic mulch, which has been placed over the prepared ground. Use scissors to cut holes at appropriate intervals in the plastic for the seeds or plants.

The plastic should be applied several weeks in advance to allow the ground to warm up. Anchor the sides and ends of the mulch with soil or rocks. Be sure the soil underneath the plastic is moist.

In addition to standard black plastic mulch, a green version is also available from local garden centers and

RECIPES

Ann Harman

If you are growing cantaloupes you know when they are ripe – the vine just hands them to you. But if you have to select one at a farmer's market or supermarket how do you know when it's ripe? When the stem scar is slightly depressed and calloused and it smells just mouth-watering. A ripe cantaloupe is a delight; a tasteless cantaloupe is a big disappointment. Cantaloupes are one of the few foods that are always served uncooked. At least I have not found recipes that cook them.

This recipe can be served with meats as a type of relish.

SPICED CANTALOUPE

1 medium or large cantaloupe
3/4 cup fruit juice – your choice; try pineapple or grapefruit juice
1/2 teaspoon whole cloves
1/4 cup honey
1/4 cup white wine vinegar
1 piece stick cinnamon
1 tablespoon chopped crystallized ginger

Pare cantaloupe. Cut into wedges or cubes. Arrange in flat glass dish. Combine fruit juice, cloves, honey, vinegar, cinnamon and ginger in saucepan. Bring to a boil then simmer for about 10 minutes. Pour over cantaloupe. Chill in refrigerator overnight. Serve cold.

Adapted from The Spice Islands Cookbook

Here is something you can do with a cantaloupe for a Summer treat. It is easy to make and really quite fun. Peel a cantaloupe. Cut off one end and remove the seeds. Or you can cut in half crosswise. Fill the cavity with a fruit gelatin mixture and allow to set. Cut in slices crosswise so the cantaloupe surrounds the fruit gelatin mixture. The slices can be served on lettuce as a fruit salad or as a cool dessert.

This next recipe makes a great salad to be served with grilled meat. Since it makes a large quantity, invite some friends to share the meal.

MELON AVOCADO SALAD BOWL

2 tablespoons honey
1/4 cup cider vinegar
1/4 cup chili sauce
3 tablespoons safflower oil
1 teaspoon Worcestershire sauce
salt and freshly ground pepper to taste

mail order companies, such as Territorial Seed Company. In most cases, the green film increases yields when compared with black. All types of plastic mulch keep the fruits and plants cleaner.

When using transplants, place them in the planting hole with the top of the potting soil level with the soil surface. If peat pots are used, remove the rim of the pot. Otherwise, the aboveground part wicks water away from the plant.

Caring for Cantaloupes

For best results, cantaloupe plants require a steady supply of moisture. Water early in the day if you are using a sprinkler or hose. This gives the foliage sufficient time to dry before nightfall.

Water regularly as needed until about three weeks before you expect the harvest to begin. After that point, excessive moisture can dilute the sweetness of the ripening melons and cause them to split.

Apply a general purpose fertilizer, such as 5-10-10, as a top dressing several weeks after planting. Long-season varieties benefit from a second application about a month later. If you prefer, use a time-release formula when the seeds or transplants are planted. Organic fertilizers and compost are suitable alternatives.

Common Problems of Cantaloupes

Insects and diseases are the most common problems that gardeners face. But, wildlife can become garden pests. Invariably, cottontail rabbits find my plants and browse on the foliage. So, I just plant more than I need. Raccoons and possums munch on the ripening fruits. Non-toxic repellents seem to work very well in these instances.

The most common insects that attack cantaloupes are aphids and cucumber beetles. The latter can be kept at bay by using floating row covers. Once flowering begins, remove this covering so honey bees can pollinate the blossoms.

Though viral infections do occur, fungal problems – particularly powdery and downy mildew – tend to be much more serious. In really bad cases, defoliation can occur. This is more likely to happen in humid and rainy climates.

Gardeners can take practical steps to minimize disease problems. Use drip or trickle irrigation rather than hoses and sprinklers. Choose disease resistant varieties whenever possible. Avoid overcrowding the plants to maximize air circulation. At the end of the season, clean up all the plant debris so disease spores don't overwinter in the plot.

Choosing Varieties

There are a bewildering number of cantaloupe varieties, including an unusual banana-shaped one. Those in colder regions will get better results with ones bred for short seasons. Among the most commonly grown varieties are the following. The days listed below are given from the date of transplant.

Ambrosia

Considered to be the most flavorful of all the varieties, Ambrosia is grown all over the country. This distinctly flavored melon is much sweeter than those from other varieties. It is also known for its tantalizing aroma. Yielding in about 84 to 88 days, this gives a consistently good yield of four to five pound fruits. The plants are tolerant of powdery and downy mildew.

Athena

This has become a favorite throughout the country, and bears a reliable crop of exquisitely flavored, uniform fruits weighing five to six pounds. Early bearing, this vigorous, high-yielding melon begins producing in about 75 days. Athena is highly resistant to powdery mildew and fusarium wilt. ➢

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1 head red leaf lettuce
1/2 head Romaine
3 green onions finely chopped
1 cantaloupe
1 avocado

For dressing mix together the honey, vinegar, chili sauce, oil, Worcestershire sauce, salt and pepper. Chill until ready to use. Tear greens into bite-sized pieces and place in a salad bowl. Add onions. Peel and halve melon and cut into spears; add to greens. Pour dressing over and mix lightly. Peel and slice avocado, place on the salad and mix lightly. Makes 8 servings.

Are you looking for a cool dessert that is a bit different from serving just plain cantaloupe? You can make this in the cool of the evening and serve the next day.

CANTALOUPE-LIME MOUSSE

1 small cantaloupe (1-1/4 – 1-1/2 pounds)
1 envelope unflavored gelatin
1/2 cup water
1 can frozen limeade concentrate
1/2 cup sour cream
1/2 cup whipping cream
mint leaves for garnish

Cut melon in half; remove seeds. Cut into 1-inch melon balls. You should have about two cups. Sprinkle gelatin over water in a small pan. Let stand five minutes. Place over medium heat, stirring until gelatin dissolves. Remove from heat. Add limeade concentrate, stirring until melted then gradually add sour cream, mixing until smooth. (If you want it to look more green you can add a few drops of green food coloring.) Refrigerate, stirring occasionally until syrupy. Whip the cream until stiff. Fold gelatin mixture into cream, then fold in the melon balls. Place mixture in a four-cup mold. Refrigerate until firm (two to three hours). Unmold onto a serving plate. Garnish with mint leaves. Makes six servings.

The Complete Book Of Salads
Cynthia Scheer

Cantaloupes are probably more versatile than you thought. Here we are going to use cantaloupe as the bowl for an interesting chicken salad, perfect for a lunch or dinner. Serve

Earlisweet

Recommended for short growing seasons, this early yielding melon begins bearing in about 68 to 70 days. With a high yield, Earlisweet bears sweetly flavored fruits weighing 2½ to three pounds. The plants resist fusarium wilt.

Fastbreak

This outstanding, very early variety is grown throughout the country. Yielding in about 65 to 69 days, it bears highly flavorful, luscious fruits reaching three to four pounds. Noted for its excellent yield, Fastbreak is resistant to powdery mildew and fusarium wilt.

Hale's Best

This heirloom variety was introduced in 1924. Requiring a long season, its fruits mature in 85 to 90 days. These have an excellent aroma and flavor. They usually weigh about three to four pounds. Hale's Best gives a very high yield. It shows resistance to drought and powdery mildew.

Park's Whopper

Park's Whopper is a superior short-season variety. These vigorous plants bear lots of large, exquisitely flavored melons in only 77 days. Reaching six to eight pounds, they can be nine inches in diameter. It shows resistance to powdery and downy mildew, and fusarium wilt.

Pollination and Status of Cantaloupes as Bee Plants

Gardeners are often concerned when the first cantaloupe flowers that open fail to produce fruits. That's because these are the males. So, there is no reason to worry.

Pollination by insects is required for these melons. At one time, the Agricultural Research Service specified that "at least one bee for every 100 flowers" is needed in commercial cantaloupe plantings. Proper pollination results in adequate fruit set, and classically shaped cantaloupes.

Bees obtain both nectar and slightly sticky, heavy pollen from the blossoms. With large plantings, the honey surplus can average over 30 pounds per colony per season. It is mild-flavored, and varies from pure white to light amber.

Harvesting Cantaloupes

Harvest cantaloupes when the foliage is dry. Doing so when dew or other moisture is present can spread diseases.

Harvesting is no mystery with these fruits. When they're ready to pick, the vine easily slips from the stem end of cantaloupes. Avoid harvesting before this stage. The sugar content will not increase once the melons are picked.

Wash the skin well before serving the fruit, especially if you use manure in your garden. BC

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with a basket of croissants and a glass of cool chardonnay.

30-MIinute Meals
Susan e. Mitchell

CASHEW CHICKEN SALAD IN FLUTED CANTALOUPE HALVES

3 cups cold, cooked, shredded chicken (3 whole breasts, skinned and boned)
1/2 cup cashews, roughly chopped
1/4 cup sliced celery
1/4 cup sliced green onion
1 small tart green apple cored and diced
2 tablespoons raisins
2 to 3 tablespoons chutney
3/4 to 1 cup mayonnaise
2 teaspoons curry powder
2 teaspoons lemon juice
cayenne and garlic salt to taste
2 small cantaloupes
paprika for garnish
4 very small bunches of red or green grapes for garnish

Combine first six ingredients in a large bowl. Blend chutney, mayonnaise, curry powder and lemon juice. Mix with chicken, season to taste. Chill. Flute (cut in zigzag shape) and seed the cantaloupes. Refrigerate until ready to fill. To serve, fill hollows with salad, sprinkle with paprika, and garnish with green grapes.

Quick! While peaches and cantaloupes are still abundant. Make this conserve now and enjoy on a nasty Winter day. And just look at how much honey it uses! This compote can be used as a holiday gift.

CANTALOUPE-PEACH CONSERVE

4 cups peaches
4 cups cantaloupe
4 lemons
3 cups honey
1 cup walnuts

Peel and dice cantaloupe and peaches. Juice the lemons and grate their rinds. Put cantaloupe, peaches, lemon juice and rind in a kettle. Bring to a boil. Add the honey and cook until thick and clear. Add nuts during last five minutes of cooking. Spoon into hot sterilized jars to within 1/2 inch from top. Complete seals and process in a boiling water bath for five minutes. Yield 6 half-pints.

Putting It Up With Honey
Susan Geiskopf

I am certain that you know cantaloupe and proscuitto are two flavors that blend very well. But if not, here's a quick starter for a nice meal. Just cut one large cantaloupe in half, scrape out seeds. With a large spoon scoop out pieces of melon onto a nice platter. Drape about six ounces sliced proscuitto over the melon and serve.

Bon Appetit

Although strawberry season may be over in some areas, perhaps you can still find some to make this cooler. Or you can save the recipe for next Summer.

STRAWBERRY-MELON COOLER

2 cups fresh strawberries, hulled
2 cups diced cantaloupe
2 tablespoons honey
2 teaspoons vanilla extract
1 cup club soda

Combine first four ingredients in a blender. Process until smooth. Stir in club soda. Serve over ice. Yield four cups.

Cooking Light Cookbook
Oxmoor House

I hope all your cantaloupes are rich with flavor!

? DO YOU KNOW ?

Basic Fundamentals

Clarence **Collison**
Mississippi State University

Annually in June and July, I spend three days at the Mississippi State University 4-H Entomology camp, where I promote beekeeping and show them how to work colonies. As usual, I found these young people to be fascinated with the bees and most of them show little fear while I am going into the colonies. They stand next to the hives in shorts and T-shirts with only veils that we have provided. In fact, I often have to ask them to step back a couple of steps so I have room to remove the combs from the colonies. They also enjoy the fruits of the hive, sampling fresh honey that we have removed from the colonies. For many of the children this is the first time they have ever seen a person work bees. I find that they know a fair amount about bees from TV documentaries and movies, but have never experienced it in person. They normally ask excellent questions and soon get fully involved with the instruction that is going on.

Please take a few minutes and answer the following questions to see where you are in understanding the basic fundamentals of beekeeping.

Level 1 Beekeeping

1. The detection of queen loss by worker honey bees following the removal of a queen from a colony usually occurs within ____ hours.
   A. 1- 6
   B. 6-12
   C. 12-18
   D. 18-24
   E. 24-30
2. ____ Honey bees upon detecting the loss of a queen respond by exhibiting an increase in scenting behavior (when a colony is disturbed) and queen cup construction. (True or False)
3. ____ Front mounted pollen traps collect more pollen than bottom mounted pollen traps. (True or False)
4. ____ Emergency queen cell production is usually initiated in queenless colonies within 12 to 24 hours following queen removal. (True or False)
5. ____ Both drones and queens cannot sting. (True or False)
6. ____ Oxalic acid is currently approved in the United States for the control of Varroa mites. (True or False)
7. ____ The larval stage is the longest developmental stage in the life cycle of the honey bee. (True or False)
8. ____ As the colony population increases, a smaller proportion of bees are required for brood rearing. (True or False)
9. ____ Workers are produced in cells that measure approximately five cells per linear inch. (True or False)
10. ____ Workers tend to prefer nectar collection over pollen collection. (True or False)
11. ____ Honey bees prefer to collect nectar over honeydew. (True or False)
12. ____ In the Fall the broodnest should be located in the lower part of the hive. (True or False)
13. ____ A honey source that has a high fructose-glucose ratio exhibits rapid granulation. (True or False)

Advanced Beekeeping

14. ____ Laying workers have queen-like characteristics. (True or False)
15. ____ Introducing a queen into a colony that is queenless and has developed laying workers will normally be more successful than when you introduce a queen cell. (True or False)
16. ____ The predominant yeast found in honey is called:
    A. Saccharomyces
    B. Lipomyces
    C. Schizosaccharomyces
    D. Zygosaccharomyces
    E. Rhodotorula
17. Name two internal structures in adult honey bees that are involved in regulating the water balance in the hemolymph. (2 points)
18. ____ The Nassanoff or scent gland is located under the base of the ___ abdominal tergite.
    A. 4th
    B. 7th
    C. 5th
    D. 8th
    E. 6th
19. ____ Egg development within the ovary occurs within tubes called ovarioles and each egg takes approximately seven days to mature before being laid. (True or False)
20. Name the three types of cells associated with the developing eggs within the queen's ovarioles and the function of each. (6 points)

ANSWERS ON NEXT PAGE

?Do You Know? Answers

1. B) 6-12
2. **True** When worker honey bees detect that they are queenless, the workers become agitated, flighty and expose their scent glands readily when the colonies are disturbed. The scenting that occurs may represent an attempt by workers to attract a lost queen back to the hive. The scenting response is one of the earliest signs of queenlessness and provides a good measure of colony disorganization. Recognition of queen loss is followed by queen cup and queen cell construction.
3. **False** Bottom mounted pollen traps normally collect significantly more pollen than the front mounted traps. In one study the bottom mounted traps were collecting one pound of pollen a day, while the front mounted traps were collecting four ounces or less each day. When the two types of pollen traps were switched between hives, similar collection rates were observed.
4. **True** Emergency queen cell production is normally initiated in queenless colonies within 12 to 24 hours following queen removal, however, cells may not found until 48 hours after dequeening.
5. **False** Drones do not have a stinger and are unable to sting. The queen, however, has a stinger, can sting but rarely does so unless the beekeeper has been handling virgin queens. Queens will sting rival queens when they fight or when a new queen emerges she goes around the brood nest killing rival queens before they emerge from their cells.
6. **False** Oxalic acid is not currently approved in the United States for the control of *Varroa* mites, though registration is expected in the near future.
7. **False** The pupal stage in all three honey bee castes is the longest developmental stage. The egg stage lasts three days and the queen, worker and drone larval stages lasts 5.5, 6.0 and 6.5 days, respectively. The queen pupal stage is 7.5 days, worker pupal stage is 12 days and drone pupal stage is 14.5 days.
8. **True** As the size of the colony increases, the efficiency of the colony improves. The ratio between sealed brood and colony populations decreases 10 to 14%, for each increase of 10,000 bees.
9. **True** Workers are reared in cells measuring about five cells per linear inch.
10. **True** Foragers tend to prefer nectar collection over pollen collection. Workers tend to specialize on one type of foraging task at a time and often exhibit constancy for nectar or pollen collection during many consecutive trips. Two studies have shown that about 58% of the foragers collected only nectar, 25% only pollen and 17% both nectar and pollen.
11. **True** The amount of honeydew collected by honey bees will depend on the availability of nectar, which is generally preferred by the bees. Honeydew is more likely to be gathered during times of nectar dearth.
12. **True** In the Fall, the broodnest of the colony should be located in the lower area of the hive, since the Winter cluster will slowly eat its way upward during the Winter. If the cluster does not start at the bottom of the food stores, then it will reach the top of the hive before the end of the Winter and starve to death.
13. **False** Honeys that contain a high fructose-glucose ratio have a slow granulation rate or do not crystallize at all, in comparison to honeys with a low ratio. Since glucose is the sugar that crystallizes out of solution while all other sugars found in honey remain in solution, the greater the amount of glucose present, the fasters it crystallizes.
14. **True** Laying workers are sometimes called "false queens." They have developed ovaries and produce ((E)-9-oxydeconic acid and other related compounds that the queen produces. In some cases their queen-like characteristics are pronounced and the behavior of other workers towards them resembles worker behavior toward queens.
15. **False** Honey bee colonies that have become queenless and develop laying workers are considered lost by most beekeepers since they can rarely be requeened by introducing an adult queen. Recent research has shown that such colonies can often be recovered by the introduction of queen cells that are near emergence. The queen cells were protected with cell protectors until the virgin queens emerge.
16. A) *Saccharomyces*
17. Rectum
    Malpighian Tubules
18. B) 7th
19. **False** Individual egg cells start developing in the tips of the ovarioles (egg tubes) and reach the oviduct in two to three days, at which time they are ready to be laid.
20. Egg Cell- develops into an embryo/larva
    Nurse Cells- provide nutrients for developing egg
    Follicle Cells-form a continuous, protective sheath around the developing egg.

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

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

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GLEANINGS

SEPTEMBER, 2006 • ALL THE NEWS THAT FITS

ROBERT ALLEN STEVENS

Robert Allen Stevens, 63, of 40 Meader Road, Greenwich, founder and president of Betterbee, Inc., died peacefully at home on Wednesday, July 19, 2006, after a two-year illness.

He leaves behind his loving wife of 34 years, Margaret (Kanauss) Stevens, a sister, Alicia Stevens, of Peru, N.Y; three children: son, Nick and his wife, Kathryn, of Kyiv, Ukraine, daughter, Alexandra and her husband, Jeff Cooper, of Greenwich, Conn., and son, Justin, a Peace Corps volunteer in San Martin, Guatemala. He had two grandsons, 4-year old Quinton Stevens and year and a half year old Benjamin Cooper, and numerous nieces, nephews, and cousins.

Bob was a graduate of the Williston Northampton School and in 1966 received a degree in American Studies from Brown University. After graduating he served two years in Bilimora, Gujurat, India as a Peace Corps volunteer, where he co-authored a book on chicken farming. After the Peace Corps, he earned a masters degree in English from Brown University and taught English and Asian Studies for nine years at Shea High School in Pawtucket, RI, where he met his wife, Margaret. During that time, Bob and his family resided in Seekonk, Mass.,

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FUNDING FOR LANDMINE DETECTING BEES

In an fiscal 2007 Defense appropriations bill of roughly $468 billion, it is easy to overlook a mere $5 million for a new defensive weapons system -- using honey bees to find landmines and other buried explosives.

But if Sen. Conrad Burns, R-Mont., and University of Montana researcher Jerry Bromenshenk have their way, a homegrown Montana business consortium could soon be developing and marketing a new tracking system for a variety of military and commercial uses -- all using specially trained bees.

"There's some fascinating research going on out there at Missoula," said Burns, whose push for federal funds might just help him win a tough race for re-election this fall.

Supporters say the relatively small amounts Burns included in the Defense bill pending on the Senate floor could be the sweetener to eventually leverage billions of dollars worth of economic development in his state.

Working with researchers at Montana State University who have been developing a laser tracking system to map where the bees go, as well as native American-owned S&K Electronics, Bromenshenk has been seeking federal funds to put together a prototype to lure private sector investment.

"What the senator is trying to do is help us bridge that 'valley of death' between it being just university research to the point where it's something a little more mature," said Bromenshenk, who has formed a company called Bee Alert Technology Inc.

"The commercial applications are incredible -- it's not just explosives, we can use the bees to find meth[amphetamine] labs, dead bodies and any number of other uses that I can't get into," he said.

The immediate focus is on marketing the idea of using bees to track

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RESEARCH NEWS

Fungus Fails A research project titled "Microbial Control of Varroa with the Fungus Metarhizium Anisopliae" was recently completed, but did not produce any measurable results.

The National Honey Board (NHB) provided funding for the project through its research program. Rosalind James, PhD., at the U.S. Department of Agriculture Agricultural Research Service in Utah led the project with assistance from Jerry Hayes, Chief-Apiary Inspection section at the Florida Department of Agriculture and Consumer Services and Jerrod Leland, PhD., Southern Insect Management Research Unit, MS.

The project's objective was to test the viability of the fungus Metarhizium Anisopliae as a control for the *Varroa* mite. Two field trials were conducted, each one varying the application methods and the season.

None of the experiments gave any measurable level of mite control. Although the fungus *Metarhizium Anisopliae* is capable of infecting mites in the laboratory at hive temperatures, poor infection rates occurred in the field. The spores survived very poorly in the hive, and may have been a major cause for lack of efficacy.

Another possible reason for the poor field control may be that the treatments failed to get the spores into direct contact with the mites, a condition required for infection to occur. The mites are protected from exposure to spores when they are in the brood cells. Also, when *Varroa* are on the bodies of adult bees, it may be difficult to get the spores directly in contact with the mite cuticle.

In 2006, NHB is funding five production research projects to study a variety of colony health issues. Funding for the projects totals $47,190. NHB began funding production research projects in 2004 to help beekeepers maintain colony health, without adversely affecting their ability to produce quality honey. Since 2004, NHB has funded an additional seven such projects with funding totaling $135,877.

Russian Bee News The busy bee--that tireless purveyor of plant pollen – has had a rough time of it lately. Parasitic mites are beating down this industrious insect that's crucial for producing more than $15 billion worth of U.S. crops each year.

But according to scientists with the Agricultural Research Service (ARS), there's hope for weary American bees. It comes from the hills of southeast Russia.

According to recent studies done at the ARS Honey Bee Breeding, Genetics and Physiology Research Unit in Baton Rouge, La., Russian bees are capable of deflecting three of the honey bee's worst assailants: Varroa mites, tracheal mites and cold temperatures.

Since Russian bees were first imported by USDA's Tom Rinderer, they have continued to impress researchers. In fact, ARS entomologist Jose Villa recently discovered just how the bees fend off tracheal mites, which kill honey bees by invading and clogging their airways.

Villa discovered that, much like other bees resistant to tracheal mites, Russian bees are fastidious and agile groomers, capable of using their middle pair of legs to brush mites away.

Villa and fellow ARS entomologist Lilia De Guzman have also confirmed that Russian bees are excellent cold-weather survivors. After studying Russian bee colonies for five winters in northeast Iowa, Villa and De Guzman found that the bees are less likely than other bees to lose hive members during harsh, cold weather. Russian bees appear more frugal with their winter food stores.

Thanks to the ARS Russian bee breeding program, promising Russian bee stock will continue to reach U.S. honey bee queen breeders. Kicking off

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Stevens ... Cont. From Pg 57

a town of which his seventh great-grandfather, Walter Palmer, was one of the founding fathers. Continuing his education during that time, Bob received a fellowship from New York University, leading to a masters degree in Asian Studies, and later completed coursework towards a doctoral degree in International Studies at the University of Massachusetts. He was also among the first group of American teachers to study in China in 1973.

In 1979, Bob returned to Hartshorn Farm in Greenwich, N.Y., where he was raised, and established Betterbee, Inc., a wholesale and retail bee supply business. Bob opened The Meadery at Greenwich some time later. It was the first meadery in the United States, where he produced honey wine made from honey produced by his own bees. Throughout his lifetime, Bob received many academic and business honors, but he was especially proud of his reception of the New York State Beekeeper of the Year Award that was bestowed upon him in 1994 by the Empire State Honey Producers Association. He leaves behind a legacy of a passion for family and friends, a love and exceptional skill in the use of the written word, and an abounding interest in the natural and international worlds.

To honor Bob's love of honey bees and his profound interest in the international community, individuals wishing to make a donation in Bob's memory may purchase beehives for third world countries through Heifer International at **www.heifer.org/myresistry/bobstevens**. Betterbee will provide matching funds for all donations.

NEW FEED BEE DISTRIBUTOR

David Ellingson of Ellingson's Inc., Odessa, MN has been named Distributor for Fee Bee. After years of Scientific research, a pollen substitute has been formulated. Made from 100% natural vegetable ingredients, Feed Bee contains no chemicals, soy products, animal products pollen or hive products. Feed Bee has been closely formulated to emulate the natural diet of the honey bee. One of the main benefits of Feed Bee is that one can either feed dry, or mix with syrup, or mix with water to make patties. David states "With all the problems everyone is having keeping their bees healthy, I believe this is one of the greatest products to come out in a long time.

Detection ... Cont. From Pg 57

landmines and help locate improvised explosive devices.

"They mostly use dogs to find landmines and unexploded ordnance, but that will endanger both the dog and the dog-handler," the aide noted. "We saw tests where the bees would not only be attracted to the target point, but would be buzzing around the guys who conducted the tests, going after the hands that handled the explosives ... the psychological influence of that could be enormous."

More From Montana Bee Lab

Last Spring, a beekeeper in northern California had 160 hives stolen from an almond tree farm one night – and the hives he replaced them with stolen the next. Almond growers need bees to pollinate almond flowers, but the decline of domesticated bee populations in the U.S. has created a shortage of hives. It now costs $150 to $200 to rent a hive, making them a sweet target for unscrupulous beekeepers.

A company called Bee Alert, which has worked with the U.S. Army to train bees for military applications, such as the detection of toxic chemicals, teamed with systems integration firm Integral RFID to develop Hive Sentry, an RFID anti-theft system that alerts owners when hives in the field are being moved. A 303-MHz active tag from RF Code is buried inside each hive. It beacons its unique ID every 12 seconds when the tag is stationary and every two seconds when it's in motion. An RF Code interrogator connected to an RS 232 Bluetooth adapter communicates with a PDA cell phone wirelessly, both are stored in a weatherproof box, powered by a car battery. When the interrogator detects a moving tag, it sends a text message to the owner's cell phone. Hive Sentry, which will be available in the Fall, promises to put an end to bee-napping.

ARRESTS IN INDIA

Four boats carrying 500 kilograms of honey collected illegally were seized by Indian law enforcement officers after an exchange of gunfire.

The officers said the action was with three Bangladeshi nationals who sneaked into India to collect the honey. One man was arrested but the other two escaped.

The guards had acted on a top off and found the four boats on the Raimangal River. When the guards approached the Bangladeshis opened fire before fleeing into the jungle.

The guards found 500 kilograms of honey on the boats along with empty containers that could have held another 5,000 kilograms.

RESEARCH NEWS ... Cont. From Page 57

an intensive selective breeding effort this year, Baton Rouge researchers are still striving for the ultimate Russian bee – one that embodies the important economic qualities, like mite resistance and good honey production, which beekeepers look for.

Traynor Donates $75,000 Scientific Ag Co. of Bakersfield, CA, has donated $75,000 for research to the California State Beekeepers Association. This year, Scientific Ag Co. placed a $2 per colony surcharge on almond pollination fees; the surcharge to be used for research, explained Joe Traynor, company manager.

Balance of the accumulated fees was donated to the Weslaco Bee Lab to fund Frank Eischen's 2006 almond pollination studies. Traynor also specified that "any of these funds that CSBA distributes needs to go for research that benefits almond growers."

"Work on *Varroa* mite[s] certainly qualifies, as does Frank Eischen's work on almond pollination . . . please reserve $15,000 of the $75,000 for Dr. Eischen until he knows his exact needs," he added.

In 2007, Scientific Ag Co. plans to set a research charge of $1 per colony and is encouraging all beekeepers to include a $1 research surcharge in their 2007 almond pollination charge.

"For 2006, it would be nice to include a suggested research donation of $1 per colony on the registration form for the 2006 convention – aimed especially at those beekeepers who received over $125 per colony for their almond rentals and rented all or most of their bees," said Traynor.

Traynor's company will make a $1 per colony surcharge for 2007 almond pollination and encourages all beekeepers to do the same.

"It's a pain-free way of supporting bee research. A $1 per colony research surcharge on almond pollination fees certainly won't be a deal-breaker at current prices. In fact it could be a deal-maker in that an almond grower may gain more respect for beekeepers who make the effort to support research that will benefit almond growers, as well as beekeepers," he stated.

"With a million-plus colonies being provided to almond growers, $1 per colony for research will provide a much-needed boost to solving current industry problems," he added.

NO ERADICATION FOR NZ

The New Zealand government angered beekeepers with a decision not to try to eradicate *Varroa* in the county's South Island.

Agriculture Minister Jim Anderton said the government had decided that the *Varroa* mite will be managed and it had approved NZ$3.2 million over the next four years to fund the program to slow the spread of the *Varroa* mite in the South Island.

"We think it best to focus efforts on managing this pest, given the costs of attempting to remove it from the Nelson area and the high probability it will re-infest the South Island in a relatively short period of time," he said

In a statement the government said it appreciates that Varroa is a significant pest that will have lasting impacts on the beekeeping industry and all the South Island industries that rely on bees for pollination.

"Established *Varroa* populations have never been eradicated from any country anywhere in the world," Anderton said. "While it is considered technically possible to remove *Varroa* from small areas, there is never a guarantee of success."

He said the recent finding of *Varroa* outside the original incursion site in Nelson and believed to have been there since February/March showed how difficult it was to be sure that all infested sites were found and totally destroyed.

"The cost of attempting removal of *Varroa* from the Nelson area was estimated to be around NZ$9.5 million," Anderton said. "This estimate includes compensating beekeepers and horticulturalists for the likely harm caused to their businesses by movement controls and the destruction of hives.

"The cost of attempting to remove *Varroa* is large both in terms of government spending and the impacts on the local beekeeping and horticultural industry, and is not justified given the risk that it may not be successful and that re-incursions are considered inevitable."

Anderton said funding of NZ$525,000 over three years from the Ministry of Agriculture and Forestry's Sustainable Farming Fund now is going towards a project on the development of technologies for the control of *Varroa*, along with $103,022 towards strategic planning for pollination needs in export crops.

The statement said that to date the government had spent about NZ$11.5 million on responding to *Varroa* since the initial incursion on the North Island in 2000.

Display Advertisers

Still Stupid

Peter Sieling

Late one afternoon I was hanging in the air with one hand clutching the edge of the upper roof. As one foot and arm flailed in the air, my other foot slipped off a flimsy scaffold as it slowly slid down the steep pitch of the lower roof. My face was six inches from the feral colony whose front wall had just been ripped open. A honey bee crawled up the inside of my trouser leg, her fuzzy body brushing against my inside thigh as she made her way ever higher.

A lot goes through your mind while hanging between heaven and earth – solemn virtuous thoughts, mostly. You don't think blasphemous oaths just before meeting Saint Peter and watching him scroll through the Compact Disc of Life looking for your name. (Is Sieling spelled with a "C" or an "S"?)

Looking beyond youth and middle age, toward the final years of life, I finally had my first really insightful, intelligent thought. If I'd thought it as a youth, I might have spared myself a lot of hardship, tumult and trouble. I am still stupid.

Jim Bence, my old mentor, used to say that in his 70 years of beekeeping, not a year passed but he learned something new from the bees. This year I had learned three new things already and it was still April:

1. Never trust someone else's platform.
2. Always use duct tape on trouser cuffs.
3. Removing bees from houses is far more amusing than bungee jumping, barefoot water skiing, or rock climbing because with beekeeping, there is more than one way to die.

Don, the homeowner, found the situation extremely interesting. As he shoved the ladder back into position from below he explained how if I stepped on the center of the platform, it shouldn't slide off the roof. At least it worked for him when he set it up. I regained my balance and slapped the bee that had just planted her stinger inside my thigh.

On my back I had strapped a metal cylinder hooked by a tube to a vacuum below – my own invention, a Flash Gordon style "Vac-o-matic". It worked well for sucking up bees, but air moving through 30 feet of ribbed plastic tubing and amplified in the metal cylinder produced a high pitched scream that resonated inside my skull. I'm thinking of selling it to the FBI or CIA as an interrogation tool. Ten minutes with it and I was ready to tell everything I knew.

As fast as I vacuumed up the bees more emerged from behind the front comb. When they finally thinned out, I cut the brood combs and set them in a bucket. By this time Don had found a bug veil in the house. He climbed the ladder until his face was in danger from my feet. His wife ran back and forth below clucking nervously, trying to lure him back down.

Each time I dropped a bee covered comb into the bucket, the crowd of one exclaimed, "Ooh!" or "Ahh!" as if he was at a fourth of July fireworks. For my finale, I removed veil and gloves, reached down below the hole and drew up great chunks of empty comb. Honey dripped from above into my hair. Afterwards they invited me to tea.

"Thank you, I'd be delighted, but perhaps you would prefer that I didn't sit on your furniture."

Stupid didn't end with Don happily writing a check. At home I removed the cage from the vac-o-matic. I meant to spray the bees with sugar syrup but forgot. The night was cold – 20°F. By morning, the caged bees were dead. The fourth lesson for this year: bees need energy to cluster and make enough heat to survive a cold night. I left the dead bees in the vac-o-matic until evening and finally got around to dumping them out. Lesson number five: Don't assume bees are dead just because they look dead. Lifting the cage I got a strong whiff of alarm pheromone. Now I know I'm stupid, but would dead bees make alarm pheromone? Looking closely, I saw a few bees feebly waving their legs in the air. I dumped the pile in front of the hive containing the surviving bees and brood combs. Lesson number six: Never dump a pile of almost dead bees in front of a live hive when you can almost see a cloud of alarm pheromone (see title). The bees rushed from the hive to meet me. Putting on veil and gloves, I brushed the bees into a bucket, sprayed them with sugar syrup and put them in the still warm greenhouse. I forgot a cover (again, see title). A couple hours later, approximately half had revived. Most were still in the bucket. Once more I dumped them in front of the hive. The survivors happily marched in to join their sisters.

Lesson number seven ought to be my last lesson for the year: There are few arrogant beekeepers. Bees keep us humble. There may even be a desperate need for motivational speakers at bee conventions to help beekeepers with self-esteem issues. If you ever do meet an arrogant, know-it-all beekeeper, either he or she doesn't actually have bees, or they're dumber than me.

BOTTOM BOARD