Nov 2010

Bee Culture

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Bee Friendly Farms are one way people are helping both honey bees, and themselves. We tour several this month to show how it's done. Come on along.

photo by Kim Flottum

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

NOVEMBER 2010 VOLUME 138 NUMBER 11

FEATURES

DEPARTMENTS & COLUMNS

GLEANINGS-73, CALENDAR-76, CLASSIFIED ADS-77

Beekeeping In Tanzania

Hello,

I am currently living in Tanzania. I do not know too much about traditional beekeeping practices here. I believe that they use burning sticks to evacuate the bees from the log hives before extracting the honey. The hives are perched very high up in trees. Interestingly, the honey here is very dark, almost like molassas and has a very distinct taste. I have a friend interested in starting a beekeeping project, while he is well versed in traditional beekeeping practices here in Tanzania, he was curious if there are any "Western" practices that would translate well into this environment? It seems this could be an interesting learning opportunity on both sides. Thanks in advance.

You can reach us at: **MeghanLMattingly@gmail.com.**

Meghan Mattingly
Tanzania

***Editor's Note**: Are you folks aware of Bees For Development, a group out of the UK? They have everything you need in terms of information and skills. They are a charitable organization, and if you have access to some funds they would appreciate it, but if not they'll help as best they can . . . they do have some transitional books, how to build equipment . . . like that. Reach them at **http://www.beesfordevelopment.org/** Good luck.*

Surviving IPM

I look through *Bee Culture* each month and read articles that catch my eye. I always read Ross Conrad's articles and will be reading Gwen Rosenberg's articles from now on. I was surprised and pleased to find myself laughing as I read *Surviving IPM*. She had a delightful way of pointing out that being too rigid in our thinking can often lead to inconsistencies that we ignore at our or our bees' peril.

Lisa Lasko
Stahlstown, PA

TECA?

We are happy to announce the launching of the TECA Exchange Group on Beekeeping, a new joint initiative between the International Federation of Beekeepers Associations (APIMONDIA) and the Food and Agriculture Organization of the United Nations (FAO) to share knowledge and facilitate networking on beekeeping.

WHY A TECA EXCHANGE GROUP ON BEEKEEPING? Research institutions, farmers, projects and other bodies generate technologies to improve beekeeping practices, processing of beekeeping products and its marketing, but this information often remains scattered and does not reach the wide public that could benefit from these improved technologies and best practices.

In order to address this problem and increase the benefits of research and years of improving practices, FAO in collaboration with APIMONDIA has decided to set up a Beekeeping Exchange Group on the TECA Platform, where information and knowledge can be shared, and beekeepers and stakeholders from all over the world can meet to discuss topics related to beekeeping.

WHAT IS TECA? TECA stands for Technologies for Agriculture and can be accessed via **www.fao.org/teca**. It is an online database of technologies that have been tested by farmers in rural areas. TECA responds to the specific information needs of small producers and those providing advisory services to them.

TECA also provides web-based communication tools (also linked to YouTube and other comparable media) to better document, share technologies and customize its use to each user's characteristics. It is interactive, and has a great potential to improve linkages among extension staff, researchers, farmer organizations and other stakeholders involved in agricultural innovation.

TECA EXCHANGE GROUP ON BEEKEEPING: The aim of the TECA Exchange Group on Beekeeping is to provide a forum to share and discuss beekeeping technologies and best practices, focusing particularly on smallholders. Additionally, the Group offers the opportunity to explore areas of common interest that could potentially serve as the basis for the establishment of partnerships.

We invite you to visit the TECA website and join this initiative for enhancing the sharing of knowledge and technology on beekeeping for smallholders. Check out the information on beekeeping already available in the database and/or share your knowledge by uploading training manuals, technologies that have been tested and validated in the field or videos and pictures demonstrating techniques. In order to ensure the quality of the information available on TECA, technologies submitted for uploading will be validated by APIMONDIA's Standing Scientific Commissions before making them available to the Exchange Group.

A brief Exchange Group User Guide and a Guide on how to use TECA can be downloaded from the TECA Website by clicking here **www.fao.org/teca/node/4730**. Guides can also be requested by email from the Beekeeping Exchange Group facilitators (**TECA-beekeeping@fao.org**).

Please feel free to share this letter with your contacts and partners that could be interested in the information available in TECA or in sharing their proven technologies, or just become a member of this new beekeeping community.

Riccardo Jannoni-Sebastianini
Apimondia Secretary-General

INNER COVER

There's a rumor going around, well, it's more than a rumor actually. Recently, it seems, several commercial beekeepers have been approached by buyers looking to get into the business . . . and the buyers are from China. The Chinese own a lot of U.S. treasury bonds, which can decline in value I'm told. To counter that I understand there is a Chinese Government policy for industries that want to invest in this country to purchase hard assets rather than more paper. This is ongoing in many countries, in industries such as mining, textiles and farming, accordng to reports. Boxes and pallets and forklifts and trucks and buildings and extractors and barrels of honey are hard assets. With beekeeping, you can be a farmer and not own a lick of land.

We'd be naïve to believe the Chinese honey exporting industry wouldn't be interested in both vertical and lateral expansion to cover their biggest potential customer, said an industry insider who is watching this very carefully.

Then, he added, consider that U.S. honey packers, forced to compete against inexpensive imported honey that is being sold at fire sale prices, may be forced to sell too because of the unfair competition. The source of the investment funds? Perhaps the ill-gotten gains of those participating routinely in honey laundering schemes. There's more hard assets. Bottling machines, trucks, warehouses, barrels of honey, shelf space and contracts. Suddenly, you have a monopoly on your hands. Complete "Honey Companies" now owned by businesses that only yesterday were doing everything they could to cheat and steal and swindle and evade and block any rule or law or trade restriction on what they wanted to do.

Now, they can do it legally.

In fact, said my confidant, they may be doing it already.

And as a 'what about this', kicker, he threw this in . . .

By owning packing facilities (plural) they eliminate the middle man in the marketing process. Their honey, whether imported or domestically produced goes right to the consumer without changing ownership . . . they become huge importer/handler/producer/packers.

And imagine, he said, if these companies wanted to mask imported honey so they could sell it as U.S. honey . . . there, right there on the bottle . . . see, Product Of The U.S.A.?

How would they do that . . . well lets get some of that stuff from somewhere else, ship it here, then filter the life out of it, and blend in a few pounds of U.S. pollen in every batch, and . . . Presto . . . it's all U.S. Honey.

Another thought . . . but this one my own. If they managed to force a few commercial operations out of business because of the extremely low prices they paid for honey (even though only about 30% of beekeeper income is derived from honey now, that 30% is the difference between business and bankruptcy for many), and these beekeepers were bought out by even more Chinese operations . . . what happens to pollination? If only, say 15% of U.S. colonies were owned by people who would pollinate for 50% of what the rest were charging . . . what happens? I don't know, yet.

My friend, the industry insider, is worried. Maybe we should be.

•

I got to visit briefly with Charlie Brandts, the White House beekeeper this Summer at the EAS meeting in North Carolina. But I was always chasing things and he was attending sessions so it was mostly short, passing in the hall kinds of conversations. EAS is like that.

So in late September we got in touch again and I asked how his bees were doing, and how that South Lawn hive was doing too.

That South Lawn hive did pretty good this Summer . . . Charlie had harvested three times as of late September, and was thinking of one more, but, maybe wait a bit and see. But those three harvests totaled 170 pounds of fine DC honey. Much of this came from the early crops . . . basswood was predominant . . . but there's a gardener's delightful mix the rest of the season with all the well-watered and cared for ornamentals planted everywhere those bees can go.

There's been some queen issues though. Supersedures. Queens that didn't take. More supersedures.

"It's been frustrating," he said, "just trying to keep a queen in that colony this Summer. But even so, they did pretty good in the honey department."

Much of the honey from the South Lawn bees gets used right there in the White House kitchen. Susie Morrison uses some of that honey. She's the pastry Chef from the White House kitchen, and she lived near Medina when she was younger. She visits her brother who is still in the area on occasion and this past summer she stopped in at the office for a short visit.

We talked about the very unroutine life she lives with formal meals for 100 or 200 or more Kings or Queens or other Heads Of some State,

A Chinese Laundry Business. The White House Bees. Buckingham Palace, Almost.

or sports stars or Congressional Leaders or industry leaders from all walks of life. And any of these meals can be at almost a moment's notice so there's a frantic rush to get it all done just so, right on time. And then . . . then it can be very quiet for a day or a week. I couldn't imagine the stress . . . and it all has to be perfect. There's never . . . oh, it's just a little brown on one side, it's OK, just eat it . . . kind of cooking at this place.

But mostly she was here because Charlie had told her all about our candles, and she wanted to see what a candle factory was like. So we gave her and her brother the Million Candles Tour . . . which can be a little overwhelming if you're not familiar with the hustle and bustle of a factory floor, the clamor of lots of different kinds of machines all running at the same time, the rumble of forklifts whizzing by, and mountains of raw materials stacked to the top of the three story ceiling, impatiently waiting to become candles.

Listening to her tell how her part of the White House operation works was fascinating, and then the crush of the Tour, followed by a quiet, lazy lunch . . . such an easy way to spend a part of a day.

Charlie has bees at his home just outside the city, and at another location, an organic farm not too far from where he lives. The organic farm bees did good early on, but the hot and dry where they were shut down any measurable production the rest of the Summer. And it was the same at his home . . . good early, poor late.

And there were queen issues, again. An iffy Spring meant poor mating for some local queens he got, and even then, he only got half of what he wanted. Queen producers in that part of the world had a tough time this year . . . wet, cold, then hot and dry. You gotta be tough to be a queen producer. We give them a lot of grief when it's the weather we should be griping about.

Charlie's been involved in a host of educational projects, and as you might imagine has had a lot of visitors who want to see the hive and hear the stories. One prominent visitor this year was the American Honey Princess, Amy Roden, who coincidently timed her visit to overlap a visit with a large group of youngish school kids. It worked out well for everybody it seems.

There are several more projects on the drawing board...not developed to the point of discussion he said, but after a couple of years now, the powers that be are appreciating more and more the educational and environmental value of having honey bees on the South Lawn, one of the coolest beeyards there is.

•

My timing was off by just a few days in very early November when I am scheduled to be in London, attending the National Honey Show. If you haven't seen the hoopla and pomp and circumstance that surrounds this event, at least once in your life you should visit. It is something to behold.

It is, I'm told, the largest honey show in the world, with the greatest number of participants from countries all over the world. If you haven't, visit the web page for a view of the show from last year, when Jim Tew and Jennifer Berry were their guests at **www.honeyshow.co.uk**.

Anyway, the timing thing. Just recently, Buckingham Palace . . . you know, where the Queen and Prince live . . . recently saw the same light as the folks in the White House and had installed several colonies to help out with the gardens on the Palace grounds. They've kind of redone the gardens there I understand, easing from the very formal grounds of years ago to a more informal, environmentally friendly kind of place. Bees fit right in, of course.

I was at the National a couple of years back as a guest, and had the great good fortune of having lunch with John Chapple, essentially a commercial beekeeper with his hives spread out all over London. Roof tops and almost anywhere a hive fits and doesn't get in somebody's way is where he has them. One stand is very near 10 Downing Street. He makes very good honey, and has very cool labels for that honey.

Well, who better to keep bees in the middle of the Palace Grounds, in the middle of London than John. So I asked about visiting his bees at the Palace. Alas, he works like a slave all during the National . . . setting up, giving demonstrations, taking down and writing up all about the show, the whole time I'm there. He's an ambitious beekeeper, for sure. So we didn't even get to ask those powers that be if we could visit . . . Perhaps next time.

That would be, you can imagine, the Other Coolest Beeyard in the world.

•

In a theatre near you!

Watch thousands of colonies in thousands of trucks heading full speed west for California. See border conflicts with small hive beetles, range wars over where to put those bees and deadly battles between desperate growers and beekeepers with no place to go. Watch out for immigration officials looking under every tree and pallet, and clandestine, colony relocations by the thousands. See USDA officials checking, sampling, looking, asking, with Canadian agents watching and Mexican officials listening. And a million gallons of toxic syrup barreling west at full speed...borders and beekeepers beware!

Witness the life and death dramas, the passion and pleasure, the fortunes lost and found . . .

See - **Pollination Power**

Staring *Charles Bronson*, the Border Guard with a Gun and a Gal.

Clint Eastwood, Fighting For Every Frame, Fighting For Every Beekeeper

Al Pacino and *Robert DeNiro*, Count your fingers when dealing with The Beekeeping Brothers From Brooklyn

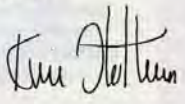
And *Bruce Willis* in the role of a lifetime as The Almond King.

With *Mel Gibson* back to his Australian roots, looking for revenge at full speed

And don't miss *Morgan Freeman* as The Negotiator, with *Leonardo DeCaprio* as Dr Extension, searching, searching...

And there's *Dave Dudley* and *Waylon Jennings* drivin' the bees all night; and feel the pain for *Kitty Wells* and *Tammy Wynette*, The Girls They Left Behind.

Opens Feb 15, 2011 at a theatre near you. Don't miss it.



New For Beekeepers

HIVE TRACKS

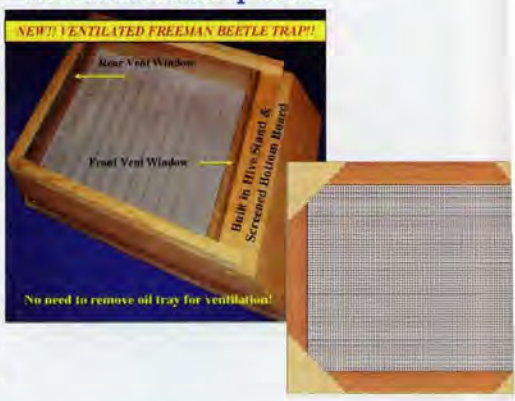
Hive Tracks is a web based, online record keeping system. Rocks, scribbles on the side of a hive, and standing on end bricks just don't do it for good record keeping. I know, I've tried. Three ring notebooks and the like, and electronic notebooks you can enter data in from the field are better. But you still have to enter the data. Hive Tracks makes it easier to enter data than any other system I've tried. And you can be as thorough, or as loose as you want. I tend toward the loose. But I could, if I wanted, enter everything from how many supers on every hive, to all about handling a 100 colony beeyard. It takes some getting used to, but it's really pretty intuitive once you get going. And best of all...it's free. You set up an account with passwords and the like and every time you want to enter data...at home, or from your cell phone in the beeyard, you call up the program and go. The screens provided here show some of what you can do, but check it out for yourself at **www.hivetracks.com** and be prepared to be impressed. And to spend an hour or so testing it out. Introduced in August this year, several hundred users are already using the program. For more info contact James Wilkes at **james@hivetracks.com** or Mark Henson at **mark@hivetracks.com**.

FIXIT

FIXIT is a permanent and self-hardening bonding and filling agent. It works for splits, cracks, knotholes in wooden or plastic or wooden beehive boxes. Use for frames, to patch holes, rebuild corners. It is a two-part product you mix to form a putty-like consistency. It is waterproof and stands up to UV, fuels, and extreme weather. Adheres to wood, porcelain, ceramic, metals, stone, glass, cement, tile, masonry, foam, fiberglass most plastics and more. Can be sanded, tapped, drilled, lathed or carved after the 24 hour setup. Comes in several colors and three sizes. **www.avesstudios.com** or 800.261.2837.

VENTILATED FREEMAN SMALL HIVE BEETLE TRAP

One of the issues with an oil tray style hive beetle trap is reduced ventilation when the oil tray is in place. Beekeepers in areas with constant beetle pressure need the tray in place all summer. The new ventilated design solves the ventilation issue and continues to kill hive beetles as they fly into the hive. Used in combination with the ventilated Freeman Trap, a screened inner cover produces a chimney effect to remove warm, moist air. Trap and inner cover available from Ashley Bee Supply. 870.853.2412. **www.freemanbeetletrap.com**



Storey's Guide to Keeping Honey Bees. Malcolm T. Sanford & Richard E. Bonney. Storey Publishing. ISBN 978-1-60342-550-6. 245 pages, black and white. 6" x 9". $19.95.

Richard 'Dick' Bonney was a long time friend and a regular contributor to this magazine. His two books for Storey, *Hive Management* and *Beekeeping, A Practical Guide*, were mainstays in the how-to beekeeping world for years. When Storey decided to update their beekeeping book they chose Malcolm Sanford, who still writes for the beekeeping trade journals, this one included and coordinates The Apis Newsletter, sponsored in part by this magazine. http://www.apis.shorturl.com/

Malcolm's goal was to keep the style and voice of the original Bonney works, yet bring it up to date in terms of management and pest and disease controls. Unique to any books I know of he enlisted the aid of some of his many newsletter readers by having them submit bits and pieces of their beekeeping lives.

This is a book for beginners, kind of, and a book for the more experienced, kind of. It is able to do this because it tends to not go into as much detail as I would like, or to give specific directions for some subjects. Richard Taylor, another past writer for this magazine and author of many beekeeping books stressed the opposite... give very specific directions to beginners. I liked that advice.

Malcolm had the difficult task of blending and updating two very good books into one very good book. I would have liked photos and color, which neither the originals nor this have, but that's Storey, not the author. But he reduces that handicap with an easy to understand style in a well orgnaized text. There is an excellent glossary and resource list, sample pollination contract, and references.

More That's New

Oil Patties

Lefore Essential Oil Patties. Jeff and Dave Lefore have been making these for some time now, but only in bulk for commercial beekeepers. Because of their success, they are now available in smaller quantities. The patties are made with a vegetable shortening base with essential oils mixed in...heavy on thymol, spearmint and wintergreen, with some other nutrient based additives mixed in that act as feeding stimulants. Store at cooler than room temperature. Patties are 3" x 6" and weigh 4 oz. each. Available in pails of 50 or 100. Available from GloryBee Bee Supplies, Eugene Oregon.

Not yet in catalog, call 888.240.4545 for info or to order.

New DVD – Basic Beekeeping, Starting Your First Hive.

The next generation of how-to media enters the scene. This one from Ron Upshaw, from Auburn, WA. Ron's a TV and radio personality there, and his presentation style is professional and well done. It's a 90 minute show that takes you, in two parts through kinds of bees, bee space and beekeeping gear. It shows smokers and how to light one, using hive tools, feeders, woodenware, frames and some other equipment. Part two takes you through a year starting with a package installation, making sugar syrup, Summer inspections, Fall inspections, harvesting, extracting and getting ready for Winter.

He squeezes a lot into 90 minutes, but has some help from a local, experienced beekeeper who adds a bit of color and wisdom to the show.

A couple of things weren't quite right with this film, and since I've been involved with making a lot of these I understand how that happens. But if you are aware of them before hand you won't get confused when you watch. Since this is a First Hive show, it was unfortunate he used both drawn comb and foundation interchangeably . . . something not possible with a first hive. But he doesn't say what to do if you have only foundation. He uses an antibiotic when feeding, but doesn't discuss the reason, and has a discussion about dark brood cappings vs light brood cappings, and how the former is a problem. And he has his bees in a bear fence, but never mentions why . . . These aren't serious, but be aware of them.

I learned a better way to put a full super on a hive without squishing as many bees, and an interesting way to wrap a hive for Winter. Both good points. All in all . . . not a bad show for the price of $15.00 plus $5.00 for shipping. Order at **http://beekeepingvideo.blogspot.com/**.

Bee Dun

We did not include the photo or the label of this product when we introduced it in the September issue. It comes in an 8 ounce aluminum bottle complete with spray applicator. Refrigeration is required after opening. Instructions are included directly on the back label. **www.beeology.com**

NOVEMBER – REGIONAL HONEY PRICE REPORT

Time once again for *Bee Culture's* Annual Honey Crop Report. Last November, after surveying our over 100 field reporters…consisting of a representative population of commercial, sideline, backyard beekeepers and honey packers, we predicted a U.S. crop of 119,375,000 pounds, with average production per colony of 53.7 pounds…the smallest honey crop reported since reporting started. The USDA did their survey a bit later in the year and, reporting in February of this year, calculated a crop of 144,108,000 pounds, with average production per colony of 58.5 pounds, the smallest honey crop reported since reporting started. You know the drill on their figures though…some colonies get counted twice…there's some hitches, but they are consistent, so we work with them. Our figures were 25 million pounds apart, which is totally attributable to our colony estimates…we calculated there were 2.223 million colonies, while the USDA's figures were 2.462 million colonies…had we used their colony count our crop estimate would have been 132.156 million pounds. Conversely, had they used our (in our opinion more accurate estimate), their production would have weighed in at only 130 million pounds…so there you have it from last year.

This year, after thoughtful consideration, and extensive phone and personal interviews, we estimate the U. S. colony count to have increased over our last year's count by right about 10%...about 80% of that due to commercial operations expanding to accommodate the almond pollination crop, but the other 20%...nearly 50,000 colonies, belong to the standing room only group of new beekeepers this year. That bumps up the colony count…by our estimation, to 2,445,000 colonies. A healthy bump, if you ask us, and right at where USDA was last year. We'll see.

As far as the crop goes, you can see the chart for average colony production per region, and the total at the end. But we have an added figure this year…we asked what was the average honey production from only the colonies that honey was harvested from, and we asked what the average was if they included the colonies that didn't produce any honey at all. The difference is significant, and we think worth noting when considering the total U.S. crop and colony counts.

So, how to proceed? Do we use the only-honey-producing figures, or the all-colonies figures? Well, we did a bit more digging with some of the commercial and sideline beekeepers we know, and we arrived at a compromise…when asked how many of their colonies, really, didn't produce honey, that were included in the total count done by the USDA, the figure we arrived at was right about 25% give or take. Applying that to the total colony count then would give us a realistic figure…but for comparison, will give both…so per colony production, when calculating for honey-only colonies, weighed in at 64 pounds per colony. This, times the adjusted number that was reduced by 25% from our total, gives a U.S. crop this year at 117,360,000 pounds. An even smaller crop than last year.

If you use the total colonies and average not adjusted, that is 41 pounds per colony the figure is 100,250,000 pound crop…even lower.

I guess we'll just have to wait and see. In any event, there isn't much honey out there, or, there's even less.

Honey Production/Colony 2010

Regions	1		2		3		4		5		6		7		8		9		10		11		12		*Total*	
	A	H	A	H	A	H	A	H	A	H	A	H	A	H	A	H	A	H	A	H	A	H	A	H	A	H
2009	30	-	37	-	37	-	33	-	70	-	72	-	32	-	57	-	83	-	57	-	54	-	83	-	54	-
2010	40	26	26	17	46	35	53	34	63	58	82	59	45	27	75	48	51	44	76	62	58	39	77	54	64	41

A = all Colonies Counted
H = Only Honey Producing Colonies Counted

REPORTING REGIONS	1	2	3	4	5	6	7	8	9	10	11	12	SUMMARY Range	SUMMARY Avg.	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.75	1.85	1.78	1.69	1.75	1.68	1.74	1.66	1.80	1.65	1.59	1.65	1.59-1.85	1.72	1.62	1.56
55 Gal. Drum, Ambr	1.56	1.75	1.56	1.56	1.56	1.49	1.40	1.56	1.40	1.56	1.57	1.55	1.40-1.75	1.54	1.58	1.48
60# Light (retail)	130.00	131.00	145.00	135.00	141.00	140.00	144.00	147.50	152.00	144.89	157.50	169.50	130.00-169.50	144.78	138.39	137.35
60# Amber (retail)	130.00	125.00	138.19	135.00	138.19	135.00	129.00	138.33	100.00	138.19	138.33	156.48	100.00-156.48	133.48	131.48	138.02
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	55.20	61.98	68.96	54.00	68.96	53.75	51.25	68.96	68.96	68.96	55.50	84.75	51.25-84.75	63.43	56.66	58.64
1# 24/case	77.29	82.78	99.39	78.00	99.39	91.18	80.65	89.20	99.39	109.00	81.70	103.10	77.29-109.00	90.92	86.00	78.60
2# 12/case	73.80	75.72	78.68	78.68	78.68	74.85	68.45	81.00	69.50	78.68	68.50	81.00	68.45-81.00	75.63	73.63	68.83
12.oz. Plas. 24/cs	68.16	74.98	70.26	66.00	70.26	76.00	57.75	78.40	70.26	70.26	73.28	73.60	57.75-78.40	70.77	67.85	64.73
5# 6/case	85.62	85.49	88.87	82.00	88.87	99.00	79.00	85.50	88.87	88.87	89.00	95.00	79.00-99.00	88.01	80.89	79.19
Quarts 12/case	105.91	110.88	105.91	96.00	105.91	104.50	109.60	103.00	126.00	125.00	96.80	126.00	96.00-126.00	109.63	101.13	97.54
Pints 12/case	69.80	66.50	69.80	69.80	69.80	59.83	75.90	68.40	90.00	92.40	61.00	74.00	59.83-92.40	72.27	66.58	65.19
RETAIL SHELF PRICES																
1/2#	3.00	3.41	4.09	3.47	4.09	3.29	2.92	2.79	3.90	4.09	3.65	5.50	2.79-5.50	3.68	3.13	3.27
12 oz. Plastic	3.50	4.20	3.80	3.25	3.80	4.09	2.93	4.07	3.79	3.02	4.28	4.66	2.93-4.66	3.78	3.94	3.90
1# Glass/Plastic	4.50	4.69	5.59	4.49	5.59	5.16	4.21	5.27	3.47	5.38	5.32	6.91	3.47-6.91	5.05	5.08	4.75
2# Glass/Plastic	7.50	7.95	8.76	8.76	8.76	7.90	6.96	9.00	6.89	8.35	8.95	10.75	6.89-10.75	8.38	8.05	8.13
Pint	8.03	7.38	8.03	6.50	8.03	6.54	7.00	7.38	9.00	8.50	8.83	9.62	6.50-9.62	7.90	7.25	7.43
Quart	12.00	9.95	12.00	11.75	12.00	10.77	10.50	11.58	10.50	13.50	11.33	15.95	9.95-15.95	11.82	12.06	11.66
5# Glass/Plastic	17.00	16.50	19.98	17.00	19.98	19.00	16.43	18.50	19.98	17.88	21.25	23.00	16.43-23.00	18.87	19.65	18.35
1# Cream	5.74	5.86	5.74	6.00	5.74	5.62	6.17	6.39	4.95	5.14	7.25	6.50	4.95-7.25	5.93	7.34	5.68
1# Cut Comb	6.50	7.50	8.11	8.11	8.11	6.50	6.75	6.50	8.11	12.00	6.25	11.00	6.25-12.00	7.95	7.22	6.76
Ross Round	6.83	6.00	6.83	6.00	6.83	6.50	7.00	6.75	6.83	9.00	7.00	8.13	6.00-9.00	6.97	5.96	6.48
Wholesale Wax (Lt)	3.00	4.00	4.80	4.50	4.50	6.38	3.37	4.50	4.25	4.50	2.75	4.13	2.75-6.38	4.22	3.76	3.51
Wholesale Wax (Dk)	3.00	3.48	3.95	3.50	3.25	4.50	2.45	3.75	3.00	3.50	2.90	3.90	2.45-4.50	3.43	3.25	3.18
Pollination Fee/Col.	90.00	85.00	93.89	60.00	93.89	77.50	55.00	65.00	93.89	93.89	70.00	116.67	55.00-116.67	82.89	78.66	81.06

A Closer LOOk

MICROFLORA

Clarence **Collison**
Audrey **Sheridan**

The natural hygienic system of checks and balances within a honey bee colony has a significant advantage over the artifical, human-imposed system.

The microscopic universe that exists within a honey bee colony, even within a single bee intestine, is teaming with organisms that are essential to maintaining good health on the individual and colony levels. Over 6,000 unique microbes have been identified in association with honey bees (Gilliam 1997), the vast majority of which are non-pathogenic. In general, bacteria, molds and yeasts associated with honey bee colonies are either benign or beneficial. Viruses are abundant in all honey bee societies, and by nature are potentially pathogenic, but a bee's healthy immune system prevents most from becoming symptomatic.

The intestinal microflora of adult worker bees maintains biochemical homeostasis of the digestive tract for the duration of the bees' lives. Eggs, prepupae, pupae and newly-emerged worker honey bees are generally free of internal microorganisms; therefore, adult honey bees require an inoculation of symbiotic bacteria upon emergence from pupation. While the larvae receive essential microbes in the brood food, these microbes are released along with the entire content of the gut in the final act of defecation, preceding pupation. A replenishing of these gut microbes occurs within four days of adult emergence, and is facilitated through trophallactic activity with older nestmates and through the consumption of pollen (Gilliam 1997).

In her comprehensive literature review of honey bee microflora, Gilliam (1997) reports on a study of the biochemical contributions of microorganisms to the honey bee. The study was executed as follows: honey bees were fed various antibiotics to eliminate the gut microflora, and the guts were analyzed over the life of individual bees for microbial content, digestive enzymes, amino acids, aminosugars, carbohydrates, lipids, riboflavin and fecal purines. The bees were given a non-pollen source of protein so the microbial contributions of pollen could be assessed. A separate analysis was conducted on some of the naturally-occurring intestinal microbes of worker bees, identifying any enzymatic and antimicrobial metabolites produced that may be beneficial to the bee. The experiments revealed that pollen, gut microflora and the bee's own physiological processes all contributed to the biochemical profile of the intestine, with the greatest source of amino acids being derived from pollen and the metabolic byproducts of microorganisms. Furthermore, *Bacillus* spp. and some mold spp. isolated from bees produced higher levels of antimicrobial substances in the intestinal environment than in other environments where they are known to occur, such as soil and food. Other microbially-mediated digestive contributions occur externally; for example, pollen is converted to bee bread by the process of lactic acid fermentation caused by bacteria and yeast.

"Beneficial microflora provide an amazingly effective defense against honey bee disease, having the advantage over antibiotics and chemotherapies of not creating resistance in disase pathogens."

Bacterial samples taken from *Apis mellifera* colonies in Africa, Switzerland and Germany were similar to samples collected from apiaries in the United States, suggesting that the composition of bacterial flora in *A. mellifera* is consistent in the species regardless of geographic location (Cox-Foster et al. 2007). Within each individual bee, however, the microbial composition varies by season and location in the intestine. Rada et al. (1997) compared the gut and rectal contents of Winter bees and Summer bees and characterized "typical" microflora of mature honey bees. Among the samples of Winter and Summer bees, lactobacilli, coliform bacteria, staphylococci, *Bacillus* sp. and yeasts were consistently found; enterococci, pseudomonads and molds were found more sporadically and in lower numbers. The midguts of Winter bees contained more anaerobic bacteria and yeasts than the midguts of Summer bees; coliform bacteria and staphylococci were more prevalent in summer bees. In rectal samples, anaerobic bacteria were present in similar numbers in Summer and Winter bees, and were the most numerous microbes found in those samples. Kacaniova et al. (2004) performed a similar investigation of the microflora of the intestinal chyme (partially digested food) of Winter bees, which tend to store more fecal matter due to decreased flight activity. Their results reflected those of Rada et al., except that lactobacilli – present in high numbers in the Rada study – and molds were not detected. The variation between gut contents in the two studies could be explained by the susceptibility of intestinal microbes to chemotherapeutics commonly used with managed hives.

"Bees introduce microbes into honey during the process of ingestion, modification and regurgitation of nectar."

The external body surface of foraging and nurse bees is relatively free of microorganisms, presumably due to grooming. Of the detectable microorganisms that are found on the body surface, yeasts and molds predominate (Gilliam 1997). While these are considered undesirable organisms to humans, bees cultivate specific yeasts and molds in their bodies to aid food preparation and hygiene. Pollen foragers appear to inoculate their corbicular pollen (pollen within the pollen basket) with specific yeasts and molds which have established in the alimentary canal following ingestion from floral sources; these microbes are responsible for the biochemical conversion of pollen to bee bread. One of the most common molds associated with honey bees, *Aspergillus* spp., has been demonstrated to have inhibitory effects on the causative agent of chalkbrood, *Ascophaera apis* (Gilliam 1997). Other chalkbrood antagonists include molds from the genera *Mucor* and *Rhizopus*, which also inhabit the intestines of worker bees.

One of the most notorious bacterial diseases of honey bees is also managed by the resident microflora of the hive. Evans and Armstrong (2005) discovered four honey bee-derived bacterial symbionts with bacteriostatic effects against *Paenibacillus larvae* (the causative agent of American foulbrood) and then later isolated 23 bacterial taxa from honey bees that were antagonistic to the pathogenic *P. larvae* (Evans and Armstrong 2006). The majority of these bacterial isolates belonged to the genus *Bacillus*, with a high representation of *B. cereus* types. This *Bacillus* species is genetically similar to the popular biocontrol agent, *Bacillus thuringiensis*, which may explain why honey bees are less susceptible to *B.t.* insecticides than are many other species of insects.

A thorough comparative survey was conducted on the microflora of CCD versus non-CCD colonies, with the objective of targeting suspect immunosuppressing microbes in unhealthy colonies (Cox-Foster et al. 2007). Of all the known pathogens – bacterial, viral, fungal and otherwise – associated with honey bees, only Israeli acute paralysis virus (IAPV) had a strong correlation with CCD colonies. Many of the other well-known pathogens, including the infamous *Nosema apis* and *Nosema ceranae*, were detected in both

CCD and non-CCD colonies, but did appear to have a direct correlation with colony collapse. The implications of this study are that pathogenic microbes are ubiquitous in healthy and unhealthy honey bee colonies alike, but are probably held in check by the antagonistic activity of beneficial microbes in strong colonies.

Beneficial microflora provide an amazingly effective defense against honey bee disease, having the advantage over antibiotics and chemotherapies of not creating resistance in disease pathogens. The prospect of developing a probiotic therapy for larval bees was explored by Evans and Lopez (2004). Larvae of four different ages were fed one of three treatments in artificial diet: *P. larvae* spores, a mixture of non-pathogenic bacteria (from the genera *Bifidobacterium* and *Lactobacillus*), or two bacterial coat components (lipopolysaccharide and peptidoglycan). The transcription of two antibacterial peptides, abaecin and defensin, was measured as in indicator of immune responsiveness to each treatment. Results showed that first instar larvae responded with increased transcription of abaecin to both *P. larvae* and the probiotic mixture, but not to the bacterial coat mixture. However, defensin transcription was not significantly increased with any of the treatment groups. The experiment proved that exposing young larvae to non-pathogenic bacteria through ingestion boosts their immune systems and potentially provides protection from infection by pathogenic microbes.

Bees introduce microbes into honey during the process of ingestion, modification and regurgitation of nectar. From a human perspective, there is generally little health concern about microbial contaminates in honey, for even though most honey contains detectable levels of osmophilic (sugar-loving) yeasts and molds, there is rarely an occurrence of dangerous vegetative bacterial growth in honey (Snowdon and Cliver 1996). Most bacteria – including those species that are pathogenic to humans – do not grow in the acidic pH and high sugar concentration of honey. Molds do not tend to grow in honey, either, though yeasts – especially those coming from floral sources in humid regions – can readily ferment honey (Snowdon and Cliver 1996). Unripened honey or honey with high moisture content (greater than 18%) is more likely to contain dormant bacteria, but these microbes are inhibited by the mechanism of glucose oxidation. In diluted honey, hydrogen peroxide is produced by the enzymatic conversion of glucose into gluconic acid. Many species of bacteria are inhibited or destroyed by hydrogen peroxide, though molds and yeasts are reportedly unaffected (Mundo et al. 2004). Unfortunately, this mechanism is relatively unstable, as glucose oxidase is quickly de-activated when honey is exposed to light and heat (Mundo et al. 2004). The floral source of honey has a definite impact on its antimicrobial properties. In a study comparing 26 honey samples from 21 different floral sources, Mundo et al. (2004) found that honeys produced from Montana buckwheat, tarweed, manuka, saw palmetto and melaleuca had the greatest antimicrobial properties. These samples successfully inhibited the growth of *Escherichia coli*, *Listeria monocytogenes*, *Bacillus cereus* and *Staphylococcus aureus* – all known human pathogens – by either osmotic pressure or hydrogen peroxide production. The results of this study suggest the potential use of honey from select floral sources as food preservatives.

The natural hygienic system of checks and balances within a honey bee colony has a significant advantage over the artificial, human-imposed system. In an unadulterated hive, beneficial organisms mutate and adapt as readily as pathogens, so the system tends to continually right itself. When humans intervene with pharmaceuticals, chemicals, and breeding for traits such as reduced propolis production, the microbial system is compromised and cannot work to its full potential. Pathogens quickly become resistant to our prophylactic treatments and the beneficial microbes are nowhere to be found. BC

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RESEARCH REVIEWED

The Latest In Honey Bee Research

Steve Sheppard

"...the highest proportion of viable cells after cryopreservaton in the most successful combination of treatments was 93% ..."

Long before humans learned of genes and chromosomes, we developed the skills needed to make selections among animals and plants that led, in turn, to their improved tractability and productivity. As agricultural ability and technology improved, an entire suite of domesticated animals and plants (crops) were developed and shaped by such selection. After the development of the microscope, our understanding of the mechanisms of reproduction improved when Leeuwenhoek reported the discovery of sperm in the late 1600s. In 1784, the first successful case of artificial (instrumental) insemination was performed by Spallanzani in a dog using a syringe to transfer semen, leading to the birth of three puppies that exhibited characteristics of both parents. With the modern development of methods to freeze spermatozoa (cryopreservation), animal breeders of some species could take advantage of the ability to preserve sperm from animals with highly desirable traits for later insemination into females. A discussion of the importance of the field of cryopreservation is beyond the scope of this Research Reviewed column but, as an example, more than two thirds of current dairy cows in the U.S. undergo insemination with previously frozen semen. Careful tracking of performance data from progeny can then be used in the selection process and such an approach led to tremendous gains in milk productivity since the practice began in the 1950s. In honey bees, instrumental insemination has been often used as a research tool, leading to improved understanding of honey bee genetics (e.g. diploid drones). However, instrumental insemination has had a much more limited impact on bee breeding industry compared to the dairy industry. Arguably, there are a number of reasons for this, but one of them is certainly the limited "shelf life" of collected semen from honey bees – generally about two weeks. A recent paper by Hopkins and Herr (2010) provides experimental evidence and methodological approaches that may soon lead to improvements in the ability to cryopreserve honey bee semen and therefore, the practicality of employing instrumental insemination more widely in honey bee breeding.

The authors introduce their study by noting that previous researchers have reported partial success inseminating virgin queens with cryopreserved honey bee semen. However, as a rule, when inseminated with previously frozen semen, the resulting queens have not produced adequate numbers of worker offspring, indicating that a significant proportion of the frozen sperm was rendered non-viable. Hopkins and Herr devised an experimental set up to examine a number of factors that could affect "post-thaw viability" of the semen. These included study of various types of diluents (material used to dilute the semen after collection), various types of "cryoprotectants" to prevent intracellular ice (essentially – "antifreezes") and various rates of freezing to lower the semen from room temperature to liquid nitrogen temperatures (-196°C or -321°F). For example, the researchers tested both "programmed cooling" (designed to allow ice crystals to form in the liquid outside the sperm cells) and "vitrification" (the temperature is reduced so quickly that ice crystals cannot form). The paper provides sufficient detailed descriptions of the five diluents, three cryoprotectants and various pre-cooling and freezing programs to allow other researchers to repeat the experiments. After freezing, the sperm samples were stored in liquid nitrogen for six days before viability assessment. Human sperm has been used successfully after 28 years in liquid nitrogen storage and the overall effective storage limit for properly frozen semen is likely much longer. The measure used by the researchers to test sperm viability was a live/dead cell staining protocol that allowed determination of the relative proportion of live and dead spermatozoa.

The authors reported that the highest proportion of viable cells after cryopreservation in the most successful combination of treatments they used was 93%, which was indistinguishable from the viability of unfrozen semen. The most successful combination included use of a diluent previously published by Harbo (of the USDA-ARS bee laboratory in Baton Rouge, LA), of slow cooling until just above freezing and then vitrification (very rapid) freezing.

The authors concluded, "there is an urgent need for the cryopreservation of honey bee spermatozoa." In addition to issues related to the loss of colonies

and genetic diversity, they noted that valuable genetic "alleles" (gene forms) could be stored as semen and distributed for breeding and propagation worldwide. This might include semen, for example, from populations of honey bees that do not require chemical treatment to survive alongside *Varroa* mites. The importance of finding practical methods to cryopreserve honey bee germplasm is also heightened by ongoing reports of colony losses worldwide. Storage of honey bee semen in liquid nitrogen would provide the possibility to develop germplasm repositories that could serve as genetic "reserves" for breeding efforts. Such repositories would help maintain and enhance genetic diversity in introduced honey bee populations (such as in the U.S. and Australia) or in other populations affected by heavy losses due to pests and parasites or breeding practices that promoted inbreeding. On a wider scale, germplasm repositories could serve as resources for conservation efforts to protect specific Old World honey bee subspecies, especially those that traditionally occupied limited home ranges and today, for a plethora of reasons, suffer from greatly reduced population sizes. While the research reported here by Hopkins and Herr is not the final answer in developing practical a methodology for honey bee semen cryopreservation, it is a significant step. Whether the widespread use of cryopreserved semen will change the world of bee breeding and colony productivity to the same extent that it has the dairy industry has over the past 50 years is debatable, but the technology certainly holds promise to address some of the issues faced by both bee breeders and honey bees. BC

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Managed Pollinator CAP
Coordinated Agricultural Project

Build A Better Bee

Nick **Calderone**
Steve **Sheppard**

The past few years have been difficult for many sectors of the beekeeping industry both in the U.S. and abroad. Many beekeepers have experienced exceptionally high losses, and while *Varroa destructor* continues to be the number one cause of colony mortality, a substantial proportion of recent losses are suspected of being due to another condition called Colony Collapse Disorder or CCD. To date, many questions about the exact nature and cause or causes of CCD remain unanswered. The CAP project was established to study colony health and to evaluate possible causes for CCD. Regardless of the ultimate findings, the bigger question centers around the remedies that will be employed by beekeepers to ensure colony health in the future.

Background: The negative consequences of the industry's growing dependence on chemical solutions for managing pest problems have become increasingly evident the past few years. AFB has developed resistance to terramycin, and catastrophic losses to mites have become commonplace as mite populations evolved resistance to pesticides. Not only have chemicals become less effective, research has shown that pollen and beeswax in hives are both contaminated with chemicals applied by beekeepers (coumaphos and fluvalinate and others) as well as by a broad array of other pesticides applied by growers of a variety of crops. These residues can cause serious damage to colonies in terms of reducing a bee's length of life and increasing its susceptibility to pathogens and parasites. Poor acceptance rates and an increased frequency of non-acceptance, drone layers and supercedure of many commercially available queens may also be caused by or exacerbated by this contamination. Interestingly, the remedy for much of what ails the industry has been available for the past 70 years.

In the 1930s, several individuals (O.W. Park. F.B. Paddock and F.C. Pellet at the Iowa Agricultural Experiment Station in Ames, IA) collaborated in the development of American foulbrood (AFB) resistant honey bees. In the 1950s, E.G. Brown of Sioux City, IA developed the 'Brown' line of AFB resistant honey bees at his wax rendering plant. These bees were used by Professor W.C. Rothenbuher (first at Iowa State and later at Ohio State) in the early 1960s to develop his AFB resistant line of honey bees – named the Brown line. An AFB susceptible line was obtained from another beekeeper named Van Scoy. With these two lines, Rothenbuhler investigated the genetic basis of AFB resistance. In 1964, he published what was to become a classic paper in behavioral genetics in which he demonstrated that resistance to AFB could be largely attributed to two independent behavioral traits: uncapping and removal of diseased brood by adult workers. He dubbed this mechanism 'hygienic behavior'. Subsequently, a number of other traits were identified that also contributed to AFB resistance. The years since that seminal work have seen a genetic (and selectable) basis identified for a number of other important traits including removal of freeze-killed brood (a surrogate for Rothenbuhler's original hygienic behavior), resistance to acute bee paralysis, resistance to tracheal mites, resistance to *Varroa* mites, pollen hoarding and length of life.

Unfortunately, the translation of these findings into commercially viable honey bee stocks has not proceeded as rapidly as the basic research. Instead, beekeepers have relied on a series of antibiotics and pesticides to control pathogens and parasites in their hives. The principal reason for this is simple: antibiotics and pesticides are generally easy to use and inexpensive in the short term, while selecting and maintaining stocks of superior stocks of bees is labor intensive and expensive. Today, the bee industry finds itself at a crossroads. It can seek yet another set of chemical treatments to solve its immediate problems with AFB, mites and CCD. However, if recent events teach us anything, these too will add to management costs, be effective for only a short time, accumulate in combs, exacerbate current problems with colony health and increase the chance of unacceptable levels of residues in hive products.

"CAP personnel are working on a *Bee Breeding and Stock Maintenance Manual* for commercial breeders and queen producers."

Bee Breeding: The alternative to more chemicals and the roller-coaster ride they provide is to establish a breeding program for the production of high quality, pathogen and parasite resistant stocks of bees. Methods for selection, stock maintenance and the production of commercial queens are well developed; so, there are no technical impediments to such a solution.

The General Method: When Rothenbuhler developed his AFB resistant stock, he noticed that while they were highly resistant to AFB, they were also exceptionally defensive and not especially productive. Clearly, it is of little benefit to invest in the development of a resistant stock of bees if they don't also exhibit a number of other desirable traits. So, it seems reasonable to start a breeding program with a large number of colonies and an initial evaluation for a suite of desirable traits like honey production, wintering ability, defensive behavior and the presence of any obvious signs of disease. Further selection for freeze-killed hygienic behavior, *Varroa* sensitive hygienic behavior, tracheal mite resistance and nosema resistance can be limited to the top 25% or 50% of this initial population based on the initial assays. Breeder queens from this population would be transferred to queen producers who would produce large numbers of queens for use by beekeepers.

Stock selection and the production of queens for consumers are two different processes. Stock selection is an ongoing process that is based on established principles of animal breeding. Once a population exhibits useful levels of the traits under consideration, those traits need to be maintained. This requires continued evaluation and selection. Queen production is a separate process. Queen producers take breeder queens developed by breeders and use them to produce queens for sale to beekeepers. Like stock production and maintenance, queen production must also follow certain basic principles to ensure viable queens that produce colonies that exhibit the desired traits. Stock production and queen production are specialized activities that are best performed by different operations that coordinate their activities.

Selection versus diversity: Selection, by definition, reduces variation as it produces a population of similar individuals or, in the case of honey bees, similar colonies. This loss of variation occurs primarily with respect to the traits under selection. This is a good thing because you want to end up with a population of superior bees without any of the inferior ones. However, variation can be reduced for other traits as well; and that may not always be desirable. Recently, several studies have shown that colonies with high levels of genotypic diversity among workers have significant advantages over colonies with less variability. This is believed to be one of the principal reasons why queens mate with such large numbers of drones. Each of a queen's mates provides a different set of genes, and the resulting mix of workers exhibit a high degree of genotypic variability.

One group of traits that will experience a reduction in variation consists of traits that are closely linked to the trait under selection. Other traits are less affected; however, another phenomenon called *drift* can affect variation for these traits as well. Because most populations under selection are relatively small and only a fraction of individuals are chosen to produce offspring for the next generation, all of the available genetic diversity is not passed on to succeeding generations, and this results in a gradual loss of potentially valuable variation in the breeding population. The larger the starting population, the longer it takes for this process to reduce variation for traits not actually under selection, but the process is inevitable. This reduction in variation is especially noticeable at the sex locus which results in what beekeepers refer to as 'shot-brood'. The phenomena of linkage and drift are both important to the design of successful breeding programs.

When queen producers rear large numbers of production queens from a small number of breeder queens, the chance for inbreeding – a reduction in variability – is high.

As part of the CAP project, we are studying the degree of genetic variation in several large beekeeping operations that have experienced CCD during the past few years and comparing those data to operations that have not had CCD. We hope to learn two things from this study. First, whether or not there is a decreased level of variation in the CCD operations; and second, whether or not there are significant differences among operations that might fruitfully be exploited in the design of a breeding program.

Long-run sustainability Relying on a single breeding population as the sole source for all production queens would be undesirable for several reasons. First, it would limit the future gene pool to whatever was incorporated into the initial population, and that would slowly diminish over time due to drift. Second, different regions of the country require different traits in bees for optimal performance. Therefore, a number of programs need to be established throughout the country with the base populations established independently of each other. This will ensure a maximum amount of variation at the beginning, and each population will differ from the others to some degree. Stock from the different populations can be exchanged from time to time to sustain variation if needed.

Selection methods Selection assumes that one has good assays to evaluate stock. As part of the CAP project, Dyce Lab has worked to improve the accuracy of two of these assays. First, the accuracy of the freeze-killed hygienic tests can be improved by repeating the assay on colonies more than once and using the average response as the selection criterion. One positive

finding from that study was the observation that the average level of hygienic behavior in an unselected population was considerably greater than the average level reported 10 years ago. This suggests that there has been progress incorporating genes for hygienic behavior into the general population. Second, assays for nosema resistance rely on being able to accurately assess the level of nosema in the colony. Since *N. ceranae* is new to the U.S., we have worked to determine the optimal sampling methods for making that assessment.

Stock certification The recent report by the National Research Council of the National Academies – *Status of Pollinators in North America* – recommended the establishment of a stock improvement program and the implementation of an independent stock certification program. A certification program will greatly facilitate the success of the breeding program because it will provide consumers with assurances that they are purchasing superior stock and will provide producers with an economic incentive to invest in the development of those superior stocks. This will all come at a cost, but stock certification is a common practice in plant and animal breeding where it has been used with great success. When you consider that there is already an enormous cost being paid in terms of poor queens, diminished colony health and colony replacement, the cost of selected stock and stock certification should be competitive.

Tech transfer Tech transfer provides the mechanism for successfully moving from theory to practice. Techniques for stock selection, stock maintenance and queen production are well established and can be developed into a viable breeding program. The success of any such program will require cooperation among commercial queen producers with experience in large scale queen production, researchers with expertise in selection protocols and mating programs and extension personnel who make recommendations to beekeepers. Towards this end, CAP personnel are working on a *Bee Breeding and Stock Maintenance Manual* for commercial breeders and queen producers. BC

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Queen Problems

A Review Of What Can Go Wrong, Why, and What Can Be Done

Larry **Connor**

As a beekeeper learns more about bees and queens, reality usually sinks in that there are many issues with queens that are difficult to control. In fact, there are many issues that are difficult to recognize, even after years of experience. Let's review some of the queen problems that frequent beekeepers' hives.

Problems with cells

Natural queen cells appear and disappear in healthy colonies as bees collective energies are expressed. Remove the queen from an otherwise healthy hive and a number of queen cells are produced in a few days. Introduce a queen into a colony with queen cells and either the queen will remove, or cause to be removed, any cells, or the bees may for some reason unclear to humans decide that the cells are more attractive than the new queen, and kill the introduced queen by balling. It can be frustrating. When dealing with queens and queen cells it is very useful to develop standard methods – standard operating procedures – when you approach hive management.

As with any living organism, there are naturally occurring genetic defects that appear in developing individuals, and certainly some queen cells are lost to genetically based developmental problems. We generally don't worry about this because we are not aware of the issues at hand – the exception would be when a source colony, such as a breeder queen, routinely produces a low number of viable queen cells when grafting.

What is more common is the appearance of black-tipped queen cells, caused by a virus perhaps enhanced by varroa mite feeding or contamination. There seems to be more of this in the queen rearing industry than in the pre-mite era, and there are three management concerns to remember. *First*, queen cells must be examined carefully before being put into a hive for emergence and mating, carefully looking for a black tip. This is actually what remains of the body of the dead larva/pupa that has been infected by the virus. Culling and careful disposal of any infected cells reduces cross contamination to other colonies (if this is a factor). *Second*, some queens are apparently more susceptible or resistant to the virus, so record keeping and selection of grafting mothers will be useful in reducing the level of black cell virus in the queen-rearing phase of beekeeping. *Third*, it has been shown in some parts of North America that treatment with fumigillin will reduce the infestation levels. Usually antibiotics are not known to reduce virus infections but there may be some interplay between other pathogens, the virus and fumigillin that we don't yet understand.

Of course, it is possible to select against black queen cell virus by not grafting from colonies that have it. So here is the bottom line – breeders who want to be chemical free must select breeders that do not produce black queen cell virus. Other queen propagators who want to use a wide diversity of queens will choose to medicate to keep healthy cells in their hives. Here the decision must be based on matters of diversity vs. chemical-free beekeeping.

Many beekeepers cause problems to queen cells by chilling the cells during cold weather, or by rough handling. As I noted in *Queen Rearing Essentials*, queen cell producers David and Linda Miksa are obsessive about keeping queen cells warm. They keep bees on their cells in colonies or provide supplemental heat (using fixed and portable incubators and hand warmers) to keep cells warm during handling and shipping. They loan or insist customers purchase portable chicken incubators to move cells from their facility in Groveland, FL to their final destination. Cells that are shipped by overnight delivery are in battery boxes with sufficient nurse bees to keep the cells warm during shipping (the bees are provided water and food for the journey). The thought of beekeepers throwing a few dozen queen cells into an empty coffee can to carry around all day is not a desirable one when concerned about queen cell protection.

Other cells are damaged by rough handling, especially at the time when the legs and wings are being formed by the metamorphosing queen. Any rough handling that dislodges the larvae or pupae may cause additional harm. I suspect that such handling may internally injure developing queens inside cells, and cause problems with acceptance, mating and overall success in the hive.

Very cold and very hot weather can be stressful on queen cells, and queen-rearing methods should be modified to protect these cells. Commercial queen producers have 'Winter' grafting bars and frames that concentrate the cells into the center of the brood area.

Grafting frame and bars with bee coverage on all cells. This is essential for good queen cell production.

Early April graft in Michigan where the bees (what there were of them) pulled away from the sides and bottom of the frame and only covered the cells near the middle of the bars. Lesson learned: Wait until there are more bees or make special frames for far fewer cells!

Virgin queens and mating problems

After emergence and maturation inside the colony, the queen makes orientation flights prior to mating. She is influenced by colony strength – weaker colonies are hard pressed to support queens in very cold and very hot weather. Once the queen leaves the hive for her mating flights, she must encounter a drone population adequate to provide her with a full load of semen in her sperm storage structure, the spermatheca. One problem I have seen with package bees is the quick conversion to drone laying by newly installed queens, as early as the first month after introduction. This implicates the weather either restricted adequate production of drones or prevented the queens from mating so they are full mated. Such queens often delay egg laying, but once they start they do not return to the air for additional encounters.

A delay in mating may seem like a good thing, but if it means that the queen lays unfertilized eggs that become drones it is a failure. Many, many new beekeepers experience queen failure from poorly mated queens, and loose their colonies because they do not know the difference between a worker bee and a worker-sized drone. It is especially exasperating when the queen starts to lay some fertilized eggs and then produces entirely unfertilized eggs that become drones. New beekeepers are often so inexperienced that they cannot sort out a worker bee from the smaller drones produced in worker cells. (One more reason new beekeepers should work in small groups and with mentors).

Many queen producers remove queens for sale or use in other colonies about two weeks after the cell is placed into the mating colony. The queen is laying eggs, but is not fully mature. Maturity in queens is associated with weight gain, hormone production, pheromone secretion, and still unknown factors. One research report suggests that queens are not fully mature until the queen is at least four weeks post emergence from the queen cells.

Mated queens

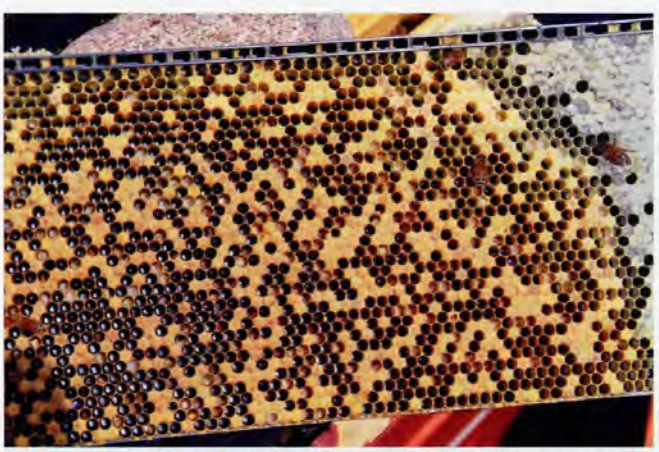
Newly mated queens may start out fast, and lay more than one egg in a cell. This is no reason to panic, as long as the eggs are carefully positioned at the bottom of the worker cell. (Laying workers usually place eggs on the sides of the cells, probably because their abdomens are shorter). At some point the workers remove one of the redundant larvae. This multiple egg deposition usually disappears after a few days. The other time I have seen multiple eggs in cells is after the colony has been exposed to pesticides, and the worker population is weakened. At this point multiple eggs is usually the least of the beekeeper's concerns.

Spotty or shot-gun brood

Traditionally any very spotty brood pattern, where there are up to 50 percent empty cells or cells with much younger larvae or pollen, has been attributed to inbreeding. Bees have a haploid/diploid system to determine sex, and when the drones and queens are closely related, they may share the same gene for sex determination. This results in a diploid drone. Bees eat the diploid drone larvae several hours after emergence (in the fourth day of the 16-day metamorphosis) and this creates spotty brood.

Since the increase of bee breeding programs that focus on the removal of diseased cell contents (American foulbrood, European foulbrood, chalk brood and sac brood), this will also create a spotty brood pattern. Heavy varroa mite infestations also cause spotty brood patterns as the bees remove the cappings of infested cells to liberate the mites. Some bee stocks remove the infested brood as well.

Poor nutrition, especially early in the season and during a dearth period, also may cause egg and larval cannibalism, reducing brood areas. Bees first remove the drone brood before they remove worker eggs and larvae.



Inbreeding or disease and hygienic behavior? This very spotty brood is the result of an infection of European foulbrood. The bees are removing the diseased larvae, creating this spotty pattern. What did we do? The new and expensive Sunbelt queen was killed and replaced by a locally produced queen. EFB is not a spore-forming disease and the condition was corrected as soon as the new queen was mated and started to lay eggs.

Queen replacement or supersedure

When colonies need to replace a failing queen, they will produce queen cells at the edge of the brood area. If the queen has reduced her egg laying, this edge is on the face of the comb, and we learn to associate queen cells on the face of the comb as supersedure cells, compared to cells at the bottom and edges of the frames as swarm cells.

In an otherwise healthy beekeeping operation any

time colonies have less than four frames of brood (when other colonies have much more), there is also a reduction in the amount of queen pheromone that is being produced. This drop in pheromone reduces the inhibition against queen cell production. These cells are not made from queen cups, but from regular worker cells on the face of the comb. The bees must reform the shape and size of the cells to allow the queen larva to develop in the same size and shape queen cell as seen in swarming.

Depending on the time of the bee season, supersedure cells may be used to make up new colonies by dividing the colony into two parts, each forming a new hive. A frame holding well-formed queen cells must go into each small hive, or nucleus (also nuc or nook).

Swarm cells

A swarm cell is a queen cell from the queen, who deposits an egg into a queen cup. These cells are always respected or treated as queen cells from the time of egg laying, and the resulting queens are well fed and large. They may be used for making increase colonies or splits. If you are concerned about selection for the swarming behavior, consider replacement of the swarm cell queens later in the season with well-raised stock selected for other desirable characteristics, like good wintering and mite resistance.

Swarm management

Keeping a strong and healthy colony from swarming requires a great deal of effort, necessitating the frequent removal of queen cells. Queen cells can be started and colonies swarm in less than ten days, so weekly visits are necessary to keep a strong colony from swarming by cutting every queen cell and giving the colony plenty of room for food storage. Once the nectar flow begins and there are plenty of empty drawn combs for the bees to store the incoming crop, the swarming instinct is reduced. Since there are a number of books dealing with swarm management we need to remember the triggers – congestion, reduction of pheromone level per bee, many frames of sealed and emerging brood, and good food reserves.

Many beekeepers sort their colonies into two groups

Normal drone brood position on a frame of worker brood. This is a desired part of colony growth!

as the swarming season begins. One group are strong colonies that will be carefully managed to prevent swarming. The second group will be made into increase colonies, to carefully grow over the summer season. These colonies are then the strong colonies for the next year. The break in the brood cycle also provides a break in varroa mite reproduction, giving the new colonies a boost. This system is excellent for colonies that will not be very productive, since the old queen will be replaced by three or four new queens and the old colony's frames of brood, stored honey and pollen and other frames divided into several new colonies. There is endless variety in this process, discussed in *Increase Essentials*.

Some beekeepers report that swarming seasons are getting earlier and earlier during the past few years. Whatever the cause, be watchful of your colonies' buildup rate, especially if you have an active feeding and colony nutrition program. If the weather does cooperate, swarming season may come several weeks earlier than normal.

Sunbelt Queens

There is bias against queens produced in southern and western states. Some of this bias is justified, especially when the stock has not been tested outside the area

Spotty pattern: Overwintered Sunbelt queen with an early spring pattern with spotty brood. This may be seasonal and will disappear. If it continues the queen should be replaced.

of production. These queens are being mated with local drones, which now may include African drones and other drones unfit for northern production colonies.

The bias is not justified when a stock developed and selected in another area, such as a northern state, is propagated in a Sunbelt state. The rearing conditions in southern and western areas of the United States will allow beekeepers a jump on production. When the cell production conditions are optimal, there is no reason why Sunbelt queen cells and virgin queens cannot be mated in another area to local drones to produce a locally bred and adapted queen. The drones with which these queens mate with is key here, since they represent 50 percent of the genetics of the final colony.

So, if you have a program of carefully selecting local colonies for target drone production, you can have a simple mating and basic bee-breeding program that will provide you with quality hives. And this can be done without risk of bringing in genetic information from African colonies. Select target drone colonies that have demonstrated low *Varroa* mite numbers, are highly productive, and are gentle to work. We like 'pet me bees' where you can gently place your hand on a frame of bees on brood combs and they do not sting or even fly off the colonies. Since this is awkward for the bees, don't do this too much!

Be mindful of inbreeding, and do not produce or purchase queens from the same stock that is in the target drone colonies. Look at bees selected for low mite numbers, hygienic behavior, physiological resistance and sort bee brood development periods.

Raise your own queens

Take a queen rearing class or work with someone who produces queens. It is a great extension of your knowledge of bee behavior and it will save you money as you produce queens that are equal to or superior to those you purchase. BC

Visit with Dr. Connor at an upcoming meeting or visit his website: ***www.wicwas.com****. Queen rearing classes are scheduled for 2011 in MI, MD and VA. Contact* ***ljconnor@aol.com*** *for information.*

Ellen Smith Tupper

Ellen Smith Tupper was from a well-respected New England family who landed with the Mayflower and then settled in Rhode Island.

Tammy **Horn**

Of all the women beekeepers I have written about, none is more compelling to me than Ellen Smith Tupper. Tupper is a fascinating figure in American beekeeping industry, not just because of her contributions to bee extension on the Iowa frontier, but because in her efforts to provide for her family, she entered a moral gray area that few women beekeepers have taken. No one looks good under a microscope, and yet, I find that in Tupper's case, such close study provides a cautionary tale that has much to teach us in this age of financial risk and scandals.

Ellen Smith Tupper was from a well-respected New England family who landed with the Mayflower and then settled in Rhode Island. But her mother, Hannah Draper Wheaton, died when Ellen was very young, leaving Ellen to raise the rest of her brothers and sisters. Her father, Noah Smith, moved the family to Calais, Maine. There, she met Allen Tupper, whom she married in 1843.

By marrying into this family, Ellen Tupper gained an impressive mother-in-law, Mary Ann McIlwayne Tupper.[1] Mary Ann Tupper ran a millinery business, and at one time employed eight women. In addition, Mary Ann was an abolitionist, a temperance worker, and a "friend to the fallen. Long before I knew your father," Ellen Smith Tupper wrote to her daughter, Margaret, "I knew his mother by reputation, and what first attracted me to him was the curiosity to see the son of such a mother. In those days, a business woman was seldom seen."[2]

Perhaps because of his mother's leadership, Allen Tupper was considered quite progressive for the time. He had once taught slaves to read and write when staying with an uncle in the South. After he married Ellen Smith, he seemed to have no objection to her teaching bees at Iowa Agricultural School. Their daughters would become leaders in education, the arts, and missionary work. The Tupper family's move in 1851 to Brighton, Iowa, was because of Ellen's precarious health. But her husband Allen struggled to make the transition to the frontier. Whereas it seemed that he wanted to become a minister according to a family history written by Jere True and Victoria Tupper Kirby, "an attack of fever put an end to that dream."[3] Ellen Tupper soldiered on. When teaching in the late 1850s, she rode to school on a horse, a child sitting in her lap, another sitting behind her. She faced other hardships typical of women on the frontier. Two of her children died of cholera. Tupper started keeping bees in 1860. A hurricane destroyed her apiary one year; a fire destroyed her home and hives during a harsh Winter.[4]

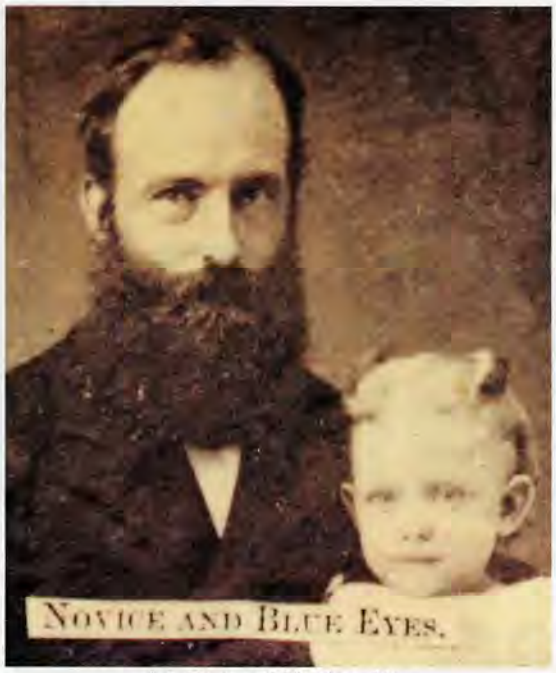
Kate Tupper

In spite of the frontier challenges, Iowa had cultural freedoms that benefitted Ellen Tupper and her family. She taught beekeeping at Iowa Agricultural School. Iowa also had become a bastion of Christian socialism. Between the influence of Iowa State College's equitable admissions policies and the progressive religious movements in the region, Ellen's oldest daughter, Eliza, converted to the Universalist Church and then later to Unitarian theology. As a pastor, Eliza established at least ten schools in Minnesota and the Dakotas. There is no indication that Eliza followed in her mother's bee boots, but Mila, Ellen's younger daughter, became a beekeeper and Unitarian minister in Minnesota before living in the Dakotas. Another daughter, Kate Tupper Gilpin, became a college professor at the University of Nevada. A son, Homer, stayed in Iowa. Margaret, the youngest, married a Texas businessman Henry Alfonso True.[5]

Throughout her career, Tupper contributed to the Iowa State Agricultural Society reports, *American Bee Journal* and *The Prairie Farmer*. When writing an annual report on the state of beekeeping in Iowa, Tupper argued for more stringent codes of judging at the state fairs:

"When a premium is offered for

the best specimen of honey exhibited, a man who has but one stand of bees, and hardly knows a drone from a working bee, may chance to have for that time the best box....It therefore seems as if the bounty should be offered to the one who obtains the most honey in the season from a stand of bees or to the one who has safely increased the fastest, or for the best average yield from a certain number."[6]



A.I. Root and his daughter.

When Charles Dadant needed finances to buy Italian queen bees, Tupper provided the money. When the *American Bee Journal* needed an editor, she joined the staff in 1873 until 1875. By all accounts, Tupper seemed to be in control of finances, family, and her mental faculties. In 1872, she moved to Des Moines to start The Italian Bee Company with Annie Savery.

One would think the arbitrary vagaries of frontier life were over for Tupper and her family.

In 1876, Tupper's life tumbled precipitously. Tupper was supposed to coordinate the 1876 Philadelphia Centennial bee exhibit, which should have been a rewarding task for a well-respected New Englander. It would have been the perfect blending of her family's history and her passion for bees. As late as February 1876, she was soliciting exhibits in the *American Bee Journal.*

But, on January 28, 1876, Tupper was arrested on forgery charges. "The Queen Bee's Temptation" screamed the *American Bee Journal* headline in March. Manager-turned-editor Thomas Newman explained in a brief paragraph: "It appears that she freely used the names of relatives and friends, and in addition, forged the names of leading citizens of various cities of Iowa, from the name of the governor of the State, down; as well as the names of leading men in the East."[7]

Tupper even signed a few checks "Jesus Christ."[8]

Editor A.I. Root was quieter in *Bee Culture*, oddly enough given that he ran a column titled "Humbugs and Swindlers," and he could be merciless when riled. Instead, on the front page of the March issue, Root merely asked that his readers consider kindness: "Mrs. Tupper is to be pitied as everyone who is taken in by temptation step by step."[9]

Evidence of Tupper's troubles occurred as early as a year before Tupper's arrest. Charles Dadant, assuming that Tupper was withholding travel funds from him because she was cheap, angrily wrote, "In France, we have a saying *souivent femme varie,* often women vary, and Mrs. Tupper shows she is not an exception."[10]

Tupper responded, saying that "a woman who has followed beekeeping persistently for 17 years can hardly be called 'fickle," and leave it to them also to say, "if after having spent over three thousand dollars in the one branch of importing, she is not very wise now to let others bear the expense of further risk in the matter." [11]

Why Tupper's sudden downfall?

Root himself may have provided an answer in a brief paragraph in his "Honor Roll." Even before Tupper's fall from grace and imprisonment, Root wrote about his concern:

Mrs. Tupper's life has been, and probably will be one full of active work, many times it seems more laborious and full of business cares than one of her sex ought to bear. Her health of late has been poor and we trust her friends en masse would be glad to see her take more rest and enjoy her bees more in peace and quietness undisturbed by busy traffic.[12]

From a much broader perspective, several queen producers felt that customers would take advantage of them, using the postal service as an excuse for dead queens being delivered. Many customers would complain that upon arrival, the queen bees were dead. In the days before federal oversight of the postal service, fake post master claims were common, and some queen producers were swindled. Mr. William King from Kentucky wrote an especially impassioned letter in his defense after he had been included in the "Humbugs and Swindlers" Column:

Very many of my orders I filled the fourth and fifth time, complaints coming that the queens died in the cage before being released...Several sent what purported to be statements of Post Masters and Express Agents, certifying that they were dead or dying . . . All such complaints were listened to attentively, and more and more queens were sent. I become suspicious that I was being played off on . . . and it turned out that some of these so called certificates of P.M.'s and express agents purporting to be signed by the same parties were in fact written in different hands. I feel fully satisfied that I was swindled out of at least 200 pure queens.[13]

The vagaries of Iowa weather were also a factor in the early days of postal service. Railroad companies hated shipping honey bees, and often these bee shipments were given the worst service of any livestock commodity. So, it was possible that Italian queens did indeed die en route to customers due to the poor quality of transportation at the time.

All that is really known is that Ellen Tupper stopped completing orders and started signing bad checks. It's difficult to tell, piecing her movements from bee journals and family histories, whether Ellen sold out and moved to the Dakota Territory with her daughter, or if she was a fugitive on the run.[14]

What is clear is that the Davenport, Iowa, sheriff had to go in search of Tupper to bring her back to Iowa and face charges.[15]

The April 1876 *American Bee Journal* reported Tupper

was committed to the Iowa Insane Asylum. In following issues, letters poured in from readers across the nation, both asking about her health and confessing to being wronged in business dealings. Newman, the editor of *American Bee Journal*, made a pointed rejoinder to those who claimed to pay Tupper, who had been an editor of *American Bee Journal*, and didn't want to pay *him* again for their subscriptions, "forgetting that two wrongs will not make one right."[16]

Newman goes on to write, "evidence accumulates every day to prove that she has been recklessly carrying on this crookedness for years." His stance was supported by a New York Times article, February 5, 1876, "Forgeries by a Woman." The writer states that forged checks started appearing in 1875, but some cases were handled quietly. The writer attributes the cause to being "much embarrassed in money matters."[17] Tupper had two daughters in school, and the writer acknowledged that Allen was an invalid for much of the time. A breakdown appears to have happened (although Ellen never mentioned such in her journal that she left with Margaret), "as soon as she resumed labor she appears to have resorted to this means to relieve her financial pressure as often as necessity required redeeming her fraudulent paper with money got by either forged paper with money or replacing it with fraudulent drafts."[18] While Rev. J.E. Lockwood would write in regularly to defend Tupper's business transactions, others railed with heavy rhetoric against her. Just listen to Mr. Ellsworth: "The unfortunate lady, whose mental and moral machinery has no balance wheel, has fleeced me of 80.00."[19]

Thomas Newman, the editor of *American Bee Journal*, never passed up a chance to publicize Tupper's troubles. For instance, an article in the October 1876 issue provides more details about how Tupper was arrested. Apparently, she was indicted for debts of $13,000 and forgeries on notes. She was held in jail until her trial.[20]

In 1877, Newman reports, "Mrs. Tupper was tried for forgery in Davenport, and upon the plea of insanity, she was acquitted and is now in Dakota on a farm." Fairly straightforward reporting until one reads the concluding sentence, "The 'insanity dodge' is quite an institution for all kinds of misdemeanors nowadays and gets 'many a one' out of trouble."[21]

Tupper's contemporary H.A. King glided over the scandals in his influential and popular book, "A Beekeeper's Manual," published in 1878. In this textbook, King reported that Tupper was writing again and had regained her health.[22]

Tupper's contemporary, a women's historian named Phebe Hanaford, acknowledged Tupper's fall from social standing: "[Tupper] broke down in both body and mind from overwork, and passed through a long time of sickness and nervous prostration. After this sickness, her mind appeared to be affected, leading to embarrassments in business, so that at present, she is not active in her chosen sphere."[23]

In 1888, Tupper visited her youngest daughter Margaret Tupper True in El Paso, Texas. While there, Tupper died very suddenly. While Thomas Newman's obituary railed, "Frailty, thy name is woman," other people were more demure in their judgments.[24] For all the turmoil of her life, Tupper was described by her peers as one "democratic in spirit; indeed, it would be difficult to find one who had more absolutely escaped the consciousness of social lines," quoted Francis Willard and Mary Livermore in their landmark work on important women.[25]

When Charles Dadant needed finances to buy Italian queen bees, Tupper provided the money. When the *American Bee Journal* needed an editor, she joined the staff in 1873 until 1875. By all accounts, tupper seemed to be in control of finances, family, and her mental faculties. In 1872, she moved to Des Moines to start The Italian Bee Company with Annie Savery.

Undoubtedly, for at least ten years, Tupper influenced beekeepers who were migrating or immigrating West and needed beekeeping instruction. Her unassuming manners erased the pretensions that divided people from one another. She also imported Italian queens, thus providing access to most influential strain of honey bees that would transform commercial beekeeping when large-scale agriculture became the norm in the West. Just as important, she taught her children to promote justice and rights for marginalized people in the West. Her children became ministers, teachers, and professors.

The point of this essay about Ellen Smith Tupper is not to expose "the underbelly" of beekeeping. Nor is it to be judge and jury, looking back at the nineteenth century with a set of ethics that may seem clear-cut to us. Rather this essay seeks to place in context the difficulties facing women beekeepers in the nineteenth century frontier. Many ideals – some unrealistic, others not – were placed upon nineteenth century women, mothers in particular, the most persistent of which is that women were supposed to be more moral than men. Another goal is to show that some of the same difficulties facing beekeepers today existed in the nineteenth century, primarily that of cash flow. If the path to misery is paved with good intentions, Tupper is a good example that starting a queen business with poor preparation could just as surely lead one down that road as any other career. Fortunately, the eternal frontier, as Frederick Jackson Turner once called the United States, had a way of superimposing opportunities upon one's past mistakes, thus providing a cultural landscape for optimism. Ellen Smith Tupper's daughters made much of the education she provided for them (albeit moral and ethical conundrums should be considered), and her family provided for her until she died. Given the contemporary scandals we see on Wall Street in which financial investors were either too arrogant or ignorant of the emerging market risks, Tupper stands as a stark

contrast, ie, a parent desperate to provide a future for her family on a frontier. Once caught, she acknowledged her mistakes, pleaded insanity and moved to a new area to create a new start. The complexity of her experiences can be summed up simply that she was a beekeeper who made unwise choices in a risky and demanding business just defining new opportunities with the Langstroth hive during the post-Civil War era. But even though no one looks good under a microscope, Tupper's portrait in beekeeping elicits such a range of emotions from admiration to self-righteous indignation to compassion, I find that the more patiently I look, the more I learn about the human heart. BC

The author is grateful to Victoria Tupper Kirby and Matt Redman for their correspondence.

References:

[1]True, Jere and Victoria Tupper Kirby. Allen Tupper True: An American Artist. *San Francisco, CA: Canyon Leap Press, distributed by University of Washington Press, 2009. Mary Ann arrived in America from Ireland and married Jonathan Tupper, who died from yellow fever almost immediately after Allen was born. A widow, Mary Ann started her own business as a milliner in Bath, Maine, and she later moved to Bangor when the business expanded to include eight women year-round and during busy seasons, employed twice that number.*

[2]Tupper E. Journal given to Margaret Tupper True (daughter). Washington, DC: Smithsonian Archives of American Art (housed); 1880 (date given to daughter Margaret Tupper True).

[3]True and Kirby, 8.

[4]Hanaford P. *Daughters of America.* 4 ed. Augusta, Maine: True and Company; 1883.

[5]True and Kirby. Margaret would give birth to Allen Tupper True, a respected muralist and artist beginning in 1912 through the 1950s. N.C. Wyeth wrote, Allen Tupper True's frontier pieces struck "the first deep note in western pictures." (xviii). His murals, some of which were done with the Works Progress Administration in 1930s, are featured in three U.S. state capitols--Wyoming, Colorado, and Missouri – and other public buildings, such as the Denver Palace Hotel.

[6]Tupper E. *"Beekeeping."*: Board of Directors of the Iowa State Agricultural Society. Des Moines, Iowa: Dept. of Agriculture.;1864.

[7]Newman T. "The Queen Bee's Temptation." *American Bee Journal.* 12.3 (1876):53-54.

[8]Fisher K. *In the Beginning, There was Land: A History of Washington County, Iowa.* Washington, Iowa: Washington County Historical Society; 1978.

[9]Root A.I. "Headlines--Ellen Tupper.". *Bee Culture.* 4.3 (1876):54.

[10]Dadant C. "Down with the Importation of Bees.". *American Bee Journal.* 11.2 (1875):54-55.

[11]Tupper E. "Answer to Dadant.". *American Bee Journal.* 11.3 (1875):51-52.

[12]Root A.I. "Honor Roll – Ellen Tupper." *Bee Culture.* 3.4 (1875):5.

[13]Root AI, editor. "Humbugs and Swindlers – Letter written by Will R. King." *Bee Culture* 1.12 (1873):93.

[14]True and Kirby 8. In writing about Margaret Tupper, who was eighteen when her mother Ellen and father Allen left Iowa, the authors write: "With her father and mother, Madge joined the Western movement, migrating to Colorado Springs in 1876, the year Colorado was admitted to the union." When contacted about Ellen Tupper's scandal, Victoria Tupper Kirby could not fill in the gaps concerning the years 1876 and 1880, so she writes: "Little is known of the courtship of Henry and Madge, [missing text] but it led to a marriage on August 03, 1880, at Wilderness Lodge in Maple Grove, Lincoln County, Dakota Territory [South Dakota], near where Margaret's mother was then living."

[15]*Democrat* and *Chronicle.* Fri. Mar.2, 1877. Article courtesy of Matt Redman.

[16]Newman T. "Notes and Queries – Ellen Tupper." *American Bee Journal* 12.4 (1876):85.

[17]"Forgeries by a Woman: An Agricultural Writer in Iowa a Humble Imitator of E.D. Winslow." *The New York Times*, Feb. 5, 1876. Article courtesy of Matt Redman.

[18]Ibid.

[19]Root AI. "Notes and Queries: Letter from William Ellsworth." *American Bee Journal* 7.5 (1876):117.

[20]Newman T. "Mrs. Tupper's Troubles." *American Bee Journal* 12.10 (1876):252.

[21]Newman T. "Notes and Queries." *American Bee Journal* 13.4 (1877):120.

[22]King, H.A. *A Beekeeper's Manual.* 1878.

[23]Hanaford P. *Daughters of America.* 4 ed. Augusta, Maine: True and Company; 1883.

[24]Newman, T. "Notes and Queries: Ellen Tupper." *American Bee Journal* 3.12 (1888): 179.

[25]Willard, F.E., and Livermore M. *American Women: Fifteen Hundred Biographies.* New York: Mast, Cromwell, and Kirkpatrick; 1899

Marla Spivak Wins MacArthur Fellowship

The John D. and Catherine T. MacArthur Foundation in early October named 23 new MacArthur Fellows for 2010. All were selected for their creativity, originality, and potential to make important contributions in the future.

The recipients will each receive $500,000 in "no strings attached" support over the next five years. MacArthur Fellowships come without stipulations and reporting requirements and offer Fellows unprecedented freedom and opportunity to reflect, create, and explore.

"This group of Fellows, along with the more than 800 who have come before, reflects the tremendous breadth of creativity among us," said MacArthur President Robert Gallucci. "They are explorers and risk takers, contributing to their fields and to society in innovative, impactful ways. They provide us all with inspiration and hope for the future."

Marla Spivak is an entomologist who is developing practical applications to protect honey bee populations from decimation by disease while making fundamental contributions to our understanding of bee biology. Essential to healthy ecosystems and to the agricultural industry as pollinators of a third of the United States' food supply, honey bees have been disappearing at alarming rates in recent years due to the accumulated effects of parasitic mites, viral and bacterial diseases, and exposure to pesticides. To mitigate these threats, Spivak's research focuses on genetically influenced behaviors that confer disease resistance to entire colonies through the social interactions of thousands of workers. Her studies of hygienic behavior—the ability of certain strains of bees to detect and remove infected pupae from their hives—have enabled her to breed more disease-resistant strains of bees for use throughout the beekeeping industry. Spivak's "Minnesota Hygienic" line of bees offers an effective and more sustainable alternative to chemical pesticides in fighting a range of pests and pathogens, including the Varroa mite, a highly destructive parasite that spreads rapidly through Western honey bee colonies. By translating her scientific findings into accessible presentations, publications, and workshops, she is leading beekeepers throughout the United States to establish local breeding programs that increase the frequency of hygienic traits in the general bee population. With additional investigations into the antimicrobial effects of bee-collected plant resins under way, Spivak continues to explore additional methods for limiting disease transmission and improving the health of one of the world's most important pollinators.

Marla Spivak received a B.A. (1978) from Humboldt State University and a Ph.D. (1989) from the University of Kansas. She has been affiliated with the University of Minnesota since 1993, where she is currently Distinguished McKnight Professor in the Department of Entomology. She is the author and creator of numerous beekeeping manuals and videos, and her scientific articles have appeared in such journals as the Journal of Neurobiology (now Developmental Neurobiology), Evolution, Apidologie, and Animal Behavior.

We contacted Marla shortly after her award was announced at her lab where she told of the secretive way the Foundation made certain that she would be available to take the phone call with the good news. They had previously set up an interview with a supposedly free lance writer who was to do an interview at a certain time. When the time came the interviewer didn't come, but the phone call did.

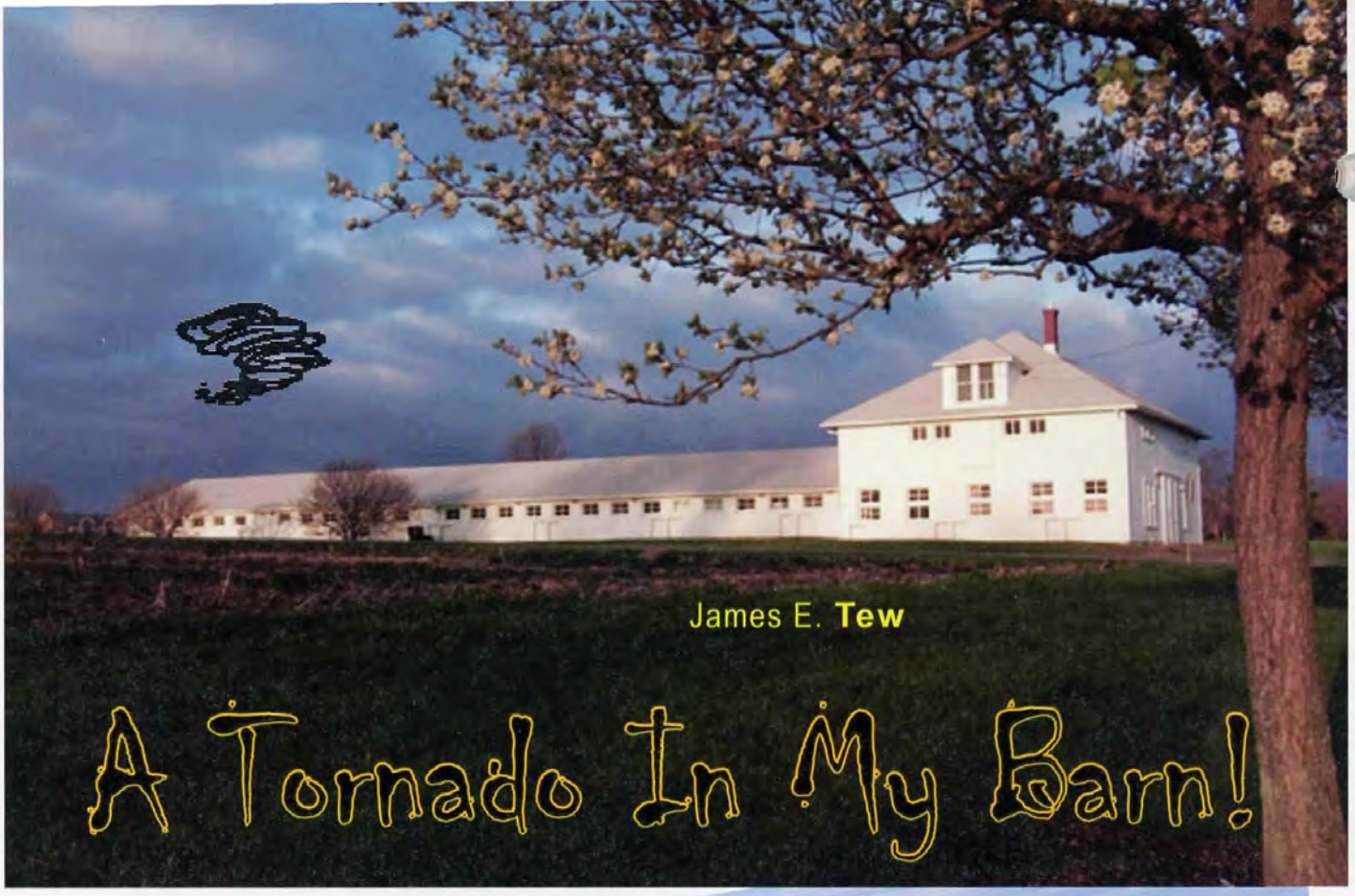
The award is substantial, and has no strings attached, but Marla said that she may be able to use some part of this to leverage funding for her bee lab work, and certainly to help with bees and beekeeping in some fashion.

"Perhaps some our propolis work can benefit from this, also," she said. She has graduate students working on the chemistry and other aspects of this project. A trip to visit the sources of the most promising types of this material may be in the works, but not right away.

Marla is the second MacArthur Foundation fellowship winner from UM, and the University is understandably pleased with this event. And it seems Marla is the first honey bee researcher to receive this award.

"Because of all the publicity that honey bees are getting, finally, people are more aware of the importance and value of honey bees, pollination and the role they play in our lives", she said, "and I think that's probably why a honey bee researcher got this attention".

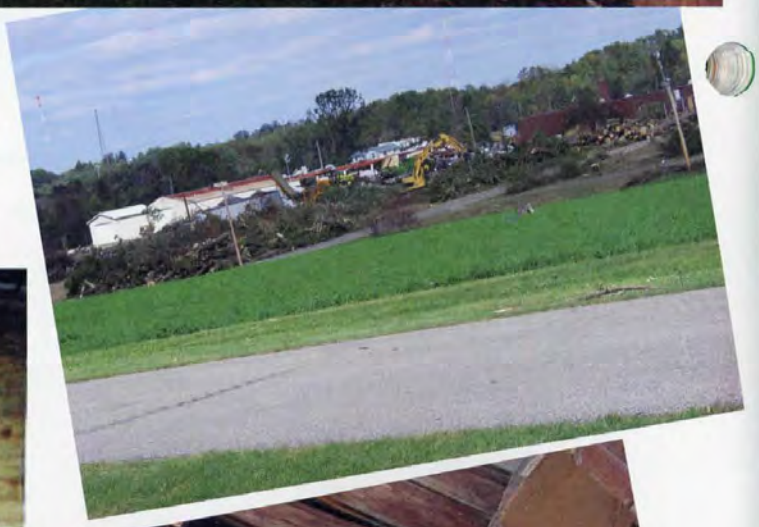
"But", she added, "none of this would have been possible without the hard work and dedication of all the people I work with...Gary Reuter, all my students here in the lab, and especially the beekeepers I have the good fortune to work with." BC



James E. **Tew**

A Tornado In My Barn!

On September 16, 2010, a tornado tore through the Ohio Agricultural Research and Development Center Campus of The Ohio State University in Wooster, Ohio. Amazingly, not a single person or research animal was harmed. The storm took out its wrath on facilities, equipment and plants. The OSU bee equipment storage facility, built in the 1920s, was squarely in the path of this rage. While the damage to the campus will – no doubt – run



A view of the saw room. Very few photos exist of the inside.

into the tens of millions and many people lost homes and personal possessions, the loss of the storage facility to Ohio's honey bee program is catastrophically significant. The structure and its contents were declared a total loss. Nearly one hundred years of bee equipment, antiques, contemporary equipment, books, back issues of journals, mowers, a small tractor, extractors, eight-frame equipment, Dadant Jumbo equipment, M fences, cases of Pierco frames . . . name absolutely anything to do with beekeeping equipment and it was in that barn. It is a real loss to the beekeeping community in Ohio, and the U.S.

Through the years, I have written some strange – even bizarre pieces. I sense that this contribution will be my oddest. I am exhausted. I am emotionally drained. My schedule is trashed. Disaster people have asked me

hundreds of questions for which I have no answers. My co-worker, Sherry Ferrell, and I have been working 14-hour days. Professional clean-up crews have required inestimable *keep/toss* decisions. Everything I toss represents either part of my life or the part of the life of former OSU apiculture professors now gone from us. Dr. Walter Rothenbuhler's original data on the research that elucidated honey bee hygienic behavior is now scattered over several Ohio counties. Yet everything I keep will require storage and I have no place to put it. Clearly, anything I write for you at this time will not be light, enjoyable reading. I am just going to show you pictures. Next month, when I hope to be more recovered, I will write a proper article on this event. I apologize for my drama but I must be back at the disaster site at 7:00 a.m. tomorrow morning. It's gloomy work. BC

OARDC STORM DAMAGE REPORT

Thus far, a team from OSU Extension, OARDC, and ATI have inventoried more than 775 trees of six inches diameter and greater, with many of these trees well more than 10 to 20 inches in diameter, including 42-inch oaks and a 53-inch sycamore. When a full inventory is completed, the count of large fallen trees on the OARDC campus and Secrest Arboretum will be well more than 1,000.

The Ag Engineering Building at OARDC was the building most damaged and the nursery and greenhouse engineering lab headed by the USDA's Charles Krause was devastated. Students and faculty lost a great deal of research and valuable germplasm in greenhouses.

Cleanup efforts at the OARDC and Secrest are monumental. OSU President Gordon Gee, College of Food Agriculture and Environmental Sciences Dean Bobby Moser, and OARDC Director Steve Slack, along with so many others have been on the scene with support.

Governor Strickland has promised support, as well, in addition to federal disaster status. As you might imagine, there are extensive insurance considerations and a need for on-site adjustor documentation. OSUE Director Keith Smith and Vice-Provost Mike Boehm have been providing supprot on a regular basis.

Taken from the Medina County Gazette
Medina, Ohio

Though insurance will cover some of this loss, it does not help with lost treasures, everyday items that are useful but not replaceable, but especially for the hundreds and hundreds of hours of labor needed to sort and clean and straighten and fix. If you, or especially your bee club would like to help, please make donations directly to the Bee Lab Gift Account (not to the university, who will take a cut) at ***www.giveto.osu.edu/igive/onlinegiving/search_results.***

MAKE A CANDY BOARD

Steve **Tipton**

Sometimes we goof when it comes to estimating how much food our bees will need overwinter, and either we don't feed, or we don't feed enough. Careful beekeepers in the colder parts of the country will be periodically checking their bees on warm-enough days to make sure they are doing OK and if they find that this is the case . . . the bees have eaten their way all the way to the top of the hive and the cupboard is bare . . . what can they do?

Usually feeding honey frames is recommended, but replacing frames in frigid weather can be hazardous to the health of the bees. And if it gets in the wrong place may divide the cluster.

A better choice is putting food directly above the bees where everybody can get at it. Bottles or cans of syrup probably won't work because of the temperature of the syrup when it gets cold again. Even if the syrup doesn't freeze it will be so cold the bees won't be able to eat it.

Slabs of commercial fondant work well, laid right over the cluster. Heat from the cluster rises and partially dissolves the sugars so the bees can eat it without moving. It works really well, but it's expensive. But so do candy boards. These use just sugar, not sugar and HFCS mixed like commercial fondant.

Last Summer I visited with Steve and Becky Tipton during their big Fun Day, and for a wintering demonstration Steve made a candy board. Here's how he did it. BC

For a few boards you can use the set up shown here. A propane burner and a galvanized washtub. He'd used the burner the night before to heat oil for deep-fried fish.

Prepare the board. Make a shim about two inches deep with the same inside dimensions as hive boxes. Plywood works for material. Steve shot some staples through the sides to support the sugar once it hardens. A good idea. Be careful when cleaning. And be aware of an upper entrance if you remove the inner cover with that notch.

Pour in 15 pounds of sugar, and add three one pound jars of Karo-type corn syrup.

Add four cups of water.

Turn on the heat and begin to mix. Do not stop mixing. Do not let the mixture burn. Stir, stir, stir. Bring to a rolling boil (see the pink spot from the infrared thermometer).

Using a candy thermometer or handheld infrared thermometer, bring the mix to 240 degrees, turn off the heat. Let cool to about 180 degrees.

Pour to fill the board about three quarters full. Let harden. It's ready for emergency feeding. Make them now for emergencies later this Winter.

How To Be A Bee Friendly- Farmer

Kim **Flottum**

Visiting several BFF-certified growers in northern California to see how the program works and where it all began.

The most obvious need for available honey bee food is where there are the most honey bees. This happens when bees from nearly everywhere in the U.S. arrive in California beginning in mid to late Fall and continuing right up to bloom time in the almond orchards. Many, maybe most, leave home right after honey harvest and before Winter sets in and they get snowed under. When they arrive in California they head for places to sit – and those places are mostly barren,

Wild flowers grow between grape vine rows at Napa Valley Reserve.

forage-free landscapes. It's Winter in California, remember. And, where almonds grow, unless there's irrigation there's not a lot out there. Recall, too, that there are hundreds of thousands of colonies already there that belong to California beekeepers; and they are usually in locations that afford better forage, water and accessibility. It's their home field advantage.

Mark Griffin, head grower at Napa Valley Reserve, and Kathy Kellison, founder of Bee Friendly Farming.

The bees spend the time from when they arrive to the time they are moved into almond orchards building their population to cover at least eight frames with bees and brood by about February first. Since there's not much available beekeepers spend a lot of time and money stuffing them full of protein and carbohydrates, and other essential nutrients from artificial diets.

But even after almonds there's a need for diverse forage in much of the state because there's either non-diverse agriculture, or lots of not much during hot, dry Summers.

This is what led to the launch of the Bee Friendly Farming™ (BFF) initiative by Partners for Sustainable Pollination (PFSP) founder Kathy Kellison. PFSP is a non-profit group based in Santa Rosa, California with abot 100 members and 40 or so farmers. The BFF initiative recognizes and rewards land owners who commit a small percent of their land – farm, ranch, pasture, orchard, vineyard or fallow land – to growing honey bee friendly plantings, along with other bee beneficial practices. "Bee Friendly Farmer" is an inclusive term that is intended to recognize Bee Friendly ***ANYONE*** who supports bees directly or indirectly – *beekeepeers, farms, ranches, businesses, schools, local governments, nonprofits, and gardeners.* The BFF initiative is an important means of raising consumer recognition and support for helping bees by (1) recognizing those who provide bee

At Kunde Vineyards, bee friendly plants have been put around irrigation ditches. Low to no maintenance plants are used. That's a California Buckeye in the foreground, which can be a nuisance to honey bees if no other plants are blooming.

It's hard finding unused space at most of the farms in this part of California. Every square inch that can be used is . . . so ekeing out even a tiny fraction of that land for bees is a bonus. This hillside vineyard is seen from the main buildings at Kunde Vineyards.

habitat, and/or (2) supporting bees by purchasing farm products and local honey bearing the BFF logo.

Still in its infancy, Kathy Kellison has made giant strides on the grower end – see the map of bee friendly farms – and in building support, where she's made friends and allies with prestigious, similar minded folks like non-profits Xerxes Society and the North American Pollinator Protection Campaign (NAPPC), with trade associations like the California Farm Bureau, and with government agencies at the national and state level, like the USDA's Natural Resources Conservation Service (NRCS).

I visited several BFF-certified growers in northern California this past spring to see how the program works and where it all began.

Napa Valley Reserve is a privately owned vineyard in the Napa Valley. Mark Griffin, head grower, dedicated land here by planting buckwheat between vine rows, which serves the dual purpose of pulling excess moisture out of the soil – grapes don't like too-wet feet – and feeding bees at the same time. When blossoming is complete the plants are plowed under and the space replanted. Other plants used include borage and a wildflower mix. He also uses space not otherwise useful near creeks and road beds and around the temperature control fans. Local bees, including his that he keeps on the property and native bees, all benefit from these plantings that provide food that otherwise wouldn't be available. Napa Valley Reserve is able to use the BFF logo on its products as a reward.

Rows of wildflowers planted in rotation with each other and sometimes vegetable crops. Some are past blooming, some are blooming, and some are just emerging.

The "Menu" at Oak Hill Farms, an organic CSA. Members join for a fee, and share the harvests as they come in.

McEvoy Ranch in Petaluma produces a host of different olive varieties and makes specialty olive oils from the different types of olives. Shari DeJoseph has set aside areas between tree rows to grow an assortment of bee friendly perennials, and uses bee friendly trees as wind breaks in the hilly terrain. They employ many sustainable agriculture practices because it's profitable in the long run, and the right thing to do. Their wind generator is a good example.

Oak Hill Farm is an organic

Some of the wildflowers at Oak Hill Farms aren't for honey bees, like this vetch, but are beneficial for other pollinators and for soil enhancement, and erosion control.

Perennial shrubs take up some space at Singing Frog Farm, but provide additional pollinator food between fruit and vegetable crops, keeping them well fed and in the area.

fruit, vegetable and flower farm near Glenn Ellen. They obviously don't use dangerous chemicals, but they also rotate crops on and off plots of land, using bee friendly flowers between vegetable crops. It works for them as soil improvement and pollinator attraction and for the bees they have on the property, and other pollinators that share their land, and pollinate their crops. BFF stickers are used on everything they sell.

A historical family owned vineyard in Sonoma County, Kunde Vineyards, is more conventional in their practices, but they are very aware, and very conscientious of the value of pollination. Steve Thomas, the manager, maintains significant pollinator plantings, mostly around the many irrigation ditches his operation requires, plus the riparian sites on the property and several large hedgerows they have on land not otherwise useful. Plantings are mostly low or no maintenance shrubs, trees and perennials . . . labor costs are always a concern. And, of course, using the BFF logo is a benefit for all of their products.

A green roof, and more plantings keep pollinators well fed at Singing Frog Farms.

Paul Keiser runs family owned Singing Frog Farms, a member supported Community Supported Agriculture operation in Sebastopol. They raise over 100 varieties of fruit and vegetables, and were one of the first businesses to use the BFF logo on their web page. They provide bee friendly food betweens rows of vegetables, on row ends, and in rotation with their many crops. The National Association of Conservation District and the North American Pollinator

Pollinator friendly flowes are planted at the ends of rows in the vegetable plots at Singing Frog Farms.

Some of John Gormain's bees on Swallow Valley Farm. The very hilly land in the background supports sheep, but pollinator friendly hedge rows went in this Summer that provide not only good food, but soil and wind erosion control.

Planting in otherwise unused space . . . here the service road to the wind generator for temperature control . . . in a vineyard makes perfect sense, and takes up no otherwise useable space at Napa Valley.

Using roadside space otherwise unused is how Shari DeJoseph at McEvoy Ranch helps pollinators at her Olive grove.

Protection Campaign awarded Mr. Keiser the 2010 Farmer-Rancher Award for significant contributions to pollinator species protection and land conservation.

John Gormain manages Swallow Valley Farm in Valley Ford, a large, mostly pastoral sheep farm with turkeys and chickens. He received a pollinator habitat grant for planting hedgerows for soil and wind erosion control, to serve as wind blocks, and pollinator habitat and food, all planted with pollinator friendly plants. (**http://home.ezezine.com/1636/1636-2010.05.08.15.26.archive.html** for information on this program). The grant money will be used for irrigation equipment, the large variety of plants used in the hedgerows, the solar powered equipment for the irrigation and the labor to install all of this. They'll be able to use the BFF logo on the promotional material they use for the farm.

Using space between buildings for bee forage also helps at McEvoy Ranch.

A much smaller operation, one that produces only a few vegetables, but meets the land use requirements is run near Petaluma by Ettamarie Peterson, one of the original certified BFFs. Ettamarie displays the BFF logo on her bee building, and puts the logo on the pumpkins she sells.

An uncommon, but well run operation was Draper Farms, in Marin County. Operated somewhat like a CSA, members don't pay to join, but purchase their food outright each time they visit and only purchase what they want. It's on the honor system and prices are posted. Because it's local, it's popular. But Marin County – everything is expensive – water, taxes, everything. They grow vegetables, herbs, and have chickens, and eggs. The CSA is run by M.E.A. McNeil and her husband Jerry in their spare time. She's a writer (you may recognize her name from the *American Bee Journal* and her recent articles with Marla Spivak), and her husband is in the computer industry. Much of their land is unfarmable, so planting lots of bee friendly plantings isn't difficult. But even in this very expensive garden, there are some bee friendly plants at row ends and scattered about in the garden.

Phil Giles, the NRCS (USDA National Resource Conservation Service) agent for Northern California has been extremely instrumental in working with the BFF initiative and Kathy Kellison, finding farms that are interested and assisting them with meeting the requirements to qualify for BFF membership. He also works with growers for conservation

A row of perennials between two rows of vines, on the edge of olives, on the edge of the field offers a diverse ecology for a variety of pollinators.

practices and has brought together BFF representatives and members of several like-minded conservation groups when working together is beneficial. He worked to get grants for workshops for growers to attend to learn of the program and how it works.

BFF, to date, has benefited greatly from the assistance they've been given by several non-profits and also government programs and services... all working toward the same goal...to provide more, and better natural forage food for pollinators....honey bees and all the rest.

The BFF self-certification process is easy, and it's open to beekeepers, growers and others that can show they meet bee friendly criteria. If you are interested in becoming a Bee Friendly Farmer, or want to learn more about the BFF initiative, take a look at **http://pfspbees.org/self-cert.htm.** You can also help our bees by spreading the word! BC

Ross Conrad

The Bigger Picture

By Expanding Our View We may Have A Brighter Future

November is a time of thanksgiving in America. With minimal commercialism and hoopla, Thanksgiving (my favorite holiday) is simply a time to get together with friends and family, share good food, and give appreciation for the many gifts we are blessed with in our lives. When we are thankful, we can't help but recognize the bigger picture, the larger context within which that we are thankful for resides. When we give thanks we recognize the good fortune of our situation compared to what it could otherwise be, and this can inspire some of our most heartfelt feelings of appreciation and gratefulness.

Lately I have been thinking a lot about this "bigger picture" and how it impacts the bees and beekeeping. For example, when we have problems with our hives such as slow population build up, poor brood pattern, disease, swarming, supersedure, or low honey yield, we often blame the queen. As the reproductive organ of the hive and the primary source of genetic material within the colony, the condition and health of the queen can have a large impact on such issues.

While it is true that the queen bee exerts considerable influence over the health and well-being of the colony, when we step back a bit and take in the larger view, we recognize that the health of the hive has a huge influence over the health and well-being of the queen. After all, it takes a hive to raise a queen. From the constant incubation of the queen in all her stages of development from egg through adult, to the workers that produce the food that will allow her to lay well over a hundred thousand eggs a year, a severely stressed, weak and/or sick hive can not be expected to raise and maintain a vibrant and healthy queen. While I am not aware of any scientific research that has looked at this question, I have a strong suspicion that queens that get superseded have poor brood patterns, have disease issues, or otherwise fail to lead healthy robust hives and are more likely to come from sick or weak hives in the first place. Thus, I don't think it is a coincidence that the increased reports of queen "issues" in recent years has coincided with the increased reports of sick and weak hives.

A look at the bigger picture can also help put the CCD issue into perspective. Most of the attention given to CCD has been focused on honey bee diseases, chemical contaminants in the hive, colony nutrition, parasitic pests such as *Varroa*, and additional stress caused by various beekeeping management techniques such as migratory beekeeping. To be frank, I have been just as guilty as others of focusing so much on what is happening inside the hive that I have failed to give enough consideration to what is going on outside the hive.

When we look at the world outside the hive, things are a mess. Forests are disappearing. Deserts are growing in size. Entire animal and plant species are disappearing from the face of the earth at an alarming rate. One

of the major factors driving this trend have been termed "greenhouse gas emissions."

The scientific evidence that our planet is warming has become undeniable to anyone willing to judge the evidence objectively. The most recent evidence is the 2009 state of the climate report released by the U.S. National Oceanic and Atmospheric Administration (NOAA) that states "each of the past three decades has been much warmer than the decade before it, with each one setting a new and significant record for the highest global temperature." Thus, the past decade was the hottest decade in the historical record and the next decade can be expected to be even hotter if trends continue. The first half of 2010 was the warmest such six-month period in the planet's history. The five warmest months in history for the tropical Atlantic have all occurred this year (likely leading to more frequent and severe Atlantic hurricanes). 17 nations around the world set new all-time high temperature records this Summer including Pakistan at 129°F – this is the highest number of national extreme heat records ever set in a single year.

A warming climate leads to warming air and higher water temperatures, higher sea levels, higher humidity, as well as less snow cover, melting arctic sea ice, and shrinking glaciers. Skeptics point to the fact that global temperatures naturally fluctuate and have been high in previous eras of Earth's history. While this is true, previous changes of this magnitude have tended to occurr slowly over thousands of years allowing life on Earth time to adapt and survive. Today, the changes are happening within a few hundred years and most life forms are not able to adapt that quickly.

One of the primary greenhouse gases influencing global warming and leading to climate change is the levels of CO_2 in the air. Atmospheric concentrations of carbon dioxide have increased from about 275 parts per million for the first 10,000 years of human civilization to over 390 parts per million today.

Not only does this impact average temperatures here on Earth, but it also affects the acidity of the oceans. When CO_2 is absorbed into the ocean, acid is created and as a result, the oceans are becoming more acidic. Populations of ocean lifeforms that make up the base of the food chain, plankton and krill, are in a state of dramatic decline. Once these organisms are gone the rest of the food chain will disappear with them. This is just the latest insult to the waters that cover about 70 percent of the planet.

When we add this growing acidity to the huge oceanic dead zones that have been created from run-off, years of over fishing, and the dumping of millions of gallons of toxic petroleum and chemicals into the oceans, it would seem that our oceans are in deep trouble.

If the world our bees live in is in a state of collapse, it matters little how chemically pure the wax combs in our hives are, how disease-free our bees are, or what the nutritional quality of the food and forage we provide our colonies with is. I could go on about how the life support systems on our planet are being systematically eroded and dismantled but I find it much more fun and energizing to focus on what I can do as a beekeeper to help try and turn things around and restore a sense of balance.

Given the bigger picture, what might a beekeeping operation with a small environmental footprint look like?

"Given the bigger picture, what might a beekeeping operation with a small environmental footprint look like?"

To begin with, the number of hives we maintain would need to match what can realistically be managed without the need for chemical, drug and artificial feeding inputs. With earlier Springs and later Autumns, more violent storms and harsher droughts and floods, and new pests and diseases that seem to show up every decade, the needs of the bees can change dramatically in a short period of time. Working with a manageable number of hives will allow us to be better able to keep a closer eye on them than has been the case in the past. We won't be able to simply rely on the calendar as much as we have historically to tell us what type of hive management or manipulation is required at any given time.

Besides having fewer hives, these hives will need to be closer to where we live. By reducing our commute, we lower our expenses for fuel and vehicle maintenance and the amount of pollution generated through transportation. Any traveling to out-lying yards that must be done should be done as efficiently as possible by combining trips and perhaps using an alternative fuel rather than fossil fuel.

Hand in hand with this would be a shift to keeping honey sales more localized. Honey is already one of the foods that embodies the smallest of environmental footprints. As a result, the transportation of honey represents a much larger percentage of honey's total environmental impact than most foods. By matching honey production with the local demand the need to ship honey to distant markets is eliminated.

Generally speaking the more money a person/business makes, the larger the environmental impact they have. One way to help address this issue is to stay out of debt. The vast majority of agricultural operations in America (and beyond) that go out of business, do so due to unmanageable debt loads. Thus, I would argue that it is more important to stay out of debt than it is to have a good credit rating. The question then becomes, how does one stay out of debt when the current structure of our economic system is designed to encourage and perpetuate debt?

If we have reduced the number of hives in our care to a number we can afford without borrowing, that is a good place to start. To go further, we need to move toward being able to supply the vast majority of our apiary needs without having to look outside the apiary. An example is learning how to control mites without having to apply a treatment. By doing so we eliminate the need to regularly purchase mite treatment materials (see my article "The Road To Treatment-Free Bees" in the April 2010 Bee Culture). By leaving enough honey for the bees, we reduce the need to buy sugar for syrup and increase the health of our colonies at the same time. Other areas where we can reduce or eliminate expenses as beekeepers include learning to make our own nucleus colonies, raise our own queens, and capture swarms so we don't have to

Paying attention to the environment outside the hive is as important as focusing on conditions inside the hive if we want to keep our bees truly healthy.

buy bees every year, making our own foundation starter strips to help guide comb construction in the hive, and making our own wooden beekeeping equipment (this is where the easy to build top bar hive and its frames has an advantage over the more complex construction of the Langstroth hive).

The basic principles expressed by sensible beekeeping ideas like those mentioned above can and should also be applied to other areas of our lives. All indications are that the rest of the 21st century is going to be difficult at best due to an unpredictable climate and unstable economic and social conditions. We will all need to become much more efficient and smarter about how we go about things if we are going to make it through the difficult times that have already begun. After all, the hardest of times are not necessarily the worst of times if we can learn to keep love, empathy, imaginative and creative living. The challenges ahead have little to do with Wall Street, and everything to do with changing the way we live, and the way we relate to each other, as well as the way we relate to the earth, the bees, and ultimately ourselves. As beekeepers we must learn to cultivate an apicultural ethic that refuses to place the needs of the bees below our needs. It is this very respect for other forms of life that is largely missing from our culture and political dialog, and lies at the heart of the conditions that are precipitating the earth changes that are in motion today.

Some have compared the honey bee to a canary in the coal mine. By doing so we forget that we are the ones that sit at the top of the food chain. It is the consistent death of millions of people annually from disease, hunger, and environmental devastation that are the true sign of the times. We keep acting as if we believe our clever technological inventiveness will somehow save us from our foolish behavior.

It seems to me that changing our behavior is a much more sensible approach. This is especially true as it becomes more and more obvious that we can't rely on the Democrats or the Republicans to make any meaningful moves on the environment. Politicians in both parties are too caught up in partisanship, environmental denial, and reliance on large campaign contributions from polluting industries and individuals. With no federal legislation on the horizon, the only real hope for progress lies in states, cities, towns, communities, and homes across America. People are going to have to start thinking about how they can make their own places better, cleaner, and more efficient. It looks like things are going to have to be done from the bottom up, if they are going to be done at all. As Mahatma Gandhi is quoted as saying, "Whatever you do will be insignificant, but it is very important that you do it." The honey bee and much of the rest of life on Earth may depend on it. BC

Ross Conrad is the author of Natural Beekeeping. You can reach him at ***dancingbeegardens@hotmail.com****.*

Stan Lee's

SUPER HUMANS

Starring Norm Gary, The Human Beehive (and one Brave Editor)

Kim **Flottum**

Norm Gary was professor and Apiculturist in the Department of Entomology at the University of California, Davis for something like 32 years. He retired 16 years ago from active academic duty, kept playing his clarinet in his Dixie Land Jazz band, and continued his unique and enviable job as the world's premier professional bee wrangler, something he's done for the past 40 years.

You've seen Norm, or certainly seen his work in hundreds of movies, TV shows, commercials, crowd pleasing events at State Fairs and other outdoor attractions. His TV shows include appearances on Johnny Carson, Jay Leno, Merv Griffin, Maury Povich, Howie Mandell, and

Norm comes prepared when he goes wrangling. Everything he'll need, and a lot he won't is in the truck.

Norm and Daniel Smith go over the sequence of events to transpire.

Rick and Britney transfer bees from hives to boxes, and boxes to packages at one of Rick's locations.

Norm's cluster screens. The tubes on the top hold the pheromone.

many others. He's pretty much done it all when it comes to manipulating honey bees. And, though there are a few others who do what he does, he's by far the star of this animal act. All of his adventures can be seen at his website **www.normgary.com**.

That suits Norm just fine though. He's a showman . . . always has been, and using bees to show off isn't surprising. But he's good at what he does. Some years ago he wrangled bees for the movie *Savage Bees*, in which Killer Bees invaded New Orleans, covered a volkswagon bug, and were dramatically destroyed in the Superdome. he also did the bee scene in the tree in the movie *Fried Green Tomatoes* back a bit. He can make honey bees do whatever a crazy writer, or dare devil director wants them to, and he makes it look easy.

"But it is easy, if you know what you're doing, and do it the right way," says Norm.

I doubt there are many even long time, hardcore beekeepers that can think of the right way to have 109 bees fly into their mouth, stay there while you close your mouth, and then let them all go . . . without getting a single sting. But this stunt earned him a Guiness World Record. Jeeze.

Last Spring, Norm decided to hang up the beesuit and let younger bee wranglers have the spotlight. But one more temptation came his way, and as a last Hurrah, he said, "Sure, I'll put on a 30-pound bee beard, or beesuit as it turns out, and we'll show 'em one more time just how gentle bees can be." He invited me to come watch. Who could resist?

There's 30 pounds of honey bees hanging here.

Norm shakes bees out of the packages and they cluster on the screens.

Daniel, on camera, telling the audience what Norm's going to do next – he does this in the most dramatic whisper you can imagine. So he doesn't rile the bees.

Daniel takes a turn dumping sugar syrup on the bees to get them well fed and happy.He's talking all the time telling the viewers how dangerous this is.

The show is Stan Lee's *Super Humans* and the star is Daniel Smith, a peson who has no joints as near as I can figure . . . he can bend and twist and do things that would put me in a hospital in a heartbeat . . . probably without one if I tried to do what he does easily. They show him limbering up at the beginning of every show. He and the crew . . . Alex Parkman, the director; Anwar Mamon, the Assistant Producer; Pete Hayns, the camera man and Collin Bowes, the sound man came to Davis to film Norm and the bees. The star and the crew are from Bristol, in the UK.

The premise of the show is that there are humans that can do super human things . . . stop bullets with a sword, hold their breath for hours . . . Super Human things like that. I hadn't heard of the show until then so didn't have a preconceived notion of what was going on. Norm was to work with Daniel, showing him how bees did their thing, that with the right tools humans could control bees . . . in this case Norm used his secret elixir of artificial, enhanced, synthetic queen pheromone, and a boat load of queenless bees. You already know how this works, don't you?

So we went to get those queenless bees at Rick Shubert's place, just up the road from the Bee Lab at Davis where all this is going to take place. Rick, a queen producer and pollinator and his assistant Brittany shook bees from colonies into large collection boxes, and then transferred them into 10, three pound packages. Norm and Daniel are chatting all the time about how gentle bees are and how much we need them for pollination.

The bees, crew and onlookers – there were several of us – moved then to a large, empty field near the lab for the beard thing. First, Norm set up some hanging cluster screens – see the photos – that had his synthetic pheromone on them, then dumped those queenless bees on the screens, where they hung just as calm as could be. After they were all dumped, he sprayed and poured sugar syrup all over them to keep them calm . . . and everybody ate lunch.

After lunch Norm assumed the position and Brittany and Rick carefully transferred the bees from the screens to Norm's pheromone soaked body . . . they hung on for dear life. It took less than an hour to get all those bees all over Norm, and to get them to settle down enough to stay in one place long enough to film, but finally Norm was covered with bees . . . simply, completely (well, almost) covered in bees. A Super Human, for sure. End day one.

Day two. First thing. I had to sign a release. I didn't have to join the Screen Actor's Guild though, but maybe

There were all sorts of people willing to help dump bees all over Norm.

Finally, wearing almost all of the bees, Norm warms up his . . . ummmmm . . . B-Flat clarinet and plays us a Dixie Land tune. (Kathy Garvey photo)

I should have. Norm took Daniel over to one of the lab's hives and did some more of the 'How I control bees' dialog, along with showing what happens when you swing a leather patch in front of a hive. Daniel watched, quietly. Then, the producer said, "OK, now we do the sting."

Norm gathered up a few bees from the entrance of one of the hives and put them in the refrigerator while the crew set up the 1000 frames a second camera. They tried it once with Norm holding the bee with his right hand that was stinging his own finger on his other hand. They wanted a long, slow shot so viewers could see the sting pull out, and the muscles and venom sac continue to pump venom into the finger. Can't do both, Norm said, I need a volunteer. Not to be outdone by this retiree, I raised my finger and said sting away. So I lay that martyred digit on the table, held very still and Norm grabbed one of his cool bees with a tweezers and held her working end on the top of my index finger. She stung like a trooper, but the camera wasn't focused quite right. Take Two, said the Director. Another bee. She refused to do her duty. Get another. Take Three, shouted the Director. Our third brave bee gave it her all . . . I didn't flinch a muscle. I took the whole sting, until it quit pumping, and even after.

And for me, that was the end of the story. I had to leave right after the sting and move onto another story, miles away. The show, Stan Lee's *Super Humans* is on the History Channel this season. This particular show was on in September, but they rerun them a lot I'm told, so if you missed it the first time, maybe later you can still catch Norm Gary in his final appearance as a Honey Bee Wrangler – and my first. BC

Self sacrifice. Norm tries to hold the bee that stings his finger, but the balancing act doesn't work . . .

With a fine tip tweezer the bee is held, business end at the ready, to be placed on the volunteer's finger. (Kathy Garvey photo)

So he gets a volunteer. Note the 1000-frames-a-second camera. (Kathy Garvey photo)

Third time's the charm. (Kathy Garvey photo)

Social Media

The NEW Buzz Word

Use Facebook and other Social Media to improve awareness of the products you sell.

Steven **Marks**

What could be more natural than to use the social media of the Web to market the products of social insects? Facebook, now with 500 million users (or 7.3% of the world's population) is leading the way for businesses large and small, and even beekeepers. A Facebook search on "beekeeping" reveals an odd mix that includes bands and musicians with the word in their name, but also legitimate beekeepers such as the Flying Beekeeper Honey Co., Loveland, Col., and Red Bee Honey, Weston, Conn., with pages devoted to their companies.

Pages are slightly different than the profiles that half a billion of us have. According to a help section on Facebook, pages are for "organizations, businesses, celebrities and bands" to broadcast information to interested people "in an official, public manner." They are primarily used as a marketing tool to engage "Fans," or "Followers," with news about the company, its staff, products and events.

"It's a way for some folks to vicariously have a couple of hives and learn a little more about bees, hive management, and swarms," says Jim Douglas of the Flying Beekeeper, with almost 200 fans.

Marina Marchese, owner of Red Bee Honey, puts it this way: "Facebook is simply a unique way to connect with other beekeepers, customers, and readers of my book, *Honeybee*."

Marchese actually has two Facebook pages, one for her company and one for the book, *Honeybee Lessons from an Accidental Beekeeper* (Black Dog and Leventhal). The book page has much more activity and followers, over 1,600 people. Marchese says that she "likes to believe that people are more interested in the honeybee than the beekeeper." Both pages, however, have "increased brand awareness," she reports, by letting people meet in one place to share information and photos.

This "flying beekeeper" appears on the Facebook page. It is also the genesis for the label used by the Flying Beekeeper Honey Company. The photo was taken by one of Douglas' sons of another son leaping through the air. (reprinted with permission from Pierce Douglas and Flying Beekeeper Honey Company)

One of the other beekeeping pages, named Beekeeping, on Facebook has over 6,000 followers, and is not affiliated with any company. Instead, it acts as a community page for people interested in beekeeping issues. Recently, there were posts on the page's "wall" of news and information about the Kenai (Alaska) city council considering beekeeping regulations in neighborhoods and a beekeeper asking for help in getting the Boy Scouts to reinstate the Beekeeping Merit Badge.

As these pages demonstrate, one of the factors influencing the marketing value of Facebook is its familiarity with such a large base of people. Incidentally, recent independent polls and surveys indicate that Facebook is skewing to the older and more affluent, the kinds of customers that many beekeepers want to reach. Although a business page is not exactly the same as an individual's profile, they have enough in common to make the experience easy and familiar for any Facebook user. The business page also acts as an information hub. Your current (and prospective) customers can click the "Like" button (a thumbs-up icon) on the page and instantly become a

The Buddha sits serenely at the Red Bee Apiary. Marchese, shown with frame, studied apitherapy in China. (reprinted with permission from Red Bee, LLC)

Marchese shows two producers from the Food Network the surprises inside a top bar hive. marchese is also the author of Honeybee Lessons from an Accidental Beekeeper. (reprinted with permission from Red Bee, LLC)

follower, or fan. The new fan can then read all about your latest projects, events and even special promotions you are perhaps running for fans of your business page.

Even though Douglas admits that Flying Beekeeper is a small operation, he uses Facebook "to market honey around the holidays" and in the Fall during harvest.

Calling Facebook "an avenue for business," Marchese says that the social media tool "has been spectacular" at getting information out about her book, honey and the natural skin care products she makes.

Douglas reports that the number of his page fans "has increased, and continues to increase, almost weekly by two to five fans a week."

"My impression," he continues, "is that there are three types of people I attract – friends, family and local people, people with an interest in beekeeping, and other people who have a type of business who want to be associated with me because my fan base might be interested in their business."

"Facebook is like free advertising," claims Marchese, "but it is soft advertising. It's not in your face, buy my product. It's more like, look what I made today, with some pretty photos, and you kind of draw people in."

What Marchese is talking about is part of the "secret sauce" of Facebook marketing, what the web media tool refers to as organic promotion, or viral marketing. This is how it works, in theory. People trust what their friends like. So, when you go a friend's profile and look at the pages they have "fanned," or "followed," you think to yourself that you might be interested in what is on these pages as well. So, you click on the icon and check out Red Honey Bee or the Flying Beekeeper and their latest adventure in the bee trade, plus what other people are saying about their products.

But, most importantly, if one of the fans or followers of your business page posts something on the Wall of your page, then all of her Friends will be able to read what she has written in their News Feeds. Thus, potentially, one post on your page could be read on the News Feeds of all 100 of her Friends. And, if 100 of your fans posted on fairly regular basis, then you could be reaching out to some 10,000 people, presumably with similar tastes and buying habits to your business page fans. Of course, like a chain letter, it doesn't always work the way you want. The number one piece of advice, to keep your business page updated and interesting so that fans become engaged, takes time. Your time.

"Setting up a page," says Marchese, "is not very hard, but figuring out how to use it to your benefit is the challenge." She recommends that you try different things on your page and see how people react to what you post.

"Sometimes," she says, "people don't care and nobody comments."

She likens the process to learning to ride a bike. The more you "ride," or try things out, the "better you get at making a useful and educational page."

It also helps, as it did on the day of the interview, that Marchese's company got mentioned on Martha Stewart's blog. Marchese said she was bombarded with orders. As it turns out, the blog mention was the result of a previous radio interview on Martha Stewart's network which came about after a producer had seen Marchese's Facebook page.

Douglas says he uses Facebook "as intended, as an open communication tool." Doing so resulted in an interesting connection for the Flying Beekeeper who has "met" a number of interesting people from around the world through his page. Recently, he received a call "out of the blue" from one of his Facebook page fans who was in the part of Colorado where Douglas lives. The man was on his way back to his home in Mexico City. It turns out that he was returning because he "works at an urban agricultural project for middle school kids" back in Mexico City.

"I want to come check out your hives so I can learn more about them," Douglas reports what the man said on the phone.

"It was a neat connection," Douglas continues. "We had a good time."

Many craftspeople, artisans and artists believe that Facebook pages have much more potential as a marketing tool than a blog or email newsletter. Marchese, however, believes that you may need all of them if your plan is to grow the business. Pages are easier to maintain on a regular schedule, since your posts don't have to be long. In fact, a photo of a product and short description is often enough to get the ball rolling. The trick is to get people talking. Ask them questions. Do you like the taste? The color? Does the soap help your skin? You can even ask people to submit posts as they would to a suggestion box (that, of course, the world can see).

In other words, a Facebook Page will work well if *you* interact with it, too. As noted before, it's a familiar format of chatting back and forth to millions of people. Use that to your advantage. BC

BEE STAMPS

Jim **Thompson**

I started collecting postage stamps in seventh grade (I won't tell you when that was). I had a fairly nice collection of United States stamps when I stopped collecting in 1968. Later, when the honey bee embossed envelope was issued, I started collecting again on a very small scale. The United States Postal System had issued very few honey bee stamps and it was hard to justify spending money on stamps that weren't going to be used. In the late 1980s, however, different individuals wrote about collecting honey bee stamps, identifying the stamps that were available, and even providing stamp dealer contacts. This rekindled my interest in collecting honey bee stamps.

Even though there were only four United States stamps, there were many stamps from foreign countries identified as bee stamps. Soon I discovered that some people don't know the difference between a honey bee, bumble bee, or wasp. It didn't matter to them if the bees were kept in a hive, skep, or gum as long as it had the semblance of a beekeeping domicile. Many of the foreign stamps are larger and more colorful than stamps from the United States.

Some stamps have a skep and flying bees, but you need a magnifying glass to see them, but they are still listed as bee stamps. Some stamps come from countries that you have never heard of, countries with names you can't pronounce, or countries that are difficult to find on any map. It makes you think that perhaps there are two guys with a printing press in a garage trying to get rich making counterfeit stamps.

It wasn't long before my collection grew to the point that I wanted to put it in order to display the stamps. I decided to use a scrapbook that had acetate pages. Simply peel back the acetate cover, place the stamp on the sticky page beneath and release the acetate cover. It looks wonderful and if I wanted to rearrange the stamps and the countries, I could do so with ease.

When the stamp dealers had nothing new to offer, my honey bee stamp collecting came to a halt once again. In 2007, the United States pollinator series of stamps was issued which consisted of four stamps. One of the stamps was a bumblebee, but considering how a lot of stamps are classified, it was close enough. Again my interest was revived and I just had to have that bumblebee.

I had gained more knowledge in stamps. A stamp that is fresh from the post office is a *mint stamp*. Once a stamp is fixed to an envelope and sent through the mail it is a *used stamp*. To remove a stamp from an envelope, a collector usually soaks it off using water. If a stamp has been affixed to an envelope, never cancelled, but soaked

Honeybee embossed envelope

(The faintest image of the embossed bee can be seen above and to the right of the upper flower.)

UMM AL QIWAIN

Imperforated pair

Missing black bee outline

Bee outline to the right- Fast Bee

off, thereby losing the glue (gum), it is classified as a used stamp. Mint stamps are usually worth more than used stamps. When I first started collecting stamps, the practice was to anchor them in albums using stamp hinges. Today, the use of hinges is discouraged as it decreases the value of the stamp.

You should not count on getting rich collecting stamps. Many collections sold at auction sell for less than 25% of what the owner paid. Some stamp dealers will only pay up to 80% face value for the mint stamps and avoid buying used stamps. Therefore if you are disposing of a stamp collection, you might be better off using the United States mint stamps for postage.

Collecting stamps is an exercise in personal satisfaction and enjoyment. The day may come when most communication is done by computer and postage stamps may be used very little, which ironically may increase the value of stamp collections.

There are some factors that may increase the value of a stamp. If very few stamps were actually printed, the value as a collectible increases. Errors in the printing of the stamp often increase the collectible value of the stamp. Such errors include the paper being folded in the print area, the wrong color of ink, indexing being incorrect causing the image to be off center or misplaced, and perforations missing or in the wrong position on the stamp.

Stamp from Rattlesnake Island United States

The honey bee stamp, Scott #2281, is a good example of errors that can occur during the printing. It was issued in rolls of 100 stamps with every 25th stamp marked with a tiny letter in the lower margin. There were some rolls of these stamps that were never perforated. A few of the stamps were issued with the black bee outline omitted during the printing process. Fewer still were issued with the black bee outline either to the far left or to the right. Examples of these errors are shown in the photos.

It is surprising how smart we become after making a mistake. When I put all those mint and used foreign bee stamps into the scrapbook album with the sticky pages, I made a big mistake. The sticky pages bonded to the mint stamps so the pages and country name tags became a unit. The local stamp club informed me that sometimes it helps to remove the acetate and let the pages dry several months and if I am lucky, the stamps may release themselves. The only good thing about this mistake is that it happened before I had gotten the valuable United States stamps and that only the foreign stamps were affected. BC

Jim Thompson is a stamp collector and honey show judge and author in Smithville, Ohio.

Connie **Krochmal**

Sages For The Ages

Bees are particularly fond of sages. While around 15 species are considered herbs, others are grown primarily for their flowers. At least three of the herbs are favored by bees.

Depending on the species, these can be annuals, biennials, perennials, or shrubs. Of the 700 to 900 species known worldwide, around 55 species are in cultivation.

Sages are native to tropical and temperate zones. Their habitats extend to nearly all types of conditions from dry, rocky places to deserts and moderately wet places. Some are hardy to zone four. Others are quite tender, and suited to zone nine or so.

General Description

These can vary greatly in height. The shrubby ones can reach 15 feet or so. Most annuals and perennials are one to four feet tall.

Sage plants are often hairy or woolly. For the most part, the stems tend to be square, which is characteristic of the mint family.

Many of the sages have scented foliage. The opposite leaves can be entire or pinnate with toothed or lobed edges. Depending on the species, the foliage can be deciduous or evergreen. The lower and upper leaves often differ in size.

The flowers can be terminal and axillary. These form whorls, opening in spikes or panicles that can be either compound or simple.

The color of the blossoms can vary greatly from one species to another. In general, the red flowering ones are unsuitable for bee gardens.

The two-lipped blooms are noted for their forked stamens and two-lipped corollas and calyces. While most are tubular, these can also be hooded, bell-like, or funnel-shaped. The bracts can resemble leaves. The calyx is often very vivid.

Growing Sages

These plants are easy to grow in the bee garden. The sages do best in a well drained, reasonably fertile soil high in organic matter. Heavy soils are less suitable. A pH of 5.0 to 6.4 is considered ideal. Those species with woolly or hairy leaves require a dry soil with excellent drainage and full sun. Most other sages will do fine in full sun or light shade.

During the growing season, the plants benefit from a monthly application of a soluble, balanced fertilizer. As an alternative, add a time release formula in early Spring.

For best results, hardy sages require a Winter mulch in very cold climates. With the exception of the woolly species, most sages should be kept reasonably moist during the growing season.

The most common diseases that attack sages are powdery mildew, rust, fungal leaf spot, and stem rot. Bacterial wilt is more likely to occur if the pH is high. Plants growing in poorly drained soils are prone to root rot, verticillium wilt, and Winter kill.

The most troublesome insects are spider mites, aphids, whiteflies, spittle bugs, and mealy bugs. While these plants are ignored by deer, slugs are a problem.

The evergreen sages can be sheared to control their size or create a low hedge. For some species, deadheading will encourage them to re-bloom.

Propagation

Sages are easy to propagate. Many are grown from seeds. Generally, the seeds need a temperature of 60 to 70°F. for best germination. For most species, the germination rate is around 75-85%. While seeds of the garden sage will sprout in six to 10 days, most others can take somewhat longer.

Sage seedlings are prone to damping off. For that reason, use sterile pots and sterile potting soil. Water the seed trays from below. These can be started indoors, in a greenhouse, or direct sown after the danger of frost.

Other suitable methods of propagation include stem and root cuttings as well as layering. The perennial sages can be divided in the Spring. The cultivars can only be propagated by vegetative means.

Nectar and Pollen Status of Sages

These plants provide both nectar and pollen. Sages are valuable bee plants for two reasons. First, each blossom contains lots of nectar. In addition, each plant has a large number of blossoms that open over an extended period of time.

The sages are the sources of wonderful, mild tasting, delightfully aromatic honey. Tending to be heavy bodied, it doesn't granulate easily. This high quality product is considered to be among the best honeys around. The flavor is hard to beat. Sage honey tends to be very light colored – usually water white to pale amber or pale yellow.

In most areas of the country, the quantity of sage honey is usually fairly small. The exception is California where the native sages can provide up to 200 pounds of honey per colony in a good year.

The Best Sages for Bees

Of all the many types of cultivated sages, the following species or hybrids are considered to be among the best ones for honey bees.

Blue Sage (*Salvia azurea*)

This goes by other common names, including prairie sage and azure sage. Woody at the base, this perennial reaches five feet in height. It is hardy to zone five or so.

Blue sage is found in rocky and sandy woods, and prairies. It is native to much of the Southeast and South with its range extending into Texas and the Midwest.

The green foliage has blue shading on the underside. The hairy leaves, oblong to lance-like, are toothed. These grow to four inches in length. The upper leaves tend to be more narrow.

Despite the name, the blossoms can also be white as well. These open in late Summer and Fall on very dense, crowded spikes emerging from the leaf axils. The blossoms are ¾ to one inch in length. There is a variety with larger flowers.

Usually, this plant will need staking. Being a native, blue sage can withstand humidity and heat better than most cultivated sages.

Clary Sage (*Salvia sclarea*)

Also known as clary, this was originally native to Eu-

Marble Arch Rose (Salvia)

Cambridge Blue (Salvia patens)

Cirrus (Salvia)

Salvia Strata

rope. Clary sage is a popular, robust, medicinal herb. It is a much branched perennial or biennial. Recommended for zones four through nine, this easily reseeds. This species grows to three feet in height with a spread of a foot.

This hairy plant has large, scented, rough, crinkled, gray leaves. With toothed edges, these are broadly oval to oblong. Sometimes lobed, the foliage reaches nine inches in length. This forms a basal rosette.

Opening from late Spring through the Summer, the blooms are an inch long. These open on three-foot-tall stalks. The flowers appear in whorls. They come in a range of colors, including white, lavender, pink, cream, lilac, and blue. They often have a pink or violet blush. The bracts vary from red or white to pink or lilac.

Garden sage (*Salvia officinalis*)

Also known as common sage, this is by far the most popular species. Native to Mediterranean Europe and Asia, it frequents stony places and dry banks. It is suited to zones four through eight. This species is easy to grow from seed.

This shrubby plant has lots of stems arising from a woody base. With an upright or sprawling growth habit, it can reach two feet in height. The stems are covered with short white or gray hairs.

The rough, wrinkled, thick, woolly foliage can be toothed. Oval in shape, the leaves grow to three inches in length and are half as wide. They're mostly gray to gray-green or gray-white. During dry spells, the foliage tends to be gray. Though this plant is evergreen, the foliage can look careworn during the Winter.

Each simple, terminal spike can have several whorls, each of which contains six flowers or so. The whorls are five inches long. The blooms can be blue-violet, violet, blue, pink, white, purplish-blue, or purple. They're ¾ inch long. Seed-grown plants bloom the second year. Garden sage begins flowering in late May, continuing sporadically for a long period after the main flowering is over.

A number of cultivars are available with some being slightly less hardy than the species. The variegated ones tend to be somewhat less floriferous.

This plant responds well to pruning. If it becomes too woody and sparse looking, cut it back. This species dislikes wet, humid weather.

Jurisici's Sage (*Salvia jurisicii*)

Native to Serbia and Macedonia, this is recommended for zones four through eight. This bristly perennial is much branched, and reaches two feet in height with a spread of one foot.

Both the stems and leaves can be hairy. The basal foliage forms a rosette. The upper leaves are pinnate with a number of leaflets and lobes. The lower ones are egg shaped with wavy margins.

This very floriferous plant blooms from June until Fall. The blossoms, which are often hairy, are one-half inch long. They come in various colors, including dark violet, purple-blue and lilac. The flowers hang upside down in terminal, interrupted whorls with up to seven whorls per spike. The spikes are eight inches in length.

Unlike most other sages, this species will tolerate most types of soil. It will also withstand dry weather.

Meadow clary (*Salvia pratensis*)

Also known as meadow sage, this is native to Europe and Africa. It has naturalized in the U.S. from Massachusetts to Illinois and Pennsylvania where it grows in fields, pastures, and waste places.

This stout, clump-forming species is woody at the base. Suitable for zones three through nine, it is tuberous rooted. The growth habit can vary somewhat. This hairy perennial can be two feet tall with a three foot spread. It is easy to grow from seed.

The foliage typically forms a basal rosette. With blunt tips, the crinkled, heart-shaped to oval leaves are six inches long. The stem leaves are sparse in number and much smaller. The foliage has red spots and toothed or lobed edges.

The flowers open during the Summer. The terminal, erect, sticky flower stalks emerge from the base. The blossoms are arranged in whorls on an interrupted spike with around six blooms per cluster. The blooms, an inch long, can vary greatly in color, especially if the plants are seed-grown. The colors include blue-violet, purplish-blue, blue-lavender, pink, violet, and blue.

For a second flush of flowers, cut back the old flower stalks. If the soil becomes too dry, this plant can suffer. It is adapted to most soil types.

Mealycup sage (*Salvia farinacea*)

This species can be an annual or perennial. Hardy to zone eight or so, it is grown as an annual in colder climates. This is native to Texas and New Mexico.

Mealycup sage reaches two to three feet in height with a spread of two feet. The erect, shrubby plant looks mealy due to the white coating on the stems. It also features white hairs.

The shiny, lance-like to egg-shaped, stalked leaves are pointed. They have blunt, coarse teeth along the wavy edges. Up to eight inches long, the foliage is white underneath.

The tubular, hairy blooms open from Summer into the Fall. The flowers are an inch long. They open on crowded, interrupted spikes containing many whorls. The blossoms are white with purple tinges, while the dense flower stalks are purple. These can be terminal or axillary.

A number of mealycup sage varieties and cultivars are available. These include Evolution, which was named an All-America Selections winner.

Perennial Sage (*Salvia x superba*)

The parentage of this natural hybrid appears uncertain. This strong, vigorous, erect, much branched plant is recommended for zones four through nine. It reaches about three to four feet in height with a spread of three feet.

The wavy-edged leaves are oblong to lance-shaped. The foliage is mostly basal, and reaches four inches in length. This is hairy on the underside.

The blossoms, about one-half inch long, open from early Summer to early Fall. This has numerous, slender, terminal flower stalks. The blossoms can be pink, violet, purple, or purple-violet. The bracts are red.

A number of fine cultivars are available. Though the plants can withstand dry conditions, they need adequate moisture in order to bloom well. Staking is recommended as the stems can get floppy. BC

Time For Nominations – Who To Get?

Ann **Harman**

Finding People To Fill Association Positions Is Always A Challenge. Here's Some Ideas.

We are still looking over the shoulders of the Nominating Committee of the East Cupcake Beekeepers Association and trying to help them decide on their nominations for officers. Last month the committee wrote down some job descriptions so that they could tell prospective nominees what the position was all about.

This month they are sifting through possible nominees from their association. The first question that turned up was "is this nominee a dues-paying member" or just someone who appears, participates, and then goes home?" The Treasurer, who keeps track of dues, was contacted and the committee reassured that indeed that particular nominee has been paying dues promptly for years.

Now for a check of the Constitution and Bylaws. Is current-dues-paid status a requirement of all the officers? If not, that would be a good idea. Certainly current dues would indicate that the nominee is indeed interested in supporting the association. Yes, amending the Constitution and Bylaws is a nuisance but I doubt that members would quibble about that requirement.

The next question was "where does this nominee live?" Does it matter? Not really. Local associations do not necessarily have borders. Some associations are actually on the border of another state. I don't think you want to turn down your hardest-working member just because he lives a few miles away – in another state. The same holds true for counties. Some states have numerous tiny counties and the local association draws upon several of them. Forget the members' addresses. Be glad those members are interested.

State associations, just like local associations, are always searching for officers. If your local club has had good officers whose terms of office are up, why not recommend them to the state association? However, make sure the potential state officer is familiar with the state association and wishes to become an officer.

While we are talking about state associations, let us consider some things that can be done to make searching for nominees easier. States seem to come in three sizes: small, medium and large. A small state may only have a very few local associations, while a larger state will have many. It can be difficult for the large-state Nominating Committee to be familiar with the beekeepers who would be good officers.

Some states have grouped local associations into regions. Sometimes a state has simply been sectioned into approximately equal parts, each encompassing several local associations. Other states may have sections according to geography – mountains, plains; or according to urban, suburban, farmland.

These regions are actually a valuable way to assess potential officers. Each region, or area, can have a Director or Representative. Perhaps each region has a paragraph or two in the state newsletter. Now members of the Nominating Committee can find out if the newsletter submission is on time or does that Director need to be prodded three or four times. When the report finally comes in, does it need severe editing before being printed? Timeliness and editing can give some clues to possible nominees.

Regional directors sometimes give regional reports at state meetings. Usually the reports give information about the honey crop. Weather conditions, bee health, winter losses are usually mentioned also. The beekeeper-reporters can give the Nominating Committee a good idea whether a Regional Director would make a good nominee. Here's one – the report is written down on some unidentifiable scrap of paper, report lasted about 30 seconds and, even with a microphone, most of the report was unintelligible. Not a good candidate.

The next reporter came to the mike without notes and began to ramble on, and on . . . and on. Several long minutes later, still talking. Although the president stepped up, with thanks, to stop the endless flow of words, it was evident that the director had much more to say, most of it useless. Not a good candidate. Especially for president.

Many local and state associations have activities other than meetings: picnics, potlucks, honey fairs, farmers' markets, raffles, door prizes, classes for beginners, etc. These are useful places to look for good nominees. Members that volunteer to help with events are usually committed to helping with the association. Here is where the Nominating Committee can look for "problem" volunteers, too. Just be aware that enthusiastic helpers can suddenly "burn out." Being asked too many times for too many things can mean the loss of the volunteer.

Can a potential nominee be good at one thing and just impossible at handling a second, unrelated thing? Yes. How about someone who is friendly, welcoming, seemingly organized and well-spoken becoming president? Too late everyone found out that running a meeting on time was an impossible task. The end-

Don't forget the people on the Nominations' Committee. they can be some of your best choices.

less speaker droned on and on and this president just did not have the courage to end the talk on time. How about the attention-to-detail treasurer who made such a production out of door prizes that much meeting time was used up and speakers cut short. Actually that could have been partly a president's or program chairman's problem, too.

Take a good look at a possible nominee's skills with people. Is that person looking to control other officers and even members, known for having a quick temper, being overly critical of other's efforts? Just use some caution in the selection of officers and directors or the association can rapidly disintegrate.

In these times of computers, Facebook, Blogs, cell phones, iPods, BlueTooth, Blackberries (I suspect no company would ever make a Raspberry) how computer-literate are the nominees? Certainly those who are keeping records (dues, membership lists) will benefit from adequate competency. If all the officers can communicate with each other via email, disasters can be averted quickly and problems can be solved easily. However, be kind to those who live in the sparsely-settled mountains where cell phones do not work and High-Speed Internet is just a dream. Yes, those places do exist. Just come to my house and see for yourself.

How can the Nominating Committee be certain that they have chosen the right nominee for the job? It does not mean counting the number of years a particular nominee has been keeping bees. Some of the newbees may be the best choices. However, a first-year beekeeper, new to the club may not be that best choice. But if someone knows the newbee well, as neighbor, good friend, work associate, then personality and qualifications may be known. Beekeepers in their second, third or fourth year can be your most enthusiastic members, willing to serve and able to get things done.

It's time for the Nominating Committee to stop hunting for a minute and consider another approach that just might produce some good nominees. Look within, not only the officers but also those who have been active in participating in other ways. How about the member who has been in charge of refreshments for a number of years? Here are a number of valuable skills: good working with people, organized, unflappable in catastrophes, ready to change program if necessary. How about becoming a vice president? Someone else can be found to be in charge of refreshments. Perhaps someone who has been helping with them for a while. Yes, you do have to ask and prepared to be turned down. But it's worth a try.

Has the Nominating Committee ever asked that quiet man who is always early to the meeting and starts arranging the chairs whether he could be the club's secretary? He may just be waiting to be asked. Would the outgoing president like to be nominated as treasurer? Or vice versa? Did the committee consider a husband-wife team? In some cases sharing the duties of office can make holding the office acceptable.

Suppose the Nominating Committee has two possible candidates for one office. I am certain that many associations would be surprised if that happened. Put both names on the ballot and let the membership decide. Now the committee has someone on the list for the next election the following year. An alternative would be to ask if the two would consider holding the office jointly. This approach would be excellent for an office that involves many tasks.

It seems the Nominating Committee still has one more candidate to obtain. Perhaps this is the time to take the absolute direct approach. There is one member that everyone feels would be a good person in that particular office. That person has said "no" in the past. So there is the clue that tells you that your direct request has to be carefully and diplomatically worded. Committee members know the candidate so they are the ones to form the question.

Associations keep members' records – name, address, phone numbers, email address – why not add what kind of job the member does, or did. The most useless piece of information is the word "retired." Retired from what? Sign painter? Elementary school teacher? Botanist? Accountant? The word "retired" hides skills that would benefit an association. Perhaps knowing those skills would make the search for nominees easier. Unfortunately in the security-conscious atmosphere of today some may feel such information is private and should be kept private. I doubt that a beekeeping association knowing that a fellow beekeeper was a bank vice president or machinist would cause a breach of security.

Oh Oh. Almost forgot where else to look for a suitable nominee – the people of the Nominating Committee. There is absolutely nothing wrong in nominating a member of that committee. One of the members might just be the best choice for a particular officer position. Go ahead and do it.

The members of the Nominating Committee should be thanked for their efforts. It is hard work. They probably hear more "no" than "yes." They will hear criticism if a choice turns out to be a disaster. So they need the thanks when a good team of officers is elected. BC

Ann Harman is still searching for good volunteers from her home in Flint Hill, Virginia.

Lip Balm – On A Budget

Edwin **Simon**

This is really Nathan's and Alex's fault. My grandsons had just sold over $750 dollars of honey at a three day antique show and flea market. ***WOW*** – easy money and fun. Next year let's expand and sell something that is made out of the extra beeswax that is just sitting on the shelf. The result is a recipe and instructions for making lip balm in small batches.

This recipe will make about 50 quarter-ounce lip balm tubes. The recipe ratio is one unit of beeswax to 2½ units of olive oil. This is just a starting point. You will have to experiment to find the best texture for your lip balm. The larger the beeswax portion the more firm the lip balm.

1¼ cup of olive oil
½ cup of beeswax

Aroma:

No aroma is used for a natural version. This is good for people who are allergic or are sensitive to additives.

About 22 to 32 drops of spearmint essential oil is used for a spearmint version. Again, this is just a starting point. All added aromas must be tailored to your nose.

Beeswax warning.

1) **Warning** – It sticks – It is very hard to clean up. Spouses get upset when you make a mess of the stove and kitchen counter.
2) **Warning** – It will ignite if it gets too hot. Therefore always heat wax in a double boiler or inside a pan of water. The water will never get above 212°F; therefore the wax will not get above 212°F. 212°F is not hot enough to ignite the wax, but warm enough to melt it.
3) **Warning** – Never leave the heat on under the wax when you are not readily available and watching it.
4) **Warning** – Wax at 212°F will burn your skin severely. Be careful.

Equipment:

Hint: Make use of your local secondhand store (Goodwill, Salvation Army, etc.)

1. Old crock pot - one with a variable temperature range
2. Hot plate
3. Pan – large enough to hold the measuring cup
4. Glass measuring cups – plastic melts
5. Thermometer – see suppliers at the end of the article
6. Soup ladle
7. 4" putty knife
8. Tray or old cookie sheets – used to contain the wax spills
9. Lip balm filling stand – see suppliers at the end of the article
10. Milk filter or possibly coffee filters
11. Clips – metal or spring clothes pin
12. Paper towels

Supplies:

1. Beeswax – white capping wax
2. Olive oil – pure with no additives
3. Essential oils – as needed
4. Peroxide
5. Lip balm tubes or cans – see suppliers at the end of the article
6. Labels – see suppliers at the end of the article
7. Shrink wrap tube covers – see suppliers at the end of the article

Instructions

Setup:

1. Load the lip balm filling unit with the tubes.
   a. Cover a cookie sheet with wax paper to ease clean up.
   b. Place the filling unit on the covered cookie sheet.
2. Start the hot plate heating a pan of water – this is used to keep the lip balm warm enough to pour into the tubes.

Note: A temperature of 165-170° seems to work best for the wax. Higher temperatures result in a severe shrinkage when the mixture cools. Lower temperatures do not keep the mixture liquid long enough to provide an even pour for filling of the tubes.

Clean the wax:

3. Melt wax in the crock pot or double boiler – use one that can be dedicated to beeswax. Cleaning it is impossible. Use only "WHITE" wax, the color will be directly reflected in the lip balm.
4. Add a very small amount of peroxide to the melted wax.
5. Stir the mixture to distribute the peroxide and participate out impurities, I use a Popsicle stick.
6. Attach a filter to the top of a glass measuring cup using the spring clips or clothes pins.
7. Carefully ladle the melted wax on to the filter to strain all impurities from the wax. Quit when you reach the gunk at the bottom.

8. Remove the filter – be careful not to drip wax.

Mix the Lip Balm:

1. Add five units (¼ cups) of olive oil to a second measuring cup
2. Put the cup of olive oil into the pan of water on the hotplate.
3. Allow olive oil to warm up.
4. Add two units of bee's wax to the mixture. If the olive oil is less than 145° when the wax hits the olive oil it will solidify.
5. Wait until the mixture has re-melted and make sure the wax and oil are blended by stirring occasionally.
6. If you want flavoring add the essential oil and stir.

Fill the tubes:

1. Pour the mixture into the filling rack and the tubes.
2. The mixture will shrink when it cools. It may produce a small dimple in the top of the tube. If you over fill the tubes and cover the filling rack with the mixture, the dimples may not be deep enough to require a "topping off".
3. Add more mixture to fill in the dimple, if there is one.
4. Once the mixture is solid use a putty knife to remove the excess wax that congealed on the top of the filling rack. This wax can be saved and reused for a later batch of lip balm.
5. Let the lip balm set until it is cool.

6. Remove the tubes from the lip balm filling unit.
7. Clean the tops of the tubes.
8. Put caps on the tubes.

Finishing:

1) Label your lip balm. I use Avery #5360 labels and cut them so they do not overlap.
2) I found that customers are more confident if the tubes are shrink wrapped. It also keeps the label from falling off or getting dirty.

Notes and recommendations:

- Use a two cup minimum size for your measuring cups.
- Keep cleaned wax available at all times. It's easier to clean a lot of wax at one time than it is to clean two cups as needed.
- Labels can be customized for the occasion. The grandkids sold 150 lip balm tubes to the local Shriner's convention to add to their "Hospitality Package" that they gave to the attendees of the convention.
- Use a non-contact infrared thermometer. It doesn't need to be cleaned since it never contacts the material you are measuring.
- Extra lip balm can be stored and used in subsequent batches.
- Popsicle sticks make great stirring rods and are available at all craft stores.

Volume processing:

I make up multiple batches of the "Natural" lip balm and store it in plastic butter containers. Then whenever I need to make another batch of lip balm I spoon about 2½ cups of the pre mixed lip balm into a glass measuring cup. Then I use the microwave oven to heat the mixture. Add whatever scent is needed and pour the tubes. It makes the operation run a lot smoother and it's extremely more efficient.

Warning – Wax is very hard to clean up. Never discard wax or even the water that has a wax scum on it, in your household drain. It will eventually clog the drain. Allow the wax to harden and reuse it. Water with a wax scum should be thrown outside behind the bushes. BC

Supplies:

Milk filters – Available at the local farmers supply store
Filler tray – **http://www.chemistrystore.com/Lip_Balm-Lip_Balm_Filler_Tray.html**
Packaging Tubes – **http://www.lipbalmtubes.com/Lip-Balm-Tubes-c-1.html**
Packaging – Shrink wrap - **http://www.lipbalmtubes.com/Packaging-c-2.html**
Essential oils - **http://www.glorybeefoods.com**
Thermometer - Do an internet search on the keywords "thermometer infrared" A laser pointer option is helpful when aiming the thermometer.

Note: This is not an endorsement of these companies. It is just an example of what can be found on the internet.

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PS Form 3526, September 2007 (Page 2 of 3)

Are You Smater Than A 5th Grader?

Eugene **Makovec**

When It Comes To Bees, You're A Genius!

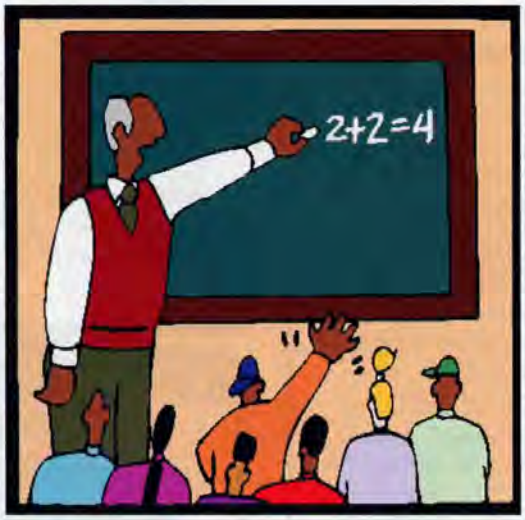
I am not a talkative guy. I'm not a meeter-greeter. You could put me in a room with a hundred people where I knew no one, and three hours later I might still know no one. I can take a four-hour plane flight, sit between two other passengers and never strike up a conversation.

It isn't that I'm antisocial; I'm just not social. I don't share a lot of interests with most of the people I run into, and I've never been comfortable making small talk with strangers. Give me a newspaper and I'll happily occupy myself while others around me chitchat about the weather or local sports teams.

But that doesn't mean I can't be engaged in conversation. Bring up my favorite sports team, and you will likely get my input. Broach the subject of honey bees, and you'll have trouble shutting me up.

That's one thing you and I have in common. We are passionate about bees. In fact, I challenge you to find a beekeeper who is not.

It's also rare to find a person without some passing fascination with bees. If I happen to be reading a beekeeping magazine on that plane, chances are good that one of my neighbors will ask me about it. And if I happen to know one other person in that crowded room and she asks me about my bees, I'll likely find myself discussing the subject at length with several of her other acquaintances.



Of course, these conversations usually begin with, "Do you ever get stung?", "What about those killer bees?", or "Is it true the bees are dying?" Most people know very little about honey bees, and cannot differentiate them from other stinging insects. But what a wonderful teaching opportunity – we're starting with someone who's already interested in what we have to say.

That's really every schoolteacher's wish, isn't it? *Please, God – let just a couple of these kids show an interest in what I'm trying to teach them.*

But unfortunately, teachers have to cram so much uninteresting information down kids' throats that it's hard to get them to pay attention to the good stuff.

That's where we come in. Any time a guest speaker comes in from the outside, the students' interest is automatically piqued. They begin the class period paying attention; and trust me, when the subject is honey bees, they continue paying attention right up to the closing bell. The teacher's biggest challenge is to keep them from all shouting questions at the same time. When class time is over, there's no shortage of volunteers helping the guest lecturer pack up, continuing the question-and-answer period all the way out to the car.

I have spoken about honey bees and beekeeping to classes ranging from 150 first-graders to a dozen high school Ag students, and have yet to find a group that was not receptive to the topic. Of course, you have to tailor your presentation to the audience. It's not easy (or advisable) to discuss bee sex with first-graders.

I have found that the best audiences are in about the fifth grade. These kids are young enough to be open to learning, yet old enough to understand some basic bee biology.

I remember the first time I was asked to do a presentation on bees. I was less than a year into keeping bees, and had just written an article about my experiences for a local weekly newspaper. A first-grade teacher who read the story looked me up and gave me a call. "How would you like to come speak to my first graders about honey bees?" she asked.

Of course, I was scared to death. "I was just thinking about doing a talk for my daughter's first grade class," I said. "How about I do that and get back to you?"

I called my daughter's teacher and offered my services. She was thrilled, and we settled on the following Friday. I printed a handful of bee photos I had taken (a worker on a purple hyacinth, a blue-marked queen bee, eggs and larvae, emerging workers, honeycomb with fresh white cappings) and affixed them to dry-mount boards. I drew up a general outline of things I wanted to cover in my talk, packed up my bee suit, smoker and other tools of the trade, and showed up at St. Peter Elementary more than a little apprehensive.

Ten minutes into the talk, my apprehension went out the window, along with my outline. Most of my time was spent answering questions, from both the children and their teachers. When the hour was over I realized I had covered only a fraction of what I'd intended. I also realized I'd had a blast! I immediately called that other teacher and set up a day to talk to her class.

And remember, I had less than a year of beekeeping under my belt. I'd done a good deal of reading and asked a lot of questions, but I was by no means an expert. Someone once said, "You don't have to be an expert to lecture on a subject. You just need to know more than your audience."

In this case, you just need to be smarter than a fifth-grader. BC

GLEANINGS

NOVEMBER, 2010 • ALL THE NEWS THAT FITS

2010 NAPPC POLINATOR ADVOCATE AWARD

Dr. Tammy Horn has been chosen as a recipient of the 2010 Pollinator Advocate Award for the United States, by the North American Pollinator Protection Campaign.

This award recognizes individuals or institutions who have contributed significantly to pollinator species protection and conservation, and to public education that results in increased awareness of the importance of pollination. One of NAPPC's goals is to encourage conservation stewardship and to catalyze future actions on behalf of pollinators. The good work that Dr. Horn has done for pollinators in Eastern Kentucky and at mining sites helps NAPPC further its reach to lend a helping hand to all pollinating species across the United States.

A ceremony honoring Dr. Horn was held at the National Geographic Society on Thursday, October 21nd in Washington, DC.

FOSSIL FLOWER SUGGESTS SUNFLOWER'S ORIGINS

An exquisite fossil flower that is an ancient relative of daisies and sunflowers suggests that this group of plants arose about 50 million years ago, possibly in South America. The Asteracaea family also includes chrysanthemums, lettuce and artichokes, and its members are found on every continent except Antarctica. Where this family first evolved and how it spread have been open questions, in part because researchers have found relatively few fossils. Most known fossils of this family are just pollen grains. In a Brevium, Viviana Barreda and colleagues describe a well-preserved fossil flower, showing several hallmarks of the Astereae family, including leaflike structures called phyllaries surrounding the flowers and a set of slender, hair-like projections called the pappus, among the flowers. The fossil was found in rocks that are approximately 47.5 million years old and that lie along the Río Pichileufú, on the dry, windy steppes of northwestern Patagonia. The authors propose that an ancestral stock of Asteraceae may have arisen in the southern supercontinent of Gondwana before it broke apart into South America, Africa, India, Australia, and Antarctica. In a related Perspective, Tod Stuessy explains that more research will be necessary to determine how the family quickly colonized the entire planet and became so incredibly diverse. This research appears in the 24 September 2010 issue of *Science*.

HERE COMES THE JUDGE

Judge Dan O'Hanlon, who recently announced his retirement, was voted Judge of the Year in 2007 by the West Virginia Association for Justice formerly known as the West Virginia Trial Lawyers Association. The professional association represents more than six hundred plaintiff's attorneys throughout West Virginia and surrounding states.

JudgeO'Hanlon, has been an avid beekeeper for many years, is the Treasurer of the Cabell Wayne Beekeepers Association and manages the Cabell Wayne Beekeepers blog. Along with his other duties, the judge is president of the WV Queen Producers Association (of which he was instrumental in forming) and also manages the group blog, Mountain State Queens. He states "I got started in beekeeping 21 years ago because of John Marra, our new County Extension Agent whose office was near mine in the courthouse. John kept bees and I helped him and got hooked on beekeeping. My current goal in beekeeping is to develop a local disease resistant bee for West Virginia".

Judge O'Hanlon wrote an article in the Sept. 2010 issue of Bee Culture Magazine about WV's new Beekeeper Immunity Law and serves as Legislative Chair of the WV Beekeepers Association (WVBA).

At the Fall meeting of the WVBA each year a member is selected as the Beekeeper of the Year. This

year's recipient of the award was Judge Dan O'Hanlon.

Judge O'Hanlon was nominated for Beekeeper of the Year 2011 by the members of the Cabell-Wayne Beekeepers Association. According to the letter written by Gary Strickland and submitted by club president Gabe Blatt, O'Hanlon worked hard this year to promote beekeeping b assisting and advising new members; organized workshops, speakers, vendors; served several years as secretary/treasurer for his local club; began the Jack Dick Annual Award to recognize a club member; began writing the Cabell-Wayne Newsletter and began Honey Harvest Day to help newcomers not yet set up to process their honey.

Judge O'Hanlon will be a featured speaker at the 2011 EAS meeting in Rhode Island the last week in July, where he will discuss the liability program he instituted in WV, and the local queen program.

NEW DEMONS FOUND – CCD TRAIL GETS WARMER

In 2007 a team was formed to search for the cause of Colony Collapse Disorder. Using mass spectrometry-based proteomics, a technique modified by the military for screening samples for pathogens, they found a fungus and an unusual virus associated with samples from colonies with CCD symptoms.

An insect iridescent virus (IIV) in bees from CCD colonies is new to the U.S. It shows similarities to an IIV first reported in India 20 years ago, as well as to an IIV found in moths. The method of its introduction to bees in North America remains a mystery but it probably arrived in infected bees, or it crossed over to bees from another insect.

The viruses thus far associated with honey bees in colonies with colony collapse disorder symptoms have been of the RNA type. The insect iridescent virus the research team correlated with CCD is a DNA

Continued on Page 76

CANADA-U.S. PARTNERSHIP DEAL

Canadian specialty honey manufacturer Island Abbey Foods Ltd. announces a agreement to distribute its Honibe products through Dutch Gold Honey Inc., of Lancaster, PA and its subsidiary McLure's Honey and Maple Products, Littleton, NH.

The Prince Edward Island company's Honibe brand is built around a proprietary technology that allows the creation of 100% pure dried honey products in a variety of forms.

Dutch Gold Honey will expand its product lines to include Honibe 100% pure dried honey products starting with Honibe Honey Drop sugar cubes and Honey Sprinkles granules for desserts, baking and ingredient use.

Island Abbey Foods president John Rowe says he's excited about the collaboration.

"Dutch Gold Honey is a leader in the honey industry in the United States that has built a reputation on quality, integrity and trust over the past 64 years," he says. "To now have our innovative Honibe product lines available through this household name in honey is a wonderful partnership for us."

Dutch Gold Honey sales vice president Jill Clark says it is pleased to be able to offer the award winning Honibe line of pure dried honey products to its customers.

"Island Abbey Foods has generated a lot of international attention for its unique technology since the launch of the Honibe brand in 2008, and we are excited to add their products to our Dutch Gold Honey & McLure's product lines," she says.

The Honibe brand has garnered international attention in recent months for its Honey Drop product, a teaspoon-sized individual serving of 100% pure dried honey without any additives. It is ideal for sweetening tea or coffee by dropping it into the hot beverage and stirring.

Most recently, the Honey Drop won two SIAL D'or 2010 Awards at the world's largest food tradeshow in Paris, France and will is one of nine finalists competing for best new food product in the world this month.

Island Abbey Foods is a 6th generation PEI agricultural family business.

– Alan Harman

STOP NOSEMA!

Beekeepers are demanding the Western Australia state government investigate the threat of the Nosema ceranae parasite to the state's beekeeping industry.

The state Department of Agriculture and Food has confirmed the parasite found in the Asian honeybee Apis cerana is present in the neighboring Northern Territory, but has not yet been found in Western Australia.

Western Australian Farmers Federation beekeeping section president David Leyland tells reporters beekeepers wanted the state government to maintain its unique pest- and disease-free status.

"The introduction of any pest or disease not currently in WA will severely impact the trade of live bees from Western Australia and potentially upon the profitability of WA's beekeepers," Leyland is quoted as saying.

The association wants a survey to ascertain the extent of the parasite's spread.

"Further investigation must also be done on assessing the possibility of the parasite to be spread via feral bees along water courses close to the Western Australia/Northern Territory border," Leyland says.

"It is imperative that the state government, with industry, act now to ensure Nosema ceranae does not spread into Western Australia."

– Alan Harman

FESTIVAL IN SAUDI ARABIA

Just three years after its formation, Saudi Arabia's Association of Bee Farmers is hosting a honey festival in the southern tourist resort of Baha attended by beekeepers from Egypt, Syria, Lebanon, Jordan, Yemen, Kuwait and Algeria.

Prince Faisal bin Muhammad, deputy governor of Baha, opened the eight-day festival in Baljurashi and toured the 60 exhibitors' pavilions.

Baljurashi Gov. Muhammad Dada said the Baha governorate has supported bee farmers in the region and had backed the creation of the first association of bee farmers in Saudi Arabia three years ago.

"The honey festival in Baha has become one of the main tourist attractions in the region," Dada says.

Organizing committee chairman Ahmed Al-Khazim says the festival is run by the Association of Bee Farmers in cooperation with the honey research department at King Saud University and the Saudi Commission for Tourism and Antiquities.

"The festival will help honey farmers market their products, promote trade exchanges, understand the requirements of the honey business, exchange expertise in the field and enlighten the public on the importance of using honey," Al-Khazim says.

Saudi Arabia produces 8,000 tons of honey a year, but still needs to import 10,000 tons to meet the growing demand.

– Alan Harman

SAVING HELENA

A big breakthrough in Helena, Montana, with residents now allowed to keep hobby apiary sites without having to count how many bees they own.

The Helena city commission approved an ordinance ending a ban on beekeeping within the Montana capital's city limits.

The new law allows residents to maintain hobbyist apiary sites containing up to two hives on their property after registering the site with the Montana Department of Agriculture.

There is a $15 license fee from the city and a registration fee of $11 with the department.

The commission amended the ordinance to remove a requirement that beekeepers would have to specify the number of bees they have.

The Independent Record newspaper reports hobbyist beekeepers will have to state the species of bees they plan to tend, show there is adequate space in the hives to prevent swarming, agree to requeen or unite hives if swarming occurs, and refrain from working with the bees between sunset and sunrise.

Beekeepers will have to provide a plan for the apiary site, showing a water source within 20 feet of the site and at least 15 feet away from adjacent properties. There will have to be a barrier at least six feet high between the site and adjoining property.

Mayor Jim Smith is reported as saying he didn't support the ordinance because he'd heard objections from people in the city with a severe allergy to bee stings

Commissioner Paul Cartwright said the concerns were addressed by the regulations placed on the apiary sites. *– Alan Harman*

CITY BEES PRODUCING SWEETER HONEY

A memo for Neanderthal city officials still banning beekeeping.

British bees foraging in the concrete jungle are producing sweeter honey.

University of Worcester researchers say this is because the bees foraging in urban locations are typically visiting a much wider range of flowers than those in rural areas.

The researchers analyzed samples of pollen from 10 of the 45 hives involved in the National Trust's and BBC Local Radio's 'Bee Part Of It' project to try and establish if there is any link between pollen and the health of the bees.

Prof. John Newbury of the National Pollen and Aerobiology Research Unit at the university says the research was carried out between June and early August.

"So far we have been analyzing the pollen pellets carried back to the hives by foraging bees," he says. "These provide a snap shot of what flowers the bees are feeding on at what time and where."

He says this is important because different flowers can provide different levels of nutrition.

"We can also see if bees are feeding entirely on commercial crops which may make them more susceptible if there are any negative effects of agriculture sprays," Newbury says.

At Kensington Palace in London, where the Duke of Gloucester is keeping bee hives, the samples contained large amounts of pollen from rockrose, eucalyptus and elderberry.

In suburban sites, such as the University of Worcester, there was a lot of pollen from lily, blackberry and rowan trees, but also some from oilseed rape.

By contrast at some of the hives at rural National Trust locations, for example Nostell Priory in Yorkshire and Barrington Court in Somerset, the June samples were heavily dominated by oilseed rape with little other pollen types detectable.

At the end of the summer, honey samples will be analyzed and these will provide a much broader picture of the plants visited during the summer season. The bees will then be left to hibernate over the winter before further analysis into their health is carried out next spring.

National Trust nature conservation adviser Matthew Oates says the early findings are interesting, "seemingly backing what we've suspected for a while - namely that bees today often fare better in urban environments than in contemporary farmland."

Apart from crops such as oil seed rape and field beans, there are precious few pollen sources around for bees and other insects in modern arable farmland, and surprisingly little in areas specializing in dairy, beef or sheep production. Bees generally, though, are doing well this year due to the fine weather.'

By installing 45 bee hives at properties all around the UK, the National Trust is aiming to create new homes for up to two million honey bees.

– Alan Harman

The Bees were in the pool again

CALENDAR

♦INTERNATIONAL♦

Apimondia 2011 - September 21-25 will be held in Buenos Aires, Argentina. Start planning now to attend.

For information watch these pages over the coming months.

♦CALIFORNIA♦

The California State Beekeepers Association will hold their 121st annual meeting November 16-18 at the Embassy Suites in San Luis Obispo.

check our website **www.californiastatebeekeepers.com** for convention updates.

♦CONNECTICUT♦

Southern New England Beekeepers Assembly (SNEBA) will hold their 5th annual meeting November 20 at the Unitarian Society of new haven, located on Turpike Road in Hamden, CT.

Speakers include Larry Connor, Medhat Nasr and David Miksa. Registration is $39 if you register by October 31, $49 after that date. A box lunch is available for $10 or you may bring your own.

To register visit **www.WICWAS.com**.

Backyard Beekeepers Association will host Allan Hayes November 30. He will discuss his unusual beekeeping tools and gadgets. The meeting starts at 7:30 p.m. in the Norfield Congregational Church in the Community Room in Weston. At 6:30 p.m. there is a newBees meeting for beginning beekeepers.

Please visit **www.backyardbeekeepers.com** for dates and locations and more activities.

♦HAWAII♦

The Big Island Beekeepers Association will hold their 1st Hawaiian natural Honey Challenge November 9 at the Komohana Agricultural Research Station, 875 Komohana Street, Hilo.

Entry forms may be downloaded from www.bibahawaiibees.org. Forms must be submitted by November 1 to compete.

For information contact Frankie Stapleton, P.O. Box 2094, HI 96778, 808.965.8945.

♦IOWA♦

Iowa Honey Producers annual meeting will be November 5-6 at the Marshalltown Best Western Inn. Speakers include Dee Lusby of Airzona, Marla Spivak, University of Minnesota and Sue Cobey, University of California.

For more information contact Pat Randol, 515.210.7445 or **randolhoney1@gmail.com**.

♦LOUISIANA♦

The Louisiana Beekeepers Association will hold their 49th annual convention December 3-4 at the Embassy Suites in Baton Rouge. Topics include the latests research information from the USDA/ARS Lab; beekeeping basics; pest management and many more. The cost is $10.

A block of rooms will be held at a rate of $89. For reservations call 800.362.2779.

For information contact Alva Stuard, 225.261.2032, Sharon Hebert at 337.937.6722 or Jimmy Dunkley, 225.610.2628 or visit **www.labeekeepers.org**.

♦NEBRASKA♦

Nebraska Beekeepers will host Kirk Webster November 20. Additional speakers include Reed Johnson and UNL graduate students.

Contact Tod Fiala, 402.783.0324, **tf92300@windstream.net** or visit **www.nebraskabeekeepers.org**.

♦NEW YORK♦

The Western New York Honey Producer's November Potluck Dinner will be November 17, 6:00 p.m. at the First Presbyterian Church, 9 Paine Street, East Aurora. The speaker will be Larry Connor, Biology Driven Managaement.

For more information contact Fred Thompson, 716.773.4945 or visit **www.wnyhpa.org**.

The New York City Beekeepers will host Larry Connor December 7 at 7:00 p.m. at Seafarers international, 123 East 15th Street, New York City. He will speak on *Bee Sex in the City*.

For more information visit **www.wicwas.com**.

♦NORTH CAROLINA♦

The Western North Carolina Center for Honey Bee Research invites you to Asheville for a one-day bee extravaganza, November 13 at the auditorium inthe Folk Art Center on the Blue Ridge Parkway.

Speaker for the day are Marla Spivak, Jamie Ellis, Debbie Delaney and Jay Evans. The cost is $35 per person. Seating is limited.

Please visit **www.wncbees.org** for more information and to register.

♦OHIO♦

The Ohio State Beekeepers Association will hold their Fall meeting November 6 in the Bromfield Building at the Ohio Department of Ag in Reynoldsburg, 9:00 a.m. to 3:45 p.m.

The guest speaker is Fred Rossman from Georgia and Ohio legislators fromthe Ohio Honey Bee Task Force.

For more information contact John George, **jkgeorge1@roadrunner.com**.

♦PENNSYLVANIA♦

Brushy Mountain - PA Branch will host Larry Connor December 8 speaking on Starting With Bees.

For more information contact Brushy Mountain 570.568.0870 or visit **www.wicwas.com**.

♦TEXAS♦

2011 North American Beekeeping Conference & Tradeshow January 4-8, 2011, The San Luis Resort, Galveston. A joint conference of the American Beekeeping Federation, the American Honey Producers Association and the Canadian Honey Council.

For registration and additional information visit **www.nabeekeepingconference.com**.

CCD ... Continued From Page 73

virus, however. That is a fundamental difference and takes CCD research in a whole new direction. This was when the team brought in RNA virus experts.

The DNA in these viruses is something to behold. Their size and shape, and the way they are stacked inside the cells they infect fundamentally alters light in such a way that it causes iridescence. Viruses and infected host tissue may have a bluish green or purplish hue. Insect iridescent viruses have also been shown to contain a protein that causes host cells to self destruct in a process called apoptosis, which can be a viral attack mechanism or a host defense strategy.

Additionally there is a significant statistical link between CCD, the iridescent virus and a fungal parasite of the genus Nosema. It remains unknown if these two pathogens in concert cause CCD, or, are CCD colonies more likely to succumb to these two pathogens?

It is known that in an Asian honey bee, Apis cerana, a combination of parasites and pathogens co-exist, including: (1) a Nosema parasite called Nosema ceranae, (2) an iridescent virus, (3) parasitic and predacious mites, and (4) two other RNA-type viruses, Kashmir bee virus and a Sacbrood virus. In India, an iridescent virus, called IIV-24, has been implicated in high losses of honey bee colonies.

Both Kashmir bee virus and *Nosema ceranae* have been in North America for a decade or more. How similar is the CCD strain of iridescent virus to the IIV-24 from *A. cerana*? Is it possible that U.S. bees acquired IIV from the Asian bee along with *Nosema ceranae* and Kashmir bee virus?

Once the strain of IIV in CCD colonies is identified, and assuming that the IIV link with CCD can be confirmed, the potential exists to use IIV presence as an indicator of CCD. It should be very easy to develop a PCR assay or even to use simple serological tests like ELISA to rapidly detect IIV. Until then, proteomics will be used to screen samples. Proteomics is an excellent screening method, but it takes more time and analysis costs are higher than for PCR or ELISA.

In the short term, the possibility of developing treatments against the IIV seems remote. Some possible treatments include antiviral drugs or heat treatment of hives. Most IIVs replicate at about 21 degrees C and do not replicate above 30-32 degrees C. Higher temperature may suppress the virus by halting replication, whereas cool weather and damp conditions may speed up replication of both IIV and Nosema. Many instances of CCD have occurred following extended periods of cool, damp weather, with more problems with bees in areas with frequent fog or in hill areas where the weather is cooler being reported. Placing bees in warm, sunny locations appears to help.

In all cases, management practices that reduce Nosema and mite loads and try to reduce long term exposures to cool, damp environmental conditions are likely to reduce colony susceptibility to IIV.

The entire paper is published in the online Journal Plos One. Find it at http://www.plosone.org/home.action

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Cell Phones

Peter **Sieling**

My grown children are pulling me, kicking and screaming, into the 21st century. For example, they all bought cell phones together with my wife, Nancy, on some sort of a family plan. They suggested I get one, too.

"Absolutely not," I explained to them. "My phone is attached to the wall where I can always find it. And when I don't feel like talking on the phone, all I have to do is wander up to the beeyard, out of hearing. Really, the only thing phones are good for is to take orders from customers and for emergencies.

"That's just the point, Dad," said my daughter, Ariele. "What if you are in the beeyard, step in a woodchuck hole, and can't get out. You can call one of us . . ."

"If I step in a woodchuck hole, I would dig myself out with my hive tool."

"But what if one of your children was driving to work, hit a deer, and rolled the car, landing upside down in the river. I know I would call you first thing . . ." Evan explained.

"And," I added, "Cell phones have been implicated by, um, credible sources as possibly causing Collapsing Colony Disorder. "

Anyways," Gary added, "I already bought one for you – with extra big buttons." He handed it to me, a little square thing, a little thicker than my AARP card. You unfold it and the inside is covered with buttons and mysterious symbols. The screen lit up like a tiny television, displaying a picture of my family, "in case you forget who we are," Gary added.

To my boys, a cell phone is a tool, like a pocket knife. They call me when they need advice. "Dad, my engine just overheated. I took the radiator cap off and most of the fluid sprayed out. I'm okay, just some first and second degree burns. Can I just refill the radiator with creek water?"

For Ariele, a cell phone is more like an extension of an ear with unlimited range. "Hey Pop, whatcha doin'? I'm at the bus stop. Can you go to www.chapelhilltransit.com/ and find out when the next bus is due here? Guess where I'm going? To get another tattoo and a belly button ring . . . Hahahahahah! Scared you for a second, didn't I?"

I still think of a cell phone as something to use for emergencies. That's not a problem for the boys. They might call once a month. The problem is the girl. Every time I hear her ring, I think, "Is she lying in a ditch, bleeding from a head wound, or is she going to tell me she just saved a bee from a spider web?"

One evening I was chairing the business meeting of the Steuben County Honeybee Association. The discussion concerned making some changes to the constitution, something about quorum numbers. A couple charter members consider any change to the constitution as a personal affront. Lash was pounding the table, driving home his five points. My phone rang. There's a button somewhere that shuts it off mid ring so I pulled it out and started pressing random buttons, hoping I'd hit the right one. There's also a button labeled "speakerphone". Suddenly I, and everyone else, heard Ariele's voice. "Dad? Dad? You okay, Dad?" I slammed the phone shut and shoved it back into my pocket. It rang again, so I quickly opened and closed it, then found the ringer button and shut it off, while the beekeepers snickered. I'd already lost control of the meeting so we tabled the discussion till next month. Later my wife told me that Ariele had called in a panic. "Dad didn't answer his phone. Was he okay? When Nancy told her I was running a bee meeting, Ariele laughed. Not a dainty feminine laugh – it was a coarse sadistic laugh, full of snorts.

2010 has been a great honey year. I harvested twice as much honey as last year. Did you know you can remove honey supers on a frosty September morning without smoke or a veil? I learned the trick from an old beekeeper. The bees cluster down below and all you have to do is crack the supers apart, haul them all away to a warm room, and extract the next day. The old beekeeper didn't mention what happens when the top of the cluster is in the super you've just removed. It reminds me of taking off the radiator cap on an overheated car engine. Bees come boiling out of the center of the cluster intent on murder. I stumbled away, hands and face covered with bees, carrying an eighty pound box of honey.

My cell phone rang. Ariele had installed a unique ring. It's a startling, insistent ring, hinting of possible emergencies. I tried ignoring it, but what if she had just been in an accident? I shifted the super onto my hip, stuck a sticky hand into my pocket, took out the phone, opened it up . . .

Eight years ago, I had my last case of American foulbrood. Ever after, I meant to fill in that burn hole, but it was so easy to step around, and you never know when you'll need a hole again. They have many uses – burning more foulbrood colonies, interring beloved pets, hiding bear carcasses, or stepping into with a full super of honey.

"Ooomph!" I said to Ariele, as I crashed. The old beekeeper hadn't mentioned that frames of honey are brittle on frosty September mornings. They cracked and honey began oozing out the bottom.

"Dad! Dad? Are you okay? Dad?" The phone was lying just out of reach. "Should I call Mom?" She hung up.

I think I have discovered the cause of Collapsing Beekeeper Disorder (CBD).

It's cell phones.