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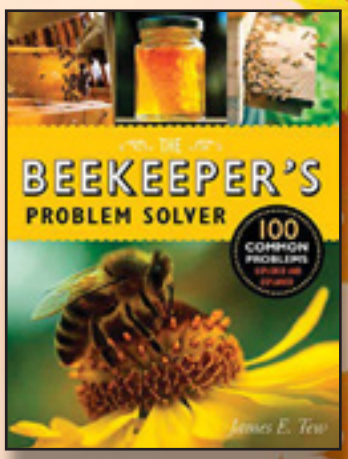

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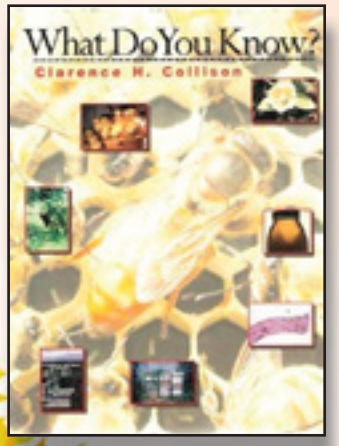

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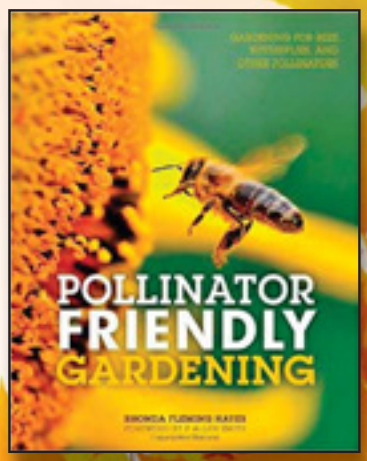

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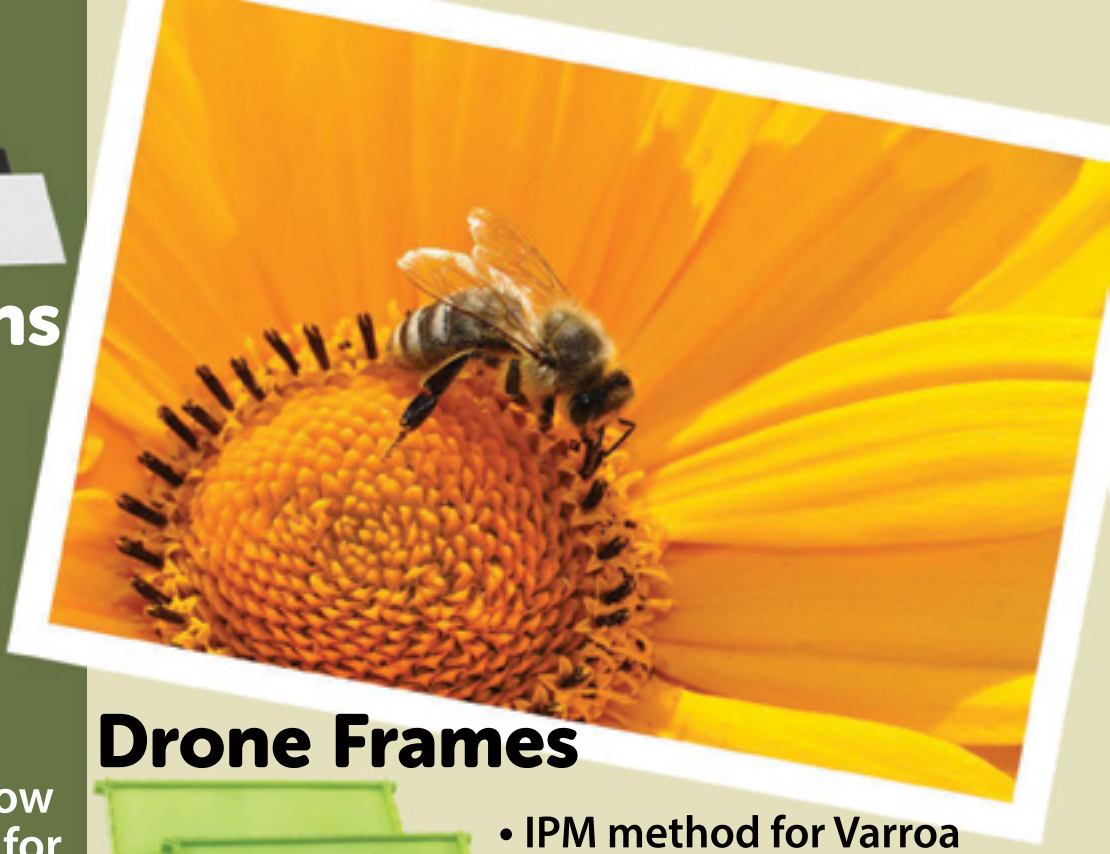

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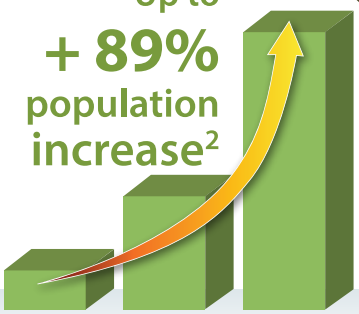

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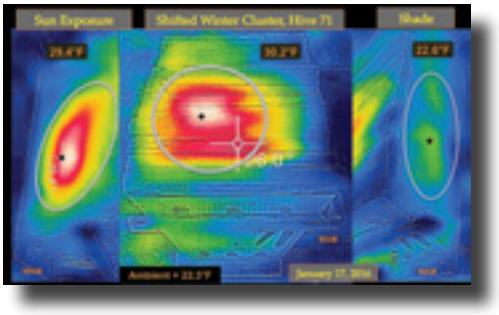
September Features . . .



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Does this Varroa *make me look fat?*
Photo by Jennifer Berry.

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SCHEDULE AT A GLANCE
(subject to change)

Tuesday, January 10	
All Day:	Board and Committee Meetings
Wednesday, January 11	
All Day:	General Session
Noon:	Tradeshow Opens
Evening:	Welcome Reception & Honey Queen Candidate Entertainment
Thursday, January 12	
All Day:	Track Sessions for Beginning, Serious Sideliner and Commercial Beekeepers
All Day:	Tradeshow
Lunch:	Auxiliary Lunch/Meeting*
Evening:	Social Activity – Moody Gardens Rainforest*
Friday, January 13	
Morning:	Kids and Bees Program
All Day:	General Session
All Day:	Tradeshow
Lunch:	Foundation for the Preservation of Honey Bees Lunch/Meeting*
Afternoon:	ABF Business Meeting
Afternoon:	2017 Honey Show Live Auction
Evening:	AHPA Banquet*
Saturday, January 14	
Morning:	Commercial Beekeepers Breakfast/Meeting
Morning:	AHPA Business Meeting
All Day:	Concurrent Hands-On Workshops
Evening:	ABF/CHC Banquet with the Coronation of the 2017 American Honey Queen and Princess*

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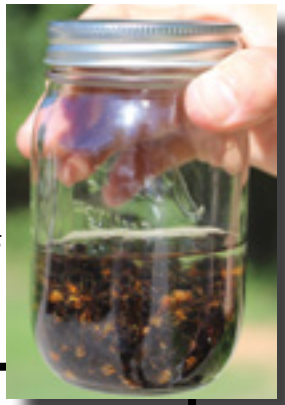

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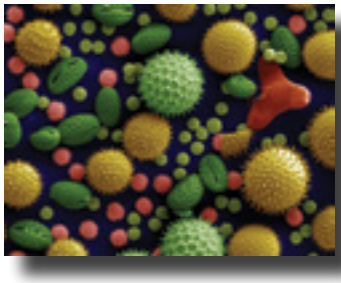

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In Every Month –

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by John Martin

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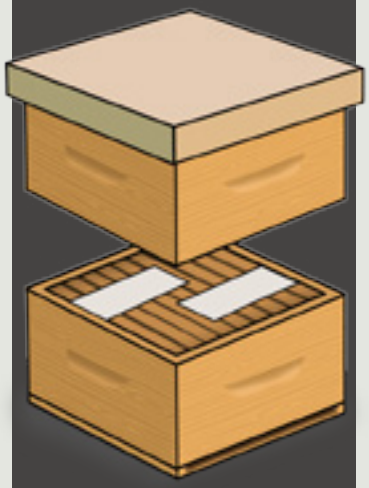

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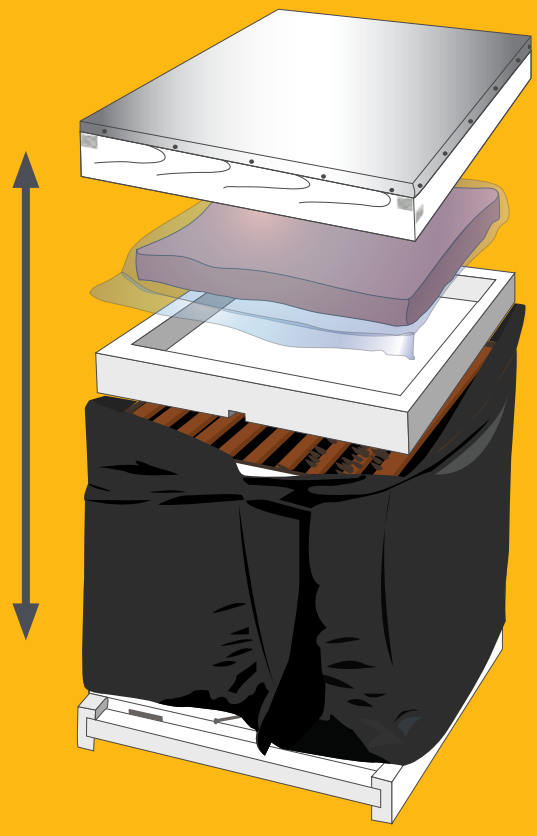

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Racing To Save The Bees

When Finian Stroup, a 10-year-old girl from the Cumberland, MD area, was asked about racing in the Soap Box Derby, she said, "sure!" But when asked about the paint job, she told her dad it needed to look like honeycomb to raise awareness about honey bees. After crashing the first couple practices runs, the brakes were adjusted and she was ready for race day, July 2.

I met Finian at a science event where I had an observation hive. She walked up to me and asked if the bees were still having problems with *Varroa*. She has been studying the plight of the bees and her knowledge exceeded that of the average adult. She wanted to visit an active beeyard to gain more information so she could tell people about saving the bees. So I invited her to my apiary to learn more.

Finian was nervous on race day, but afterwards commented, "It was exhilarating!" She won all her preliminary races and ended up as the highest finishing girl with 6th place out of 42 derby racers. This is pretty amazing since she had never even ridden a bike before this.

Her design was honeycomb with bees since the sponsor, Hunter Douglas, made and sold a window blind called, "Honeycomb." She said she would love for the readers of *Bee Culture* magazine to consider planting flowers that honey bees like. "I think this could make a huge difference, especially if they tell their family, friends and neighbors". Some of the area beekeepers have had a rough year with less blooms than normal this past Spring. She went on to say, "Bees have all sorts of problems when they don't have enough food. Without honey bees, we would lose most of our fruits and vegetables, including cacao, which is used for making chocolate."

So, what lies ahead for Finian? While the race car undergoes some upgrades for next year's Deby race, she plans on taking a Beekeeping course with her parents this Fall and keep telling people that they need our help.

Ben Cooper

Responding To Ross

Ross Conrad gives some excellent tips in his July 2016 article on Beekeeping on a Budget and I heartily endorse his underlying message to avoid gadgetizing the unnecessary. To his list I would offer two more. Splitting is a cheap way to increase the number of your colonies and should be considered a basic beekeeping skill. Second, you can scavenge neglected or uncollected political yard signs (after the election!) and cut them down for sticky boards. This is cheap and good for the natural and visual environments. It's also satisfying to see the usual hive debris plastered over the face of the candidate you didn't vote for.

Brent Weisman
Alachua, FL

Nasty Hive

Kim's Inner Cover in the July *Bee Culture* was very well written leading myself, and I hope others, to a greater awareness and knowledge of beekeeping with its heartaches as well as joys. It was also an excellent confirmation of my own undesirable decision to *execute* what had been a very strong developing nuc because of the same necessity you reflected on – mean can't be tolerated.

That said may I add two personal experiences for you to expand on in the future or publish in the "Mailbox," Your column plus my experience opened my thinker to deeper issues and ability to be prepared for the future.

Bee Culture

623 West Liberty St.
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mailbox@beeculture.com

First a little history to support the experience(s). About May 1, 2015, my best friend, farmer and beekeeper called to tell me he had a large swarm on his garden fence but needed a hive. I delivered a complete three super package to him – he housed the bees in two.

On the 8th of June Ronnie died of a stroke while working on fences. As the family settled they asked me to tend the bees – five colonies. I had a state inspection scheduled for the 15th and waited for the inspector so we could do his bees also. This leads us to the first information and knowledge that I hope will become more clear and helpful to as many beekeepers as possible – the necessity to have a deep knowledge of our girls.

During the inspection we worked the four colonies that I was aware of, with no problems and a passing score. But the 5th was a nightmare in broad daylight. They beat on us for about 45 minutes even though we had moved about 100 yards away, sprayed a water cloud about us, pumped smokers and waited to no avail. Finally, I told the inspector I was going to get in the car, drive with open door to shed them and get a cup of coffee about three miles away. He agreed. We whole-heartedly agreed – Africanized – must be killed. I had about 750 stings and ended up spending nearly four months in the bed with fever, convulsions, etc. The end of first half of the "the thinker" getting my attention.

Second half begins the first of May 2016, when I purchased a few nucs. One of the new colonies began a little aggression while I was working on the surrounding

colonies about three weeks into its residence with the rest of us. This kind of confused me as they had plenty of space, queen was increasing with pretty large hatches quite frequently. I was feeding 1:1 plus protein in addition to the basic honey in the supers and no noticeable pests. Now comes the part that I would like to add about your and my own expeience plus a new and potential bit of beekeeping knowledge. About June 15, I was working on a behicle and parked it some 50 yards from the bees – the attack began for no apparent reason and was constant enough that I decided to use fly spray to cover me with a short term cloud to finish the 30 minute job.

Yep, I had to quit several times to put up another cloud of spray but the vehicle was fixed and on inspection and observation of flight path it was the new nuc. Tried to get my "thinker" to supply the answer and if there was any solution – nope. Then *Bee Culture* and Kim came to the rescue while trying to sooth my decision – They definitely had to go.

Quite unexpectedly a few people that I told wanted to know why I had to kill them as soon as the rain quit. My explanation was that the queen must have been impregnated with a rogue African and the colony was full of drones and brood carrying the same genes with the potential to contaminate every bee colony within many miles. They didn't understand the biology and life cycle that was consistant with the time frame I experienced in both situations – new queen, eggs, hatch housekeeping, field – all fit into the five to six weeks to produce the mean guys.

The killing was successful – too early before dawn and my habits, but what an education. The dawning upon me as my "thinker" said: "It is time to rethink buying nucs and queens since there is so much potential for transitory bees (drones) and migratory pollinators spreading the bad guy genes." Much of this was amplified by the education I got attending the queen breeding program there in 2014, which I had intended to begin for the 2016 year – thanks to *Bee Culture* and Jennifer Berry.

Wayne Burnett
Linden, TN

PS – *Bee Culture* came the very next morning after I made the decision, but had to wait on the rain to stop.

PSS – Have you any suggestions on where to begin study of "Winter Survival" in Mailbox – your brief answer REALLY peaked my thinkers.

No Hearing Aids

In the July issue Richard Brewster mentioned about having trouble with his bees when wearing aids. I have the same trouble so I just remove them when I am working in my bees.

Marlin Crider
Jacksonville, FL

Deformed Wing Virus

Dr. Stephen Martin and collaborators recently discovered that it appears that an avirulent form of DWV may outcompete the virulent form in some apiaries, thus conferring to those bees resistance to the harmful effects of this virus. He has recently received funding from Project Apis m to analyze samples of bees from the U.S. for the presence of the avirulent form. What we are particularly interested in are samples from apiaries or feral colonies that have survived without treatment for *Varroa* for several years (especially those in which the brood looks healthy despite the mites). If you have access to such hives and are willing to collect samples later this Summer, please email **randy@randyoliver.com** for details, with the words "Martin project" in the subject line.

Randy Oliver
Grass Valley, CA

SELL's Research Projects

The students did an incredible job, especially since many had never even considered doing a research project from start to finish. Lots of angst about having to come up with their own research question, but they all accomplished the task, and the projects included some that I didn't expect. Read the

list of Titles (attached), it's an eye-opener.

I do think having them each obtain and read The Craft of Research provided them with templates for guidance, especially that tough one – how to formulate a research question.

Research Reports, UM SELL Online Beekeeping Master Course, Spring, 2016

(Students Formulated Their Own Research Questions, Worked Individually and In Groups, and Experiments Ranged from a Use of a Few to as Many as 90 Colonies of Bees).

Post-Traumatic Stress Disorder and Beekeeping.

To Have or To Have Not; Understanding the "Hands-Off" Style of Beekeeping.

Role of Glucose Oxidase in the Antimicrobial Action of Honey.

Methods for Staining, Mounting and Preserving Pollen Slides.

The Blue Herons of Beekeeping (IR Cameras and Backyard Beekeeper).

Removing Bees, Using Every Tool Necessary (published in July, Bee Culture).

Reliable Introduction Methods for Virgin Honey Bee Queens.

How the Use of Smoke Affects Colony Acceptance during Virgin Queen Introduction.

Impacts of the Use and Omission of Queen Excluders on Honey Bee Colony Development and Honey Production.

Virus Loads in Honey Bee Colonies.

Do *Varroa* Sensitive Hygiene (VSH) Honey Bee Queens Offset Higher Purchase Price through Overall Colony Improvements and Increased Honey Production?

Evaluation of a Mite Attractant for Use in Conjunction with Oxalic Acid Strips

Scale-Hive Study in the South Carolina Piedmont.

Can You Lead a Honey Bee to Water? Directing Bees to Clean Water.
Is Bee Race a Factor in Pollen Collection Fidelity?
Pollen Restricted Hives and Egg Availability.
An Examination of Queen Mortality after the Application of MAQS for the Treatment of *Varroa Destructor*.
Temperature Modulation in the Bee Hive during Winter and Early Spring.
A Review of Chalkbrood Disease.
Grooming Behavior in *Apis Mellifera* and the Relationship to Infestation levels of *Varroa Destructor*.
Safe and Effective Dose of MAQS for Five (5) Frame Standard Langstroth Nuc Box.
Effect of Formic Acid (MAQS) Treatment on Small Colonies.
Comparison of Mite Treatments: Formic versus Oxalic.
An Examination of Queen Mortality after Application of MAQS for the Treatment of *Varroa Destructor*.
Oxalic Acid Treatment Methods to Achieve High Varroa Mite Mortality.

Jerry Bromenshenk
Missoula, MT

Time For A Change

Friends,

With both sadness and excitement, I write to say that I am leaving USDA-ARS on Sept. 30th 2016 to pursue other research opportunities.

I most likely will be taking an opportunity with a University in Europe and starting my own consulting firm with a focus on pollinator health and development. In moving on, I will miss the opportunities ARS afforded me to work directly with U.S. beekeepers.

I truly appreciate the friendships, collaboration and research support over the years. I thank you all. You have made my research what it is and helped target it toward your problems and concerns. I plan to continue work on Varroa and Tropilaelaps control, small hive beetles and queen health.

I will not get to say goodbye to many of you but hope our paths cross in the future. I will remain active as the president of the Bee Health Commission of Apimondia and in that capacity I expect to see many of you.

It has been a great run but time to move on. All the best and thanks again.

Cheers,

Jeff Pettis, Research Entomologist
USDA-ARS Bee Research Lab
Beltsville, MD

Honey's *NOT* GMO

This message is supported by the American Beekeeping Federation, American Honey Producers Association, National Honey Packer & Dealers Association, Sioux Honey Association and the Western States Packers & Dealers Association. As a collective group, these organizations represent approximately 95% of the entire United States Honey Industry

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Pure natural honey is, by definition, a non-GMO food. It's that simple!

Today's consumers rely on many sources for information on their diet and food choices. Perhaps the most frequently consulted, but least reliable, source is the internet - where everyone can be an 'expert' on their chosen subject. Gluten-free, raw, local, vegetarian and non-GMO are currently among the food topics most often discussed.

Regarding a non-GMO diet, some of the main questions being asked of the honey industry are:

"Is honey free of GMOs?"

Answer: The FDA discourages the use of the term "GMO Free" because all food items may contain trace amounts of GMOs. The European Union, Australia and other countries have established thresholds for their GMO labeling laws. The regulations require all food items which contain more than 0.9% GMOs to declare GMO contents on the labels. Honey is not required to be identified or labeled as a non-GMO food because GMO's in honey never exceed this threshold. Honey, as most other foods, may not be completely GMO free, but it is a non-GMO food according to the standards established by the European Union, Australia and other countries.

"I am on a non-GMO diet. Can I eat honey?"

Answer: Pure honey can be introduced into a non-GMO diet and not only will you maintain your personal nutritional choices, but you will receive all the wonderful benefits honey has to offer.

"If honey is not *Certified* as non-GMO, does that mean it may contain GMOs?

Answer: Although some interest groups and organizations appear to complicate the issue, the simple truth is this: honey qualifies as a non-GMO food. It does not require any type of certification in order to be classified as a non-GMO food item. Some companies choose to have their honey certified as "non-GMO" by independent organizations, but in terms of GMO content, honey certified as non-GMO is not superior to any other non-certified pure honey.

"Can trace GMOs be eliminated from honey by monitoring bee forage areas?"

Answer: It is not realistically possible to monitor all honey bee forage areas, or to create a GMO-free forage zone. Even if a GMO-free zone were to be established, bees can travel great distances, and neighboring bees could enter the GMO-free zone and distribute pollen containing GMOs onto non-GMO crops.

To better understand the basics of GMOs, here are the FDA definitions on the subject:

"Genetic modification" is defined as the alteration of the genotype of a plant using any technique, new or traditional. "Modification" refers to the alteration in the composition of food that results from adding, deleting, or changing hereditary traits, irrespective of the method.

This definition is provided by an independent certification organization:

"GMOs (or "genetically modified organisms") are living organisms whose genetic material has been artificially manipulated in a laboratory through genetic engineering, or GE. This relatively new science creates unstable combinations of plant, animal, bacterial and viral genes that do not occur in nature or through traditional crossbreeding methods."

So how are these definitions applicable to Honey?

Honey is a food produced by bees from the nectar of plants. Honey is not a plant and there are no known species of genetically engineered (GE) honey bees. The definitions support honey's established status as a non-GMO food item.

Here are just a few of the facts about honey as a non-GMO food:

- No genetically modified honey bees exist
- Honey is made by bees from the nectar of plants
- Honey is not a food that has been artificially manipulated in a laboratory
- The amount of pollen in honey ranges from about 0.1% to 0.4%
- On average, pollen in honey contains about 0.2% protein. GMO markers may be found only in the protein
- Any trace of GMO's in honey, therefore, will fall far below the 0.9% threshold established by countries around the world as requiring GMO labeling

In the US, there are no current national GMO labeling requirements. Moreover, the state of Vermont enacted legislation in 2016, which clearly excludes foods from any GMO labeling requirement when the food is "*consisting of or derived entirely from an animal that is itself not produced with genetic engineering, regardless of whether the animal has been fed or injected with any food, drug, or other substance produced with genetic engineering*".

Honey bees, beekeepers and the honey industry are direct contributors to the success of American and world agriculture. In today's world, the honey industry faces many problems such as hive loss, drought, colony collapse and shrinking forage areas. Fortunately, honey's position as a pure and natural food is unchallenged.

Produced by bees from the nectar of plants, honey is a non-GMO food, the purest of nature's sweets.

This message is supported by the American Beekeeping Federation, American Honey Producers Association, National Honey Packer & Dealers Association, Sioux Honey Association and the Western States Packers & Dealers Association. As a collective group, these organizations represent approximately 95% of the entire United States Honey Industry

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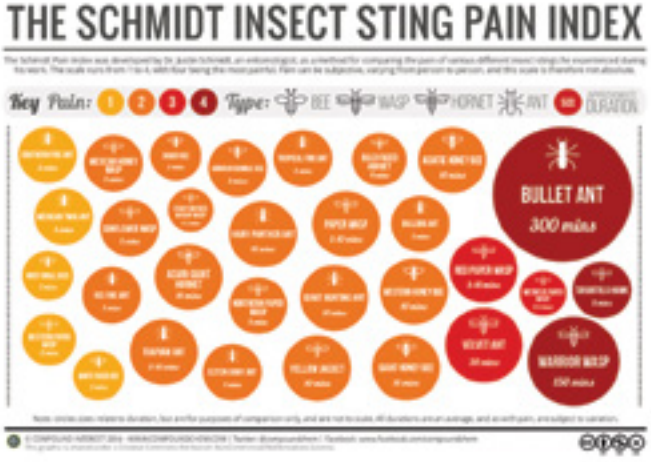
The Sting Of The Wild, by Justin O. Schmidt. Published by John Hopkins University Press. ISBN 978-1-4214-1928-2. 280 pgs, 5.5" x 8.5". 13 color photos. $24.95.

I met Justin when he was still at the Bee Lab in Tucson, but he moved on and I lost touch with him until a couple of years ago when we published the index shown below for an article on stings. To put this together, Justin has sought out the stings of 83 insects (so far), and ranked them as to the level of pain they inflict. But of course he's an entomologist, so he also explores the lives of the insects that sting him, why they sting, and the evolution of the apparatus used to deliver that pain.

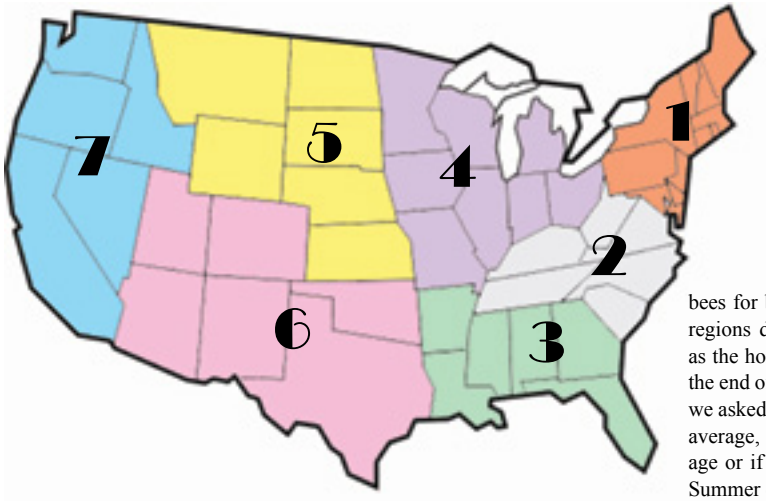
He uses extraordinary descriptions when delivering his experiences. "Rich and full-bodied in appearance, but flavorless, or, Pure, intense, brilliant paid. Like walking over flaming charcoal with a three-inch nail embedded in your heel". That's pain, folks.

He gives biology and physiology information on stings in general, then looks at the various classes of insects that inflict this kind of pain – sweat bees and fire ants, yellowjackets and wasps, harvester ants, trantual hawks and solitary wasps, and finally the worst of the worst – Bullet Ants.



He leaves the last chapter to deal with honey bees and humans, which is, to say the least, the most interesting since these are the insects we deal with on a daily basis…well, some of them. We don't have the giant honey bees of Asia, and some of the other honey bees that exist. You will be glad of that when you are done reading this.

SEPTEMBER – REGIONAL HONEY PRICE REPORT



Overall Losses, Winter & Summer – 34%

Winter and Summer Loss Survey, Plus, Spring and Summer Honey Crop Survey

Bee Culture's field reporters this month have been busy, and we've been collecting data to give you a picture of what our reporters have gone through since just about a year ago.

Winter loss survey. Average loss in a region when counting all reporters.

Regions:

1. 32%
2. 23%
3. 19%
4. 19%
5. 47%
6. 34%
7. 19%

Overall Winter loss average – 28%

With a range of 19 – 47%

Then, we asked about Summer losses. This was up to the first of August, so it's not quite the whole picture of Summer, but it's close. Average loss in a region when counting all reporters.

Regions:

1. 3%
2. 4%
3. 9%
4. 4%
5. 8%
6. 9%
7. 7%

Overall Summer Loss average – 6%

With a range of 4 – 9%

Then we asked about the Spring and Summer honey crop. We take into consideration that some regions, or parts of some regions don't have a Spring crop because it is used by the bees for buildup, and parts of some regions don't have a Summer crop as the honey flow is mostly over by the end of Spring. With that in mind, we asked if the crop was below their average, average, above their average or if they even had a Spring or Summer crop.

Combining the two – below average and just average, we get a picture of the situation of surplus honey by the end of Summer. Dry conditions in much of the country have beekeepers uneasy about harvesting a Fall crop, first because there may not be one, and second, because that may be the Winter food for their bees. So, the combined "below and just average" for regions –

1. 70%
2. 70%
3. 77%
4. 88%
5. 80%
6. 44%
7. 45%

Overall, the below, or just average total for the Spring crop was only 66%, while the below, or just average total for the Summer crop was only 73%.

What you have to be aware of is which states are in each region, and what each contributes to the overall honey crop of the U.S. each year. For instance **Region 1** – New York; **3** – Florida; **4** – Minnesota, Michigan; **5** – N. and S. Dakota, Montana; **6** – Texas and **7** – California. Combined, these states produce more than 70% of the U.S. honey crop almost every year. A good guess for this year's honey crop is that it is going to be short. Right now, before the Fall crop, and even some of the harvestable Summer crop not in yet, it's hard to say, but being down more than 25% from the 'average' crop isn't outside the realm of possibility. However, what constitutes an 'average' crop is difficult to say anymore, with more and more beekeepers putting their focus on pollination rather than producing a honey crop. So, don't be surprised if more than 80% of the honey consumed in this country this Winter and next year is off-shore honey, and not yours.

We also looked at queen replacement problems. 59% replaced less than 10%, 36% replaced between 10 and 50%, 3% replaced between 50 and 75%, and 2% replaced more than 75% of their queens this season because of failure.

	REPORTING REGIONS							SUMMARY			History	
	1	2	3	4	5	6	7				Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS								**Range**	**Avg.**	**$/lb**		
55 Gal. Drum, Light	1.55	2.03	2.14	2.67	2.23	2.20	3.20	1.25-4.00	2.26	2.26	2.17	2.23
55 Gal. Drum, Ambr	1.45	1.96	2.06	2.57	2.40	2.01	3.20	1.25-4.00	2.18	2.18	2.08	2.11
60# Light (retail)	211.11	187.75	200.12	216.54	171.00	188.10	312.00	140.38-480.00	218.59	3.64	208.34	191.06
60# Amber (retail)	213.89	186.75	191.12	215.11	262.41	182.85	307.00	134.38-480.00	217.64	3.63	204.07	191.96
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	89.46	76.00	74.64	58.33	70.20	88.50	125.00	40.00-144.00	81.37	6.78	79.06	81.86
1# 24/case	131.75	106.49	112.73	99.23	106.32	96.60	165.30	45.00-240.00	119.60	4.98	117.58	113.23
2# 12/case	109.82	88.08	106.87	92.36	105.06	100.50	127.00	72.00-168.00	104.49	4.35	104.40	101.38
12.oz. Plas. 24/cs	108.70	84.33	85.80	85.47	74.40	111.60	108.00	48.99-216.00	96.47	5.36	95.91	93.45
5# 6/case	132.22	111.00	118.50	102.40	102.30	105.00	160.00	84.00-204.00	120.86	4.03	115.92	113.94
Quarts 12/case	197.41	118.88	131.81	109.25	125.64	138.59	145.00	60.00-350.00	141.21	3.92	142.72	139.95
Pints 12/case	119.28	89.47	72.75	102.00	104.35	76.20	92.50	54.00-180.00	91.70	5.09	91.05	89.99
RETAIL SHELF PRICES												
1/2#	5.14	4.10	3.90	3.47	4.40	3.76	6.00	2.00-8.00	4.44	8.87	4.20	4.41
12 oz. Plastic	6.32	4.94	4.81	5.27	4.90	5.80	7.46	3.00-10.00	5.75	7.67	5.67	5.24
1# Glass/Plastic	7.14	6.85	6.81	6.24	6.46	6.45	9.00	3.00-12.00	6.89	6.89	7.11	6.56
2# Glass/Plastic	12.30	10.15	11.60	11.64	9.85	10.10	15.00	6.00-22.00	11.59	5.79	12.02	11.37
Pint	12.07	9.16	8.15	13.78	7.60	11.37	14.51	4.00-25.00	10.43	6.96	9.91	9.01
Quart	18.74	15.86	15.29	17.00	14.78	15.35	19.92	8.00-31.29	16.63	5.54	16.48	15.64
5# Glass/Plastic	25.47	25.94	29.24	25.09	21.31	28.05	30.00	15.00-43.00	25.84	5.17	26.71	25.59
1# Cream	8.75	9.00	7.00	7.98	10.14	6.66	11.00	5.00-16.00	8.64	8.64	8.25	8.05
1# Cut Comb	11.96	8.08	7.67	8.31	8.00	4.50	14.00	4.50-19.00	9.63	9.63	10.61	10.52
Ross Round	9.93	6.67	8.95	9.50	8.95	9.30	9.20	6.00-12.00	8.90	11.87	8.10	8.48
Wholesale Wax (Lt)	7.36	4.92	4.56	6.21	6.00	4.65	7.50	2.50-12.00	6.09	-	6.31	5.88
Wholesale Wax (Dk)	6.50	4.65	3.46	5.90	5.80	3.17	8.33	2.00-10.00	5.60	-	5.61	5.41
Pollination Fee/Col.	91.82	55.00	65.00	70.00	80.00	132.50	80.00	35.00-200.00	80.00	-	81.60	77.07

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INNER COVER

A peculiar thing is happening, relative to what is growing where anymore, at least in my part of Ohio, and in parts of several other states I've traveled in this Summer, including much of the mid and northeast.

What I've noticed is that birdsfoot trefoil (*Lotus corniculatus* L.)is taking over roadsides. There's a photo below that shows what I'm talking about. Now I'm no birdsfoot expert, but I know it's an invasive, and it does well in poorly drained, generally poor soil locations, which roadsides generally are. So that might be it. Maybe, in the last two or so years, highway departments are seeding roadsides with this stuff for erosion control and to keep other weeds down – it is quite competitive and will take over where it's planted given the chance, and the European varieties (versus the Asian types), which these seem to be, are low growing and don't need mowing, so it's a win, win, win for highway maintenance people. Well, and beekeepers and pollinators, too. Bees and butterflies like this plant, and it's pretty productive from a beekeeper's view, providing there's some rain to go with it. It's a legume, so the pollen is pretty high in protein, it doesn't have a lot of nectar per flower, but there are a lot of flowers on a plant, and when established the population gets pretty dense. One plant will expand to a rosette of about nine inches across, and about 3" - 5" tall with 30 - 50 blossoms on it, so it isn't very tall, and doesn't cause any visibility problems, yet covers a good chunk of land with – flowers. When grown as a pasture plant, in good soil with adequate moisture it will get a lot taller and makes a good forage plant for cattle, especially dairy cattle. It was used in northern Wisconsin for that years ago.

The photo shows that it is thriving, blooming and spreading where it is growing here in Ohio on roadsides, while the grass it is competing with is essentially dormant. It's been dry here in NorthEast Ohio in July so this shows it does well when its competitors don't.

So, that's one. The other one is a bit less noticeable because it's been around for so long. Chicory, (*Cichorium intybus*). You probably recognize it immediately. Roadsides, near-roadsides and other not-often mowed pastures and meadows. It, too is an invasive, and has spread to much of the U.S.

It blooms in mid to late Summer until frost or so, and has been around since colonial days. It shows up early on as a rosette, but in mid-summer sends up flower spikes and becomes very visible. Course, strong flower stems preclude it being removed easily so it stands, strong, tall and purple for the rest of the summer. Occasionally you will see a white flower, even less often a pink flower, but the purple is predominant. It's a friend to bees and beekeepers. It's not at the top of the list of bee plants, but it blooms in a lot of places when there's nothing else at the end of the season.

Some report that it produces honey, but the quality isn't well defined. I've watched bees on the flowers and have seen only pollen collection, but that might be a time of day thing, rather than no nectar. But the pollen is distinctive when you see it – white. I don't know any other plant with such white pollen, especially this time of year.

But what's curious to me is that there seems to be so much more of this plant growing this year than where it has always grown in past years. Of course I'm relying on memory, which is never a good thing, but there just seems to be more. Dense patches in lawns, like the photo,

Three Odd Things. This Is War.

Trefoil

Chicory.

spreading far, far off the road, where it typically grows now far up into ditches and even lawns. And on the typical roadside stand, they seem to be denser, more plants per unit area than in the past.

Now part of this, I admit, is that it's been a very dry June, July and early August here in northeast Ohio, and in some of the other locations I've seen this chicory phenomena. This simply means that all vegetation is growing slower and lawns and roadsides are stressed and not getting mowed as often letting these plants thrive. Chicory is, after all, a very drought tolerant plant so that would explain some of this I suppose.

And, the one trait invasives have in common is that, because of their special skills they out compete native plants for resources, space and attention. And that seems to be the case. So, two invasives doing well, helping bees and beekeepers, and looking good besides. Dare I say, win, win, win?

Ok, that's two.

Yet a third curious thing happened this past month. Look at the photo of the bees on the wall of my garage, above the door. A tiny, tiny bunch, with the blow-up showing them up close. No big deal, you think, right? Look closer at the bees. All workers. No drones, not a queen, just workers. They're moving around a bit, back and forth, but not a washboard movement. One might fly off, and then one might join them – same bee returning? Can't tell you that, but the number stays about the same, day after day after day – for three full weeks. Well, at least three weeks because that's how long I watched them. I checked in for 21 days – I missed a few in between because I was gone, but they were there when I got back. Same bunch? don't know. Nor do I know how long they were there before I started watching. It's a pretty protected spot, with some tree foliage above them and a bit of overhang from the garage roof.

No, there's no entrance into the garage underneath them. And there's no queen from a lost swarm hanging around, and there's no glop of something to eat they're hanging onto. Just a bunch of bees, hangin' out on a garage wall. For three weeks.

There are two hives on the ground about 20 yards directly to the left of the garage from your perspective. One is going gangbusters, the other has lost four queens so far this Summer. Can't keep one in there for reasons only they know, so maybe this is a rebel band, tired of the chaos inside and looking for some peace and quiet, out on a garage wall.

There's two more hives another 20 yards away, directly behind where I'm standing taking the photo here, sitting on the front porch of the house. Both doing pretty good. So within 20 yards in two directions are four mostly full size hives, three doing quite well, one struggling and more queenless than not most of the summer.

So, given that, you got any idea why 20 or so bees would take up residence on the side of my garage for a few weeks? I'm thinkin' it just ain't that great a place to hang out.

•

OK, here's a switch. Well, it's moving toward a switch. I don't think it's in stone yet. And maybe it won't be in the future.

Long ago, when we studied Integrated Pest Management, one of the things we learned was not to prophylactically treat a crop for a pest or disease. That is, you don't spray apples for apple maggot just because it's the first of June, when they usually start being a problem. Rather, you put up traps to see how many of them there are which will tell you how much damage they are bound to cause, and, when trap catches hit a certain level you treat so they don't become a problem. Terms like economic threshold and economic injury level played into this, and if you were a smart farmer, you paid attention to those because it saved your crop, and it saved you money.

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First, we treated when the adult population reached that threshold by measuring how many mites were on adult bees in a colony. We did this by counting how many fell off adult bees during a three day period. The sticky board was our yard stick.

Then, we figured out that the mites on adult bees were only a small per cent of the mites in a colony, so we refigured our treatment yard stick, and treated when the number on the sticky board was even smaller.

Next we figured a better way to measure and we went to the ether roll and then the alcohol wash, which measured all the mites on the adult bees in the sample we took. Capture 300 bees, put them in a jar, spray or soak them with ether or alcohol which kills the bees and the mites. Shake, rattle and roll for a bit and count the mites. Three mites would give you a 1% infestation rate of mites on adult bees. Again, assuming that way more mites were under cappings than on adults, the number of infested adults needed to be pretty low so that you got almost all the mites in the colony with the

Continued on Page 92

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It's Summers Time –

Summer, Bee Culture's 2017 Calendar Contest

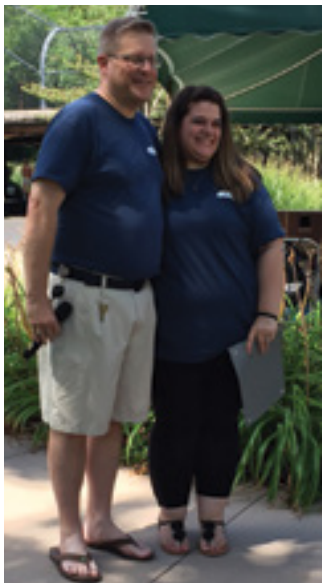
It's been a busy month, but it's been a busy month at home unlike the first few months of 2016. We've been home for a month. So we've had time to kind of catch up on all that was neglected.

The garden is still – in spite of the heat and lack of rain – growing like crazy. We'll have lots of zucchini bread this Winter because we've had several get away from us and turn into those foot longs good for shredding up and putting in the freezer. Our bunch will enjoy that nice warm, right-out-of-the-oven homemade bread this Winter. We've got tomatoes by the bushel – just waiting on them to turn red or orange or yellow. And lots of eggplant. Thank you to those folks who sent me their recipes. I'll let you know how it turns out.

We have our friend expanding the chicken coop. So our plan is that chickens and yes, ducks, will be a part of our lives for quite some time. We're almost doubling the size of the coop and there will be two separate sections with a door between where I can easily isolate babies or sick birds from the rest of the flock. There will also be a full door going to the outside that will make cleaning out the old straw much easier. We're holding steady at 17 birds for now. I think six or seven of those are from the original group which makes them almost five years old. They're doing fine, not laying as much as before, but that's OK. We didn't go into this to get rich.

We'll definitely get ducks again in the Spring and try to do a better job of protecting them from the predators. The Medina County Fair was last week and they had the little Call Ducks that we had before. They are so cute. So I'll do some more reading and we'll work hard at making sure the pen is secure.

Now there's a lot going on in *Bee Culture* land. I wanted to be sure and mention the *Bee Culture* ***2017 Calendar Photo Contest***. The deadline of October 1 is fast approaching. The theme for the 2017 *Bee Culture* Calendar is Workin' From Home – bees doing what bees do on and in the hive. See the back page of your 2016 calendar for more information and for some tips on where and how to send your photos. Please be sure that however you send your photos that they are clearly labeled with your name and mailing address – either in the email or on the CD. Send all photos to **kim@beeculture.com** or mail CDs to Kim Flottum, Bee Culture Magazine, 623 West Liberty Street, Medina, OH 44256. Photos not properly labeled will be automatically disqualified. Good luck all!



It's been a hectic Spring and Summer at *Bee Culture*. We are six strong right now which is the most people we've ever had in our Publications department. Our newest team member is Katie, who is the daughter of our Advertising Coordinator, Jean. Katie helped us out this Summer while Amanda has been gone on her maternity leave. Katie has focused mostly on Catch The Buzz and keeping on top of our Social Media activities. In addition to that she helps out with subscriptions when it gets busy. She's been a welcome addition to our team and it looks like she'll still be helping us out some while she goes back to school – studying engineering.

Amanda will be returning some time this month and we are all glad. We've missed her smiling face. She'll be back in time to finish coordinating our October event – A Case For Honey.

Joy has been with us since October and is doing a great job on the layout and design of our new quarterly magazine *BEEKeeping*. We've just about got all the bugs worked out and are looking to make it available by subscription in 2017. Joy has become the voice of *Bee Culture* in that she handles most of our phone calls.

Then there is Jean who has been with us for almost two years now. She is doing a great job with managing our advertising for both magazines and has just recently launched a new web and Catch The Buzz advertising program. It looks like Jean will be coming with us to the big joint meeting in Galveston in January. If you're there make sure you meet her and say hello.

This past weekend we – Root Candles and *Bee Culture* – held our annual service awards event, held this year at the Akron Zoo. Kim was presented with his 30 years of service award. That's 30 years as editor of *Bee Culture*. I've been here with him for most of those 30 years and it has been wonderful. We're both excited to see what the next few years bring. We hope you'll all be right there with us.

Amanda also received her 10 year service award at the picnic. She started out in retail working at our Root Candle Store. Then we were able to sneak her away from them and she has been with *Bee Culture* for about five years now. Both awards were presented by Brad Root.

Our Pollinator Day is this Saturday, August 13 and we are really excited about it. The five pollinator gardens here at work are beautiful. We've invited all of the people who manage the gardens and have donated seeds. They will, along with all of us at *Bee Culture* spend the day talking to the public about bees and bee plants. It's the best part of our job – educating people about bees and beekeeping.

Coming up after Pollinator Day is our October event. If you want to find out how to go from small time to big time in the honey business, you want to come to Medina in October. You can still sign up for our "Case For Local Honey" event. Visit **www.BeeCulture.com** for details.

I hope you've had a good Summer and are starting to get those bees ready for Winter. You know it's coming!

The natural colony booster for strong bees.

Nowadays bees have to cope with a multifold of increasing stressors like pesticides and poor nutrition. Yet we expect them to deliver high performances in pollination and to produce as much, good quality honey as possible. In return for their hard work we need to support our colonies to survive and to stay strong and healthy!

The strength of the colony comes from the vigor of the collective of all individual bees. Therefore, it is crucial that the colony has a solid foundation to build on: a strong brood nest. For this purpose, BeeVital developed **BeeStrong.**

BeeStrong is the *number 1* naturally sourced concentrated beefeed made with high quality ingredients. It can help to restore and maintain strong brood especially for colonies with an unsatisfactory brood pattern

BeeStrong is easy to use. It comes in a concentrated form in different sized containers from single dose to 200 doses. This allows for BeeStrong to be easily added into sugar syrup for feeding.

The effect of BeeStrong on the brood development was investigated by the Bee-Health Group of Prof. Dr. K. Crailsheim of the University of Graz, Austria, in summer 2013.

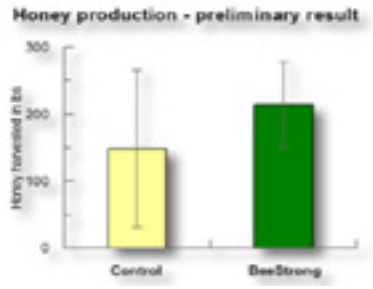
The team used artificial brood rearing to establish controlled conditions and then compared the survival rate – meaning how many eggs turned into healthy adult bees – of syrup fed vs. syrup and BeeStrong fed larvae.

The results show that the survival rate of BeeStrong fed larvae increased by 10%. After this finding the group wanted to find out if BeeStrong had an effect on adult bees.

The bees were collected after hatching and weighted. The groups which were fed BeeStrong, produced bees that were on average 5% to 10% heavier. This means BeeStrong not only helps improve brood survival but also helps bees gain more body mass, which is important for the bee's endurance. The effect of BeeStrong was then assessed in a field test in Canada together with a commercial beekeeper.

The test was carried out throughout the season and consisted of two groups of 20 weak colonies which were each treated equally. The only difference was that one group was fed BeeStrong twice at the beginning of the season: Effects noted during the trial in Canada were surprising!

- 1 week after 1st feeding the test-colonies showed significant improvement in the brood pattern
- The bees were calmer.
- The BeeStrong group showed a higher population at the end of the study.
- The honey yield increased by almost 30%*.



Best times to use BeeStrong are

• In Spring, with the incentive feeding to kick-start the colony and assure the colony can start with healthy brood.

• In late Summer, to rear strong and healthy wintering-bees. This helps the colony with overwintering and gives a boost into the next season.

During the season when you notice a problem in the brood development and the bees are accessible to sugar-syrup feeding (periods of dearth of nectar).

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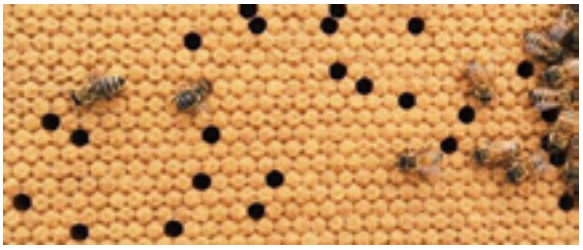

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*Different conditions will influence the amount of honey your bees produce.

A Closer LOOK

POLLEN QUALITY

Clarence **Collison**

The nutritional value of pollen has been demonstrated by measuring such diverse parameters as the growth and development of fat body, the development of hypopharyngeal glands, life span or brood rearing.

Proteins and amino acids (the building blocks of proteins) are extremely important components in honey bee nutrition. Bee colonies rely mainly on pollen to satisfy their protein needs (Höcherl et al. 2012). A single colony consumes between 17 and 34 kg (37.4-74.8 pounds) of pollen per year (Crailsheim et al. 1992; Keller et al. 2005). The nutritional value of pollen for bees is primarily defined by its absolute and relative content of essential amino acids. Accordingly, pollen from different floral sources has a different nutritional value for bees (Standifer 1967; Haydak 1970; Crailsheim 1990). De Groot (1953) described the nutritional value of various sources of protein for the colonies as well as the requirements of individual bees. He classified the following 10 amino acids as being essential for the growth of the honey bee: arginine, histidine, lysine, tryptophan, phenylalaine, methionine, threonine, leucine, isoleucine, and valine. The largest requirements were for leucine, isoleucine, and valine.

The amino acids in pollens are required by the bee for synthesis of tissues, hemolymph proteins, enzymes etc. These include the essential amino acids which the bees cannot synthesize and the non-essential amino acids which the bee can transform metabolically from one to another or which it can synthesize from certain essential amino acids (e.g. tyrosine from phenylalanine, cysteine from methionine, etc) (McCaughey et al. 1980).

The nutritional value of pollen has been demonstrated by measuring such diverse parameters as the growth and development of fat body (Maurizio 1954 as cited by Crailsheim 1990), the development of hypopharyngeal glands (Standifer 1967), life span (Schmidt et al. 1987) or brood rearing (Herbert et al. 1970). Caged bees show the ability to distinguish between different kinds of pollen. They prefer protein-rich pollens (Schmidt and Johnson 1984) and react to the presence of phagostimulants in pollen (Schmidt 1985).

"Pollens that induced decreased life span included Ambrosia, Uromyces (a rust spore), Typha, and Kallstroemia; those that induced little increase in life span included Haplopappus, Baccharis (brooms, aster family), and Taraxacum; and those that induced the greatest increase in life span included Ephedra (desert evergreen shrubs), Prosopis (mesquite), Rubus (blackberries, raspberries etc.), Populus and two blends of pollen."

High quality pollens are produced by numerous clover species (*Trifolium* spp.), oilseed rape (*Brassica napus*), pear (*Pyrus communis*), almond (*Prunus dulcis*), *Populus* spp. (poplar, aspen, cottonwood) or lupin (*Lupinus angustifolius*) (Schmidt et al. 1987; Pernal and Currie 2001; Somerville and Nicol 2006).

Pollen of less quality can come from sunflower (*Helianthus annuus*), blueberry (*Vaccinium* spp.) or *Typha* spp. (cattail family) (Schmidt et al. 1987). Despite their optical attractiveness for pollinating insects, even such blooming plants as dandelion (*Taraxacum* spp.), *Haplopappus* spp. (flowering plants in aster family) or *Kallstroemia* spp. (caltrop family) produce pollen of minor value for bees' nutrition. On the other hand there are examples of wind-pollinated plants (e.g. *Populus* spp.) which are better apt to satisfy the dietary demands of bees than pollen from animal pollinated plants (Schmidt et al. 1987).

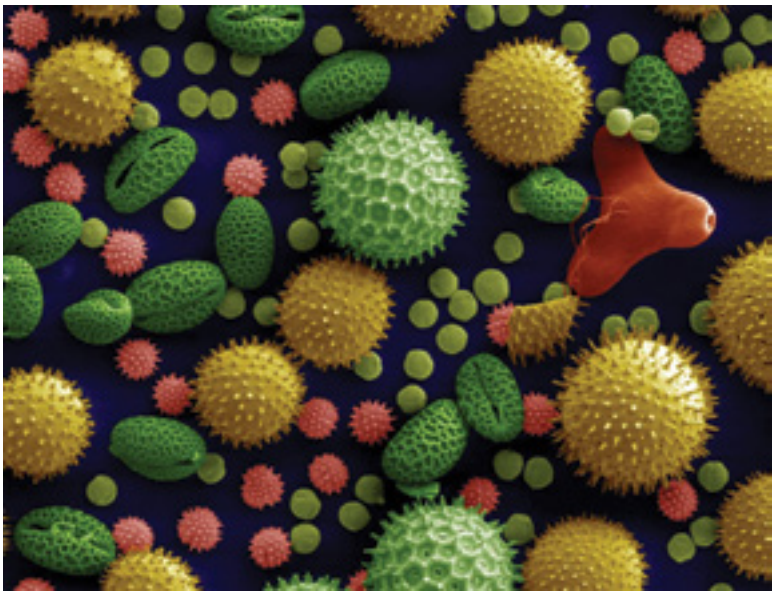
Liolios et al. (2016) ranked bee pollen according to its contribution to bee nutrition taking into consideration the seasonal variation. They found that the richness in protein content of each single taxon

alone is not enough to classify it, as a "good" pollen source, and seasonal variation in vegetation and colony needs should be taken into account. In many cases, bees collected more pollen from plants poorer in protein, which were in total more beneficial to the colony compared to pollen rich in protein, but collected in smaller amounts. They concluded that the amount of collected pollen was the most important factor and this is relative to the population of the plants in the surrounding area, the flowering period and the season. The attractiveness of pollen, as indicated by the amount of pollen collected by the bees, was not correlated to the protein content of different taxa. Bees collected pollen from a large number of taxa, but only a few of those contributed significantly to their nutritional requirements. They found that only 14 out of 46 pollen taxa accounted for 88.8% of the total proteins that were available for bees. The crude protein of these "selected" pollen sources ranged from 13.9 to 25.5%. Pollen from plants blooming in Spring had higher protein content (20-24.7%) than those from summer (15.1-19.9%) and autumn (19.3-23.1%). The great amount of pollen that honey bees collected in spring and its richness in proteins could explain the strong growth of brood and population during this period.

Pollen pellets collected from honey bees foraging at 62 floral species in Australia were analyzed for protein and amino acid content and their value in nutrition was determined (Somerville and Nicol 2006). The crude protein levels of all pollen pellets analyzed ranged from 9.2% for *Hypochoeris radicata* (flatweed) to 37.4% for *Echium plantagineum* (Paterson's curse) with a mean of 25.9%. Pollen pellets from 15 species were identified as providing protein levels below those acknowledged to satisfy honey bee dietary requirements when they are the only source of pollen available to the colony. Pollens collected from species of the same genus demonstrated similar protein profiles. Isoleucine was deficient in 38% of the pollens with 69% of eucalyptus and related species demonstrating a significant isoleucine deficiency.

McCaughey et al. (1980) determined the amino acids and protein contents of hand-collected

Wikipedia photo.



pollens from selected desert plants that bees sometimes visit and from other floral sources. Prickly pear pollen that is seldom collected by honey bees had the lowest protein content and creosote bush, a pollen source for bees, the highest. Glutamic acid, aspartic acid and proline were the predominant amino acids in all desert pollens examined. The desert plants had low protein levels, but their amino acid patterns were in agreement with the requirements for honey bees with the exception that catclaw pollen, which is seldom collected by bees, was low in methionine. All pollens contained detectable levels of the 17 amino acids measured. Since honey bees rarely feed on one floral source, the low protein levels of these pollens could be compensated by collection of pollens that have high protein levels.

Amino acid content of honey bee-collected and hand-collected dandelion, *Taraxacum officinale,* pollen was determined (Loper and Cohen 1987). Hand-collected pollen (one source) was unexpectedly higher in proline and valine than bee collected pollen (five sources). Generally, dandelion pollen was low relative to honey bee requirements in valine and isoleucine and low in leucine and arginine. The reported poor brood-rearing capability of dandelion pollen appears to be the result of multi-amino acid deficiency.

Twenty-five pure pollens plus several blends of pollen were fed as sole protein sources to honey bees and resultant survival of bees on these diets was measured. Average increase in mean life span of bees on a pollen diet versus sugar water controls was 19.5 days, with a range from 3.9 days less than the controls for *Ambrosia* (ragweeds) to 40.6 days longer, for a five-pollen blend. Actual consumption of test pollen diets also varied dramatically among test pollens, with a mean consumption of 16.5 mg pollen per bee for the first 10 days and a range of 1.9-29.0 mg per bee.

Pollens that induced decreased life span included *Ambrosia*, *Uromyces* (a rust spore), *Typha*, and *Kallstroemia*; those that induced little increase in life span included *Haplopappus*, *Baccharis* (brooms, aster family), and *Taraxacum*; and those that induced the greatest increase in life span included *Ephedra* (desert evergreen shrubs), *Prosopis* (mesquite), *Rubus* (blackberries, raspberries etc.), *Populus* and two blends of pollen. Increased life span was not correlated with pollen grain size, grain spininess, or dispersal vector (biotic or abiotic) and was weakly correlated with season of floral bloom (pollen produced in spring was better than that produced in fall). Pollen from the family Compositaceae was poorer than average pollen. Major factors affecting life span were amount of pollen consumed, protein concentration in the pollen, and, especially, total amount of pollen protein consumed. By combining information relating to consumption levels and protein intake, reasons why pollen caused the observed life span could be determined. Reasons included presence or absence of attractants and phagostimulants/deterrents, presence of toxic compounds, and a poor nutrient balance or level (Schmidt et al. 1987).

Di Pasquale et al. (2013) tested the influence of pollen diet quality

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(different monofloral pollens) and diversity (polyfloral pollen diet) on the physiology of young nurse bees, which have a distinct nutritional physiology (e.g. hypopharyngeal gland development and vitellogenin level), and on the tolerance to the microsporidian parasite *Nosema ceranae* by measuring bee survival and the activity of different enzymes potentially involved in bee health and defense response (glutathione-S-transferase (detoxification), phenoloxidase (immunity) and alkaline phosphatase (metabolism)). They found that both nurse bee physiology and the tolerance to the parasite were affected by pollen quality. Pollen diet diversity had no effect on the nurse bee physiology and the survival of healthy bees. However, when parasitized, bees fed with the polyfloral blend lived longer than bees fed with monofloral pollens, except for the protein-richest monofloral pollen. Furthermore, survival was positively correlated to alkaline phosphatase activity in healthy bees and to phenoloxydase activities in infected bees. Their results support the idea that both the quality and diversity (in a specific context) of pollen can shape bee physiology.

Individual and colony-level foraging behaviors were evaluated in response to changes in the quantity or nutritional quality of pollen stored within honey bee colonies (Pernal and Currie 2001). Colonies were housed in vertical, three-frame observation hives situated inside a building, with entrances leading to the exterior. Before receiving treatments, all colonies were deprived of pollen for five days and pollen foragers were marked. In one treatment group, colony pollen reserves were quantitatively manipulated to a low or high level, either by starving colonies of pollen or by providing them with a fully provisioned frame of pollen composed of mixed species. In another treatment group, pollen reserves were qualitatively manipulated by removing pollen stores from colonies and replacing them with low- or high-protein pollen supplements. After applying treatments, foraging rates were measured four times per day and pollen pellets were collected from experienced and inexperienced foragers to determine their weight, species composition, and protein content.

Colonies responded to decreases in the quantity or quality of pollen reserves by increasing the proportion of pollen foragers in their foraging populations, without increasing the overall foraging rate. Manipulation of pollen stores had no effect on the breadth of floral species collected by colonies or their preferences for the size or protein content of pollen grains. In addition, treatments had no effect on the weight of pollen loads collected by individual foragers or the number of floral species collected per foraging trip.

However, significant changes in foraging behavior were detected in relation to the experience level of foragers. Irrespective of treatment group, inexperienced foragers exerted greater effort by collecting heavier pollen loads and also sampled their floral environment more extensively than experienced foragers. Overall, their results indicate that honey bees respond to deficiencies in the quantity or quality of their pollen reserves by increasing the gross amount of pollen returned to the colony, rather than by specializing in collecting pollen with greater protein content. Individual pollen foragers appear to be insensitive to the quality of pollen they collect, indicating that colony-level feedback is necessary to regulate the flow of protein to and within the colony. Colonies may respond to changes in the quality of their pollen stores by adjusting the numbers of inexperienced to experienced foragers within their foraging populations (Pernal and Currie 2001). BC

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Real Time Watching Winter Clusters

Wyatt **Mangum**

Using Thermal Imaging

In the March 2016 issue of *Bee Culture*, we saw how a thermal camera can locate the brood nest and determine some colony conditions. That was for the Summer. This article extends the diagnostic capabilities of thermal cameras into Winter. First let's examine two strong colonies wintering well. Then we will examine two Winter clusters under distress.

With this innovative thermal technology, I wanted an efficient graphical way to show the heat from a Winter cluster in one picture. **Figure 1** shows a Winter cluster radiating heat from the top and sides of top-bar hive 71, all in one composite heat signature, originally built from three separate heat signatures, which we can just call panels. The middle panel of the composite shows the top of the hive, seen from above and shifted towards the entrance end. The heat from the cluster conducts through the top bars where the color white is the hottest, followed by red, yellow, and blue the coolest. The side panels match the original sides of the hive. I aligned the side panels so the heat from all three would be in a row as with reality. The ovals emphasize the position of the cluster's heat, which had shifted to the left. That shift was towards the warmer side of the apiary, sun exposed from dawn until afternoon.

The temperatures in the black boxes near the top of each panel are the temperatures at the black diamonds directly below them. (The camera recorded the temperature at the white crosshairs at the center of the image.) The heat losses from the top and warm-side of the cluster are nearly the same (30.2˚F, -1˚C, and 29.4˚F, -1.4˚C, respectively). Those temperatures are warmer relative to the cold side of the hive (22.6˚F,-5.2˚C). The composite heat signature shows an important fact when using a thermal camera. When a Winter cluster shifts in a hive, the colony may appear dead from the cold side of the hive. Therefore examine both sides of the top-bar hive. Moreover, the beekeeper should know the warm and cold sides of the apiary from how the sun arcs over it, and how much sunlight actually hits the hives because of shade. (If the sun exposure is not so pronounced, some clusters may shift towards the sun exposure while others do not.)

Figure 2 shows a composite heat signature for hive 5-20 (5 means the hive is five-feet long). The three upper panels follow the format of **Figure 1**. The slight cluster shift to the left may not be apparent from only the top panel. The inscribed oval on the top panel helps to accentuate the shift, but the sides give better evidence. In this graphic, I added the two lower panels in a closer comparison of the sides. The sides show a warmer heat signature on the left. The left oval had a warmer white core compared to the cooler, all red, heat signature within the oval on the right. Apparently a slight shift to the warmer, afternoon side of the hive had occurred, a subtler cluster displacement than that of **Figure 1**.

In my old top-bar beekeeping, I conducted my Fall management analogous to frame hive beekeepers. Then mostly, I just left my colonies alone until Spring. Waiting to see the survival results. Waiting. No more of that. No

Figure 1.

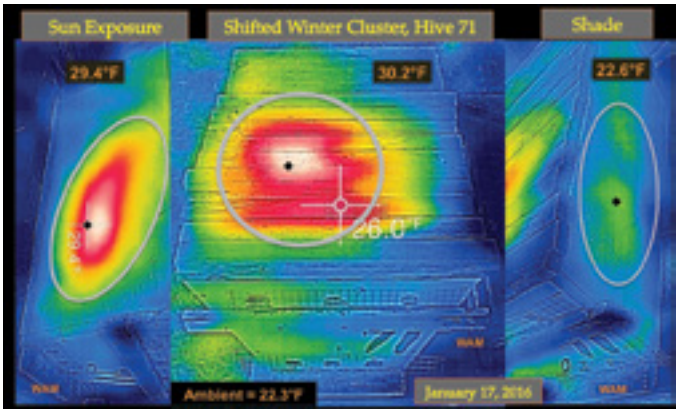
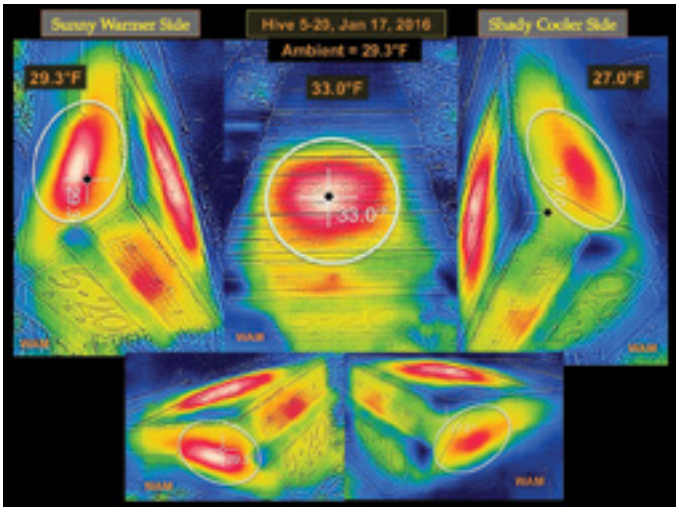


Figure 2.



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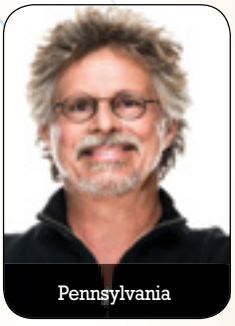

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The thermal camera changed my Winter and early Spring beekeeping from passive waiting to a more active watching.

more waiting. *Now I go through the Winter with my bees.* I go out, even on cold nights "watching" my Winter clusters. That's my new top-bar hive beekeeping in the Winter. This Winter began generally warm, the temperatures more typical later on. My colony loss was low (about 11%), and most all heat signatures did not show signs of problems. Still, I suspected some difficulty might happen to the next colony. The thermal camera helped document some of what occurred in the cold. Before this camera, I would have found the final result later in the Spring.

Under my Winter conditions, most large top-bar hive Winter clusters move up the combs slowly into the honey stored above the bees (called the honey bands). From its heat signatures, the next cluster began low on the brood combs. Later on, I found it high up on the combs in the former honey bands. The cluster's heat signature seemed to be getting smaller too, suggesting the bees had an abnormally high death rate.

Winter clusters showing abnormal heat signatures (relatively fast upward moves and/or becoming smaller) could perish in the Winter or survive into early Spring as weak nonviable colonies, a burden to the beekeeper. Both of these observations occurred with colony five to 10, which we met in the previous article because of its odd thermal behavior in the Summer. The warmest region of its heat signature did not completely align with its brood nest. For a complete comparison, **Figure 3** begins by showing the strange Summer heat signature from hive five to 10 in the upper panel. The middle panel of **Figure 3** shows the Winter-cluster heat signature in early January, which appeared apparently normal. The white (warmest) region was well within the entrance end of the former brood nest location from the Summer, a typical occurrence.

In February cold, I recorded the lower panel of **Figure 3**, the cluster showing difficulty. At first, I thought the colony had perished, finding no Winter cluster heat where the bees had been (the white circle). The bees had made a drastic move upward. They also had moved to the other side of the hive, over to the far upper corner of the combs, by the adjacent hive on the stand, essentially between two five-foot hives, a difficult place to take thermal images. If that location was the warmer side of the hive, it was very subtle.

Nevertheless, on the other side of hive five to 10, between the pair of hives, was part of the heat signature from a small cluster. It was just a splotch of yellow glowing in the dark thermal shadows. The upper left panel of **Figure 4** shows it with a close up in the right panel. The lower panel of **Figure 4** diagrams the possible movement of the cluster, using a comb (from another hive) as a natural background. (The comb has a honey band too narrow for Winter.) The lower white circle is the January 8, 2016 cluster position (**Figure 3**, middle panel), including its heat signature from the white core symbolized by the large white arrow. The cluster reached the yellow-circle position by February 14, 2016. By that

Figure 3.

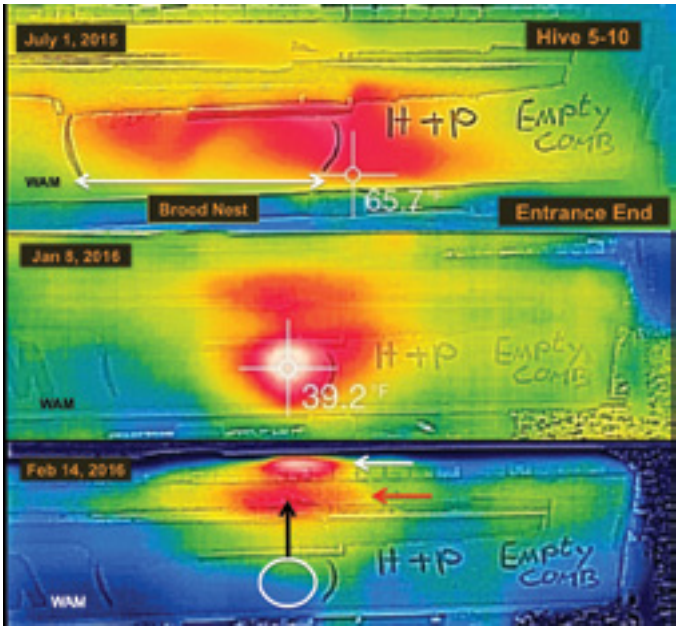
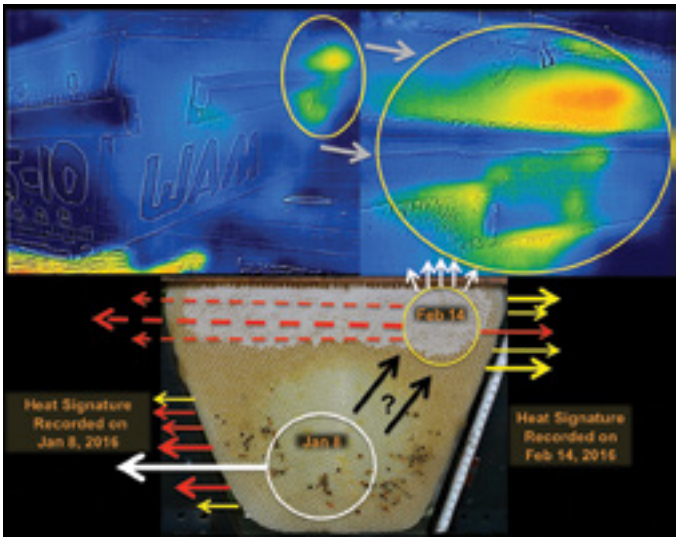


Figure 4.

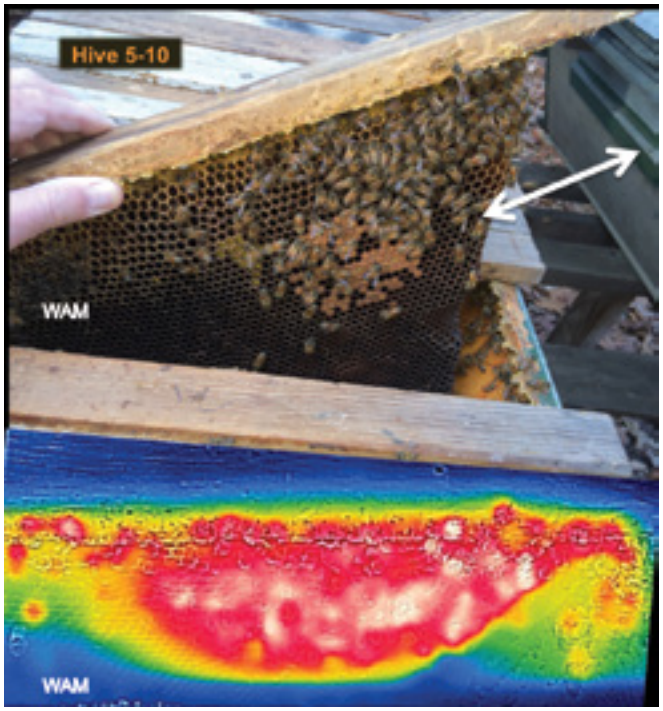


time, the cluster was apparently smaller so I drew it that way (no scale implied).

In February the heat signature of the small cluster was too high up on the combs in its former honey bands. Inspecting hive five to 10, I verified a very small cluster and its location in the hive, all consistent with the thermal images (see **Figure 5**). The little cluster occupied the upper corners of three top-bar combs, extending into the former honey bands. Also troubling, the bees did not have much honey close by, the cluster liable to die by starvation with the return of cold. Beekeepers find these small clusters on their Spring inspections, but with the thermal camera, I am beginning to forecast them from Winter.

Occasionally, I let some weak colonies try to survive the Winter for observational purposes (rather than unite them with other colonies in the Fall). In early Summer, colony five to seven had been moderately strong. Then slowly the colony became weaker over the season; its main problem was an old queen with greatly reduced egg laying.

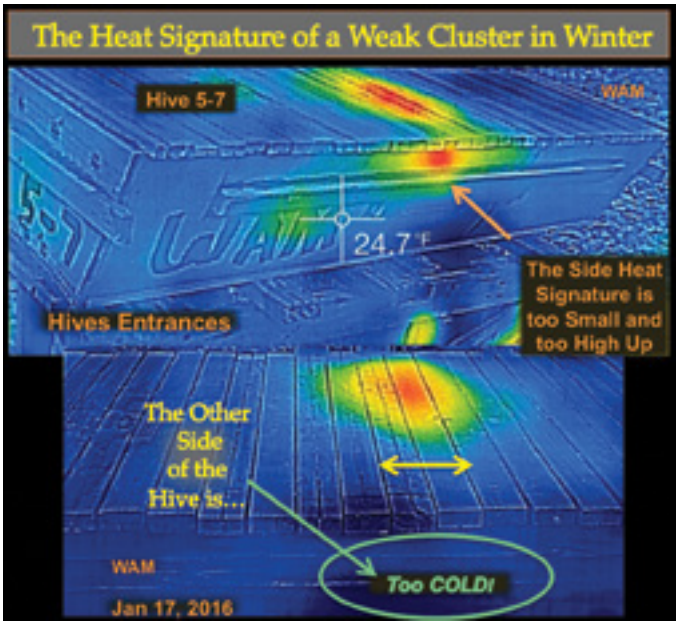
Figure 5.



Somehow colony five to seven managed to keep out robber bees, greater wax moths, and small hive beetles, our three main Summer scourges, besides *Varroa* mites and their viruses. Colony five to seven went into the Winter already too weak, beginning in the Fall already up in its honey bands, too high up on the combs.

Over the Winter, I recorded its small heat signature up in the honey bands (see **Figure 6**, upper panel). On the shady side of the hive, the camera detected no heat signature from the weak Winter cluster (see **Figure 6**, lower panel). The small heat signature never shifted position like the one in the previous example. The cluster was always in this upper position, although it must have been becoming smaller in size due to attrition. By February, still in Winter cold, before any early Spring inspections, I could not find the colony's heat signature.

Figure 6.



Opening the hive showed the expected. The cluster had dwindled to a very small size and starved after losing contact with its surrounding honey.

The thermal camera changed my Winter and early Spring beekeeping from passive waiting to a more active watching. Extending that active watching (like data collection) to predicting Winter losses while still in Winter, one can easily construct the following strategy. Beekeepers go through the Winter monitoring their colonies, classifying them with perhaps (at least) two broad types of heat signatures, beginning in the first cold days of late Fall: wintering well, heat signatures showing large clusters wintering well (**Figures 1 and 2**) and even moderately strong colonies could go here; or problematic colonies, heat signatures showing some deleterious condition (**Figures 3, 4 and 5**). From proper Fall management, most all colonies should start in the first category (wintering well). During the Winter some colonies may move to the problematic category.

Thermal cameras with top-bar hives are on the cutting edge of bee management, hopefully making contributions to help all beekeepers.

Now thermal-proficient beekeepers should be well prepared for early Spring inspections because even before then, while the weather is still too cold for colony inspections, they can pick up hive equipment from dead colonies getting a head start on clean up, and have it positioned ready for rapid deployment before the good-weather time crunch. They can pick up the nonproductive weak colonies too and handle them according to their management procedures.

With the problematic hives mostly out of the way, and with warm weather arriving, beekeepers can concentrate Spring management on the stronger colonies, which sets the stage for the whole season. Keep in mind among these colonies some conditions may appear later to slow their growth, for example sudden queen failure or parasitic mite syndrome (the brood appears similar to a bad case of European foulbrood). For beekeepers working with limited help, or alone (like me), focusing on the stronger colonies, during the first warm days, would be a big advantage.

I'm making minor changes in my top-bar hive design and changing the hive layout in my apiaries, all with the goal of having a thermal-camera efficient top-bar hive operation. On Winter nights, I want to roll up on any apiary, pop out of the truck, leaving it idling, and walk around the hives recording one thermal video of their heat signatures. I narrate observational notes as I record while holding an extra bright (tactical) flashlight on the hives. Then I get in the truck; go to the next apiary, and make the next video. In a few hours, I can go through my entire operation, recording a video for each apiary. I have done test runs. It's easy. I'll be trying a similar procedure in the Spring and Summer too.

Thermal cameras with top-bar hives are on the cutting edge of bee management, hopefully making a contribution to help all beekeepers. BC

Acknowledgments

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Milkweeds As Honey Plants

Connie **Krochmal**

Milkweeds are common wildflowers in most areas of the country. Around a hundred species are found worldwide with slightly over half of those being native to the U.S. Members of the milkweed family, the plants are found along roadsides as well as in fields, meadows, prairies, and thickets.

The genus name (*Asclepias)* refers to the Greek god of healing, Aesclepius. The common name is a reference to the sap, which is usually milky.

The fluffy fiber from the pods has been used as quilt batting and stuffing for jackets and life preservers, particularly during wartime when kapok wasn't available. The young shoots and young pods of some species are eaten as a vegetable once the sap is removed.

Bee Value

Very fond of milkweed blossoms, bees will desert other flowers when these are available. The plants provide a good nectar flow. Bees discard the pollen. Assuming enough plants are available, milkweeds can bring a good crop of honey.

The milkweeds are major bee plants in the North Central states, the Northeast, Southeast, the Plains, and the mountainous West. Typically light colored, the honey is mild flavored.

Generally, milkweeds are considered beneficial to bees. However, there are potential negative aspects to milkweed flowers. It is conceivably possible for bees and other small pollinators to become trapped in a blossom. Also, the sticky pollen masses might cling to a bee's head or legs, thereby affecting her mobility or appearance.

In Europe, the flowers have been blamed for some bee losses. One English beekeeper reported losing thousands of bees. However, it appears there are few such reports in the U.S.

General Description

Typically perennials in North America, these are sometimes sub-shrubs or shrubs in tropical America. In a few cases, the plants are evergreen in warm climates.

Readily hybridizing, milkweeds arise from creeping rhizomes and are moderately fast growing. Typically two to six feet in height, the tough, free flowering plants can produce multiple stout stems that can form dense clumps.

Ovate to oblong, the leaves are mostly opposite, rarely alternate. They can form pairs or whorls.

The blooms open in crowded, many flowered, rounded, axillary and terminal umbels. Less than ½ inch wide, the blossoms contain five petals, a deeply five-parted corolla with lobes that curl backwards, and a crown consisting of five erect or spreading horned hoods.

Three to five inches long, the pods are typically warty, but sometimes smooth. These split to release the flat seeds, which are attached to tufts of long, silky hairs. They're spread by the wind.

Growing Milkweeds

A number of species, including butterfly weed, common milkweed, and swamp milkweed, are sometimes cultivated. Seeds or plants of some species are available from various sources, such as Johnny's and Well-Sweep Herb Farm. In most cases, these can't be shipped to Hawaii.

Generally preferring full sun, these are easy to grow. They thrive in a range of soil types and moisture levels. Typically, they do well in a poor, dry soil. Milkweeds tend to spread rather freely in rich soils.

The plants can be grown from seeds, which germinate erratically. Stem and root cuttings are also options. Milkweeds can be hard to transplant or divide due to the long taproots. For best results, plant the seeds or cuttings into large, deep peat pots in order to disturb damaging the roots during transplanting.

Once they're established, the plants require minimal attention. Generally, milkweeds experience very few pests or diseases with the exception being caterpillar larvae that might eat on the foliage.

Recommended Milkweeds for Bees

The following species are known to be popular among bees.

Blood flower (*Asclepias curassavica)*

Native to tropical America, this frost sensitive evergreen is a woody sub-shrub. It is considered invasive in some tropical countries. After being introduced to the U.S., it naturalized in Florida, California, Louisiana, and Texas. For that reason, I don't recommend its cultivation as it might become invasive in America in warmer areas. Some sources report it is hardy to zone seven, while others list this as zone nine.

Reaching two to four feet in height, it is almost as wide. The upright, leafy plant features mostly smooth stems.

The opposite, shiny, greenish-gray leaves are blue-green underneath. Four to six inches in length, the foliage is oblong to narrow and willow-like.

Blood flower blooms appear from Summer to Fall. This species features the most vividly colored blossoms of all the milkweeds. The tiny, star shaped flowers form large, two to four inch wide umbel-like clusters.

The blossoms are typically red-orange to red, but they can

Blood Flower (Asclepias curassavica)

occasionally be white or yellow. These contain purplish-red corollas. Bees love these flowers, which are an excellent nectar source. Pods are mostly smooth.

Butterfly weed (*Asclepias tuberosa)*

Butterfly weed occurs in the lower 48 states except Nevada, Oregon, Washington, Idaho, Montana, Wyoming, and North Dakota. It is found in dry open areas, margins of woods, and sandhills. This does best in a dry sandy soil. Preferring full sun, it tolerates light shade.

This is a very variable species with a number of subspecies occurring. The long lived plant lacks milky sap. Butterfly weed is the most common milkweed and bears the showiest blossoms.

Reaching three feet in height and about two feet wide, this species is less likely to spread than some milkweeds. Sometimes branched, the stout, rough, very hairy stems are very leafy.

Forming spirals, the alternate, ovate, lance-like to oblong leaves are rough and hairy. These can be four inches long. Sometimes, monarch butterfly caterpillars feed on the foliage.

Flowering reaches its peak from May to July, but can extend into September. The blooms are mostly orange or red but are sometimes yellow, orange, or orangish-green.

The compact, dense clusters or umbels arise mainly from the leaf axils. Flowers feature red or yellow corollas. The hoods can be light yellow, dark red, or orange.

Butterfly weed (Asclepias tuberosa)

Butterfly weed is easier to grow from seed than most milkweeds. This commonly grown, drought tolerant species prefers average to poor, light, dry, sandy soils. The spot must be well drained. Rich, moist soils and mulch can promote root rot.

This native can provide very good honey crops annually even during rainy or dry seasons. Nectar flows continue throughout the daylight hours.

Common milkweed (*Asclepias syriaca)*

Hardy to zone three, common milkweed is found in all mainland states except for the Southwest, Wyoming, Colorado, Idaho, Washington, and Florida.

Sometimes hairy, the stout, unbranched, coarse, upright, very leafy stems are usually solitary. This can reach three to six feet in height.

Occasionally hairy, the thick, opposite, large, veined leaves are oval to oblong. Up to 10 inches long, these are blue-green or gray underneath. The foliage is the preferred food for monarch butterfly caterpillars.

The heavily scented blooms appear in nodding, loose, rounded, dense, hairy clusters from May through September, depending on location. The flowers can be white, cream, or pastel purple. The corollas are dull purple, rose, greenish, purplish-white, or rarely whitish-green.

This can provide a good nectar flow even during dry years. Most nectar is produced in the afternoon and evening.

The honey is typically light colored but can have a slight yellowish tinge. The somewhat tangy, distinctive, fruit-like flavor mellows with time. The aroma is like that of the blossoms.

The honey can be very heavy and thick during hot weather. At times, this needs to be heated before extracting. It rarely granulates. Common milkweed provides a good annual crop of honey, averaging 50 pounds per colony in some areas. The best yield is from plants growing in clay soils.

The common milkweed is easy to grow, Sometimes, the plants tends to spread freely.

Common milkweed (Asclepias syriaca)
(Monarch Watch photo)

Mexican whorled milkweed
(*Asclepias fascicularis)*

This is found from Washington, Oregon, and Idaho to Nevada, Utah, and California into Mexico. Occurring in meadows, this species is hardy to zone six. A tough perennial, it is tolerant of heat, drought, and wind. This adapts to most any pH level and soil type – even clay.

Mexican whorled milkweed is two to four feet tall. Forming whorls, the opposite, lance-like to narrow leaves are six inches long.

Mexican milkweed
(Asclepias fascicularis)

Flowering from mid-Summer to Fall, the blooms are mostly whitish-green or white. Occasionally, they're purplish or pink-rose. The outer portions are pink, while the centers are white or pastel green. The nectar flow becomes slower and more concentrated in the afternoon.

This can provide a large crop of good quality, light colored honey. Slow to granulate, it has a distinctive, fruity flavor and an aroma similar to that of the flowers. The average honey yield is around 100 pounds per colony.

Prairie milkweed (Asclepias sullivantii)

Prairie milkweed (*Asclepias sullivantii)*

This grows in low plains prairies mostly in rich moist soils. It is native to Oklahoma, Arkansas, Missouri, Iowa, Minnesota, Michigan, Wisconsin, Illinois, Indiana, and Ohio.

The very smooth stems reach two to five feet in height. The slightly clasping, oval to oblong, pointed, very thick leaves, up to eight inches long, are unique among milkweeds due to the sharp tips and rounded ends. Often, there are pink tinges along the veins.

Blooming June through August, prairie milkweed flowers are mostly pink but can range from rose-purplish or whitish-pink to pinkish-rose. Forming crowded, ball-like clusters, these open terminally and in the upper leaf axils. The hourglass-shaped flowers, ¾ inch wide, feature a white to purple corolla.

Showy milkweed (*Asclepias speciosa)*

This native occurs throughout the West, Southwest and the Central states. It occurs in openings and adapts to partial shade.

Hardy to zone three, this can reach one to four feet tall. Showy milkweed is less likely to spread than some species. This coarse plant features hairy, erect stems. All of the new growth is hairy.

Swamp milkweed (Asclepias incarnata) (NC State photo)

The light green, opposite, oval to oblong leaves are three inches in length. These are hairy on both surfaces.

Flowering occurs from May through August. The purple-rose, star-shaped blooms emerge in large, ball-like clusters that are less dense than those of other species. The corollas feature purplish lobes.

Showy milkweed is a source of honey in some areas.

Swamp milkweed (*Asclepias incarnata)*

This native species is found in all mainland states except Mississippi, Arizona, California, Washington, and Oregon. It can be found along shores – especially gravelly ones, streams, and swamps. Despite the common name, this species thrives in less moist soils.

Easy to grow from seed, swamp milkweed is a very variable species with different varieties and subspecies found in some areas. Hardy to zone three, this is up to five feet tall. The stout, very leafy, much branched stems can be hairy. Unlike most other milkweeds, its stems lack milky sap.

Usually occurring in pairs, the opposite leaves can vary somewhat in shape from willow-like to ovate or oblong. Finely veined and up to six inches long, these bring beautiful Fall color. They're hairy on both sides.

The sweetly scented blooms, ¼ inch wide, open mid-Summer to Fall. These form broad, flat corymbs or umbels that can contain up to twenty flowers. The blossoms are mostly rose-pink or pink, but are occasionally white. These feature dark rose corollas with reflexed lobes, purplish-red hoods, and lighter colored horns.

Swamp milkweed can provide a surplus honey crop.

Whorled milkweed (*Asclepias verticillata)*

This is found in all mainland states except New Hampshire, Maine, Vermont, Utah, Colorado, Nevada, California, Idaho, Washington, and Oregon. This grows in dry places, sandy and rocky soils, dry rocky slopes, dry open woods, open sterile soils, roadsides, and sandhills. Hardy to zone three, it is reportedly toxic to animals.

Mostly unbranched, this very leafy species is only one to two feet in height and equally wide. The somewhat hairy stems are slender.

The delicate, narrow, linear, willow-like foliage forms whorls of three to six. These curl backwards along the edges. Three inches long, the leaves can be hairy. The Latin species name apparently refers to the spoke-like arrangement of the leaves that form a whorl.

Whorled milkweed blossoms generally appear from June to July, but flowering can continue into September. The creamy white or whitish-green flowers form clusters. These feature whitish-green corollas with purplish-rose lips. BC

Connie Krochmal is a writer and a beekeeper in Black Mountain, North Carolina.

Showy milkweed (Asclepias speciosa)

TOWER OF JEWELS


Madeira

Steve **Andrews**

Many beekeepers will be familiar with the Borage (*Borago officinalis*) or Starflower because it is a plant that bees love. There are many species in the related Echium genus, which is also in the Borage family (*Boraginaceae*), that are just as good, if not even better at attracting these honey-producing insects.


Viper's Bugloss.

A common name for some of the most spectacular types of Echium is "Tower of Jewels," and with good reason because of the massive flowering spikes the plants produce. Each "tower" is covered in thousands of tiny nectar-bearing flowers that bees simply cannot resist, and humans find these plants very attractive as well. If you grow a Tower of Jewels it will be a definite talking point. So many of our favorite pollinating insects can be attracted to an Echium plant that perhaps "Tower of Bees" would be just as appropriate as its name!

Viper's Bugloss

Incidentally, bugloss is another name for plants in this fascinating genus, after the type species, the Viper's Bugloss (*E. vulgare*) or Blueweed. This species will grow happily in places with cold Winters, is found throughout Europe, and was introduced into North America and Canada. This is worth knowing because it illustrates the fact that there are species of Echium that can grow in a wide range o f temperatures and climates. You should be able to find the types suited to your garden, wherever you live.

Viper's Bugloss gets its name because its small nut-like seeds were thought to resemble a snake's head and its spotted stems were thought to look like snakeskin. It grows in waste ground, fields, grassy places and in sand dunes.

Viper's bugloss is a much smaller plant than any of the Tower of Jewels species but it has flowering spikes of pretty blue flowers, and like the other Echiums, it is a biennial. Because it produces plenty of pollen and nectar it is a flower the bees find irresistible.

But now let us take a look at some of the other Echium species we can grow in our gardens that will benefit our bees.

Red Bugloss

Echium wildpretii is one of the types often referred to as a "Towers of Jewels," and is also commonly known as the Red Bugloss or Mt Teide Bugloss. The names are very apt because it has very tall flowering spikes of red flowers, and it is found

Red Bugloss.

growing naturally up on Mt Teide in Tenerife in the Canary Islands. The Red Bugloss, or "Taginaste Rojo," as it is called in Spanish, is actually a very rare species in the wild because it is only found in this mountainous location and around the mountain village of Vilaflor. The Red Bugloss, which can reach around three m (10 ft) in height is often grown in gardens and parks, though it needs protection in areas where there is frost in Winter. Seeds of this species are easy to find in Internet searches, and it will grow successfully in many parts of North America. Red Bugloss grows best in the ground but can also be cultivated in pots and containers as long as these are big enough and well-drained. The Red Bugloss hates having wet feet! In its first year it produces a large rosette of leaves, which is followed in the spring of the following year by its flowering spike. It is well worth waiting for the second year of growth because the Red Bugloss definitely has the wow factor!

Pride of Madeira

The Pride of Madeira (*E. candicans*) is another very aptly named plant because it comes from Madeira originally, and it is a flower the island can certainly be proud of! Although, not a "Tower of Jewels," as such, this member of the Echium family grows into a very large bush that in Spring and early Summer produces flower spikes at the end of its branches. Each flower head is covered in tiny blue blooms with red stamens, and also covered in bees and other pollinating insects. The Pride of Madeira is widely available as an ornamental plant, and being drought-tolerant is especially suited to coastal gardens and parks, such as those in California, where it grows so well it has become regarded as an invasive species.

The Tree Echium

The Tree Echium (*E.pininana*), Pine Echium or Giant Viper's Bugloss, is another very aptly named species too because it gets very tall indeed. Very much a Tower of Jewels, the Tree Echium reaches four m (13 ft) with a stoutly-stemmed inflorescence of small deep blue blooms. Sold as "Blue Steeple," and easy to find by

Tree Echium.

Googling for the seeds online, this plant will grow in many areas of the world besides its natural habitat in the mountainous forests of La Palma in the Canary Islands, and although it is a subtropical species it does very well in Ireland and many parts of the UK. In its first year, the Tree Echium grows as a rosette with a short stem bearing lance-shaped slightly hairy silvery-colored leaves. It is a biennial, and sometimes a triennial, which in its second or even third year, produces the tall Tower of Jewels of

Simplex.

its name. Besides parts of the UK, this Giant Viper's Bugloss will also grow in North America, including California, just like the Pride of Madeira. In its natural habitat the Tree Echium is now an endangered species due to habitat destruction, so growing it in our gardens is actually helping in the conservation of this amazing plant, as well as benefiting the bees.

Echium simplex

Echium simplex is a white-flowered Tower of Jewels that, like the Mt Teide Bugloss, comes from Tenerife. It is another very rare plant in the wild state and is mainly found in the cliffs and mountains of the Anaga Mountain range in the north of the island. It is a very attractive plant for gardens in warm temperate climates and can do well if given plenty of sunlight. Like many other Echiums it produces a rosette of leaves in its first year and then erupts with a glorious Tower of Jewels in the Spring of its second year. It grows to an approximate height of anything from one to three m (three to 10 ft) and looks very impressive when in full bloom. It is a Tower of Jewels that provides us with a visual delight and at the same time delights our friends the honey bees! BC

COMPARING MITE TREATMENTS

Shearer **Turton**

This research paper was in partial fulfillment of the requirements for the Master Level Beekeeping Course, University of Montana, with Jerry Bromenshenk Ph.D. Thanks to Jennifer Berry, UGA, my wife Bonita, and Jerry Phillips for their meticulous fieldwork.

Introduction

Two methods for treating *Varroa* mites (*Varroa destructor*) were tested during this study. One method of treatment was vaporized oxalic acid applied once per week for 3 weeks. This method did prove beneficial in reducing mite loads in honey bee (*Apis mellifera*) colonies. The second method of treatment was the use of one formic acid pad, MiteAWay Quick Strip (MAQS). The use of formic acid slightly reduced the mite load in the tested colonies.

While there are a number of available treatment options, not all treatment options are recommended in all temperature situations. Formic acid, one of the more commonly used mite treatments, has limited usefulness in the climate in which this comparison was performed. Summer temperatures in geographic location Zone 8, exceed the manufactures high temperature limit. Another commonly used method of treating varroa mites is oxalic acid, which has the extra benefit of no temperature restrictions.

Location and Conditions

Our sample study to compare the effectiveness of formic acid with oxalic acid in hives with brood present consisted of 90 hives. These hives were located in three different yards with 30 hives in each yard. Within each yard 10 hives were designated as control hives, 10 hives were treated with formic acid and 10 hives were treated with oxalic acid. The hives were numbered labeled and grouped by treatment method.

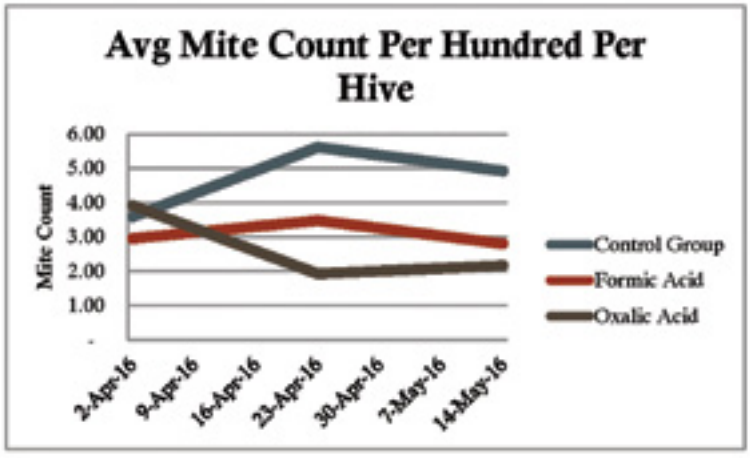
In an attempt to control variables and conditions to the extent possible, all three yards were located in Dooly County, Georgia on similar sites. The yards were within a radius of five miles and separated by at least two miles. As the study began each yard was experiencing a good nectar flow and had easy access to water. All hives were 10-frame, Langstroth hives with bottom screen boards. The yards and groups were balanced as to hive size and sun exposure.

Materials and Methods

Control Hives were left untreated.

Hives in the formic acid group were treated with MAQS by placing one strip inside the hive on frames containing brood where it remained for one week before being removed. The use of one strip per hive was a deviation from the maker's recommended product use

	#	Baseline	Post Treatment	
Date		2-Apr-16	23-Apr-16	14-May-16
Control Group				
Apiary 1		25.52	60.81	47.05
Apiary 2		31.90	67.57	66.40
Apiary 3		43.04	28.83	24.48
Total		100.46	157.22	137.94
Avg Mite/Hive	28	3.59	5.61	4.93
Formic Acid				
Apiary 1		27.22	25.53	20.93
Apiary 2		23.21	42.47	30.47
Apiary 3		26.44	22.43	21.50
Total		76.87	90.44	72.91
Avg Mites/Hive	26	2.96	3.48	2.80
Oxalic Acid				
Apiary 1		24.09	18.43	16.59
Apairy 2		58.38	19.63	26.45
Apiary 3		31.18	17.80	19.72
Total		113.65	55.86	62.76
Avg Mites/Hive	28	4.06	2.00	2.24



Mite Treatment Options

	treatment times	treatment temps	costs per	with supers	
MAQS (Formic Acid	1	50 - 92	$4.20	no	
Hop Guard II	1	any temperature	$3.75	no	
Apilife (Thymol)	3	65-95	$4.53	no	
Apiguard (Thymol)	1	60-105	$3.60	no	use smaller dose at higher temp
Apivar	1	none listed	$5.00	no	
Apistan	1	none listed	$4.34	no	
Oxalic Acid	3	any	approx .02	no	use 1 gram per brood chamber
The above was obtained from Mann Lake LTD, Brushy Mountain Farm and Rossman Apiaries					

of two strips per hive. This approach to treatment was based on conversations with beekeeping professionals coupled with articles such as the one written by [2]Robyn M. Underwood, and Robert W Currie appearing in the Journal of Economic Entomology by December 2005 where they conclude formic acid in "high concentrations can cause queen mortality."

Hives in the oxalic acid group were treated in seven day increments for a total of three times by vaporizing two grams of product (1/4 tsp) into each hive in the group for three minutes. A commercial vaporizer was used in order to treat four hives at a time.

Samples were taken from each hive on April 2nd, before treatment had begun, on April 23rd, after completion of all treatments and on May 16th (the third sampling). The samples were placed in an alcohol wash in jars labeled by hive and group. The resulting mite load per hundred was noted on the below graph and following spread sheet.

Results and Observations

The results of the three samplings areas follows:

All hives experienced consistent colony growth and nectar collection during the course of this study.

The **control group** was not treated and saw a steady increase in mites from the first to second sampling. The mite count dropped some from the second and third sampling. The decrease from the second to the third sampling could be because some of the more heavily mite loaded hives swarmed and this took their larger mite load numbers out of the count.

The **formic acid** treatments (MAQS) were applied once and left on the hive for one week. The total mite count for the group increased from 76.8 mites to 90.4 mites from the first mite sampling to the second. The third sampling showed the mites count decreased to 72.9 mites. This decrease might be due to the mite count already being fairly low at the beginning of the study. The experienced mite drop with this treatment was not consistent with expected results. [3]R. W. Currie and P. Gatien 2006 said that "formic acid provided consistent control of *V. destructor* in spring applications,"

The application of MAQS strips only takes about two minutes per hive and another one minute to remove the strip the next week. However, the cost of formic acid using MAQS is significantly more than that of two grams of oxalic acid.

It is also worth noting that, even though the treatment used was one half of the manufacturer's recommendation, this group experienced more hive loss than either of the other groups, suggesting that formic acid is a factor in queen mortality.

The **oxalic acid** treatment was applied for three weeks and resulted in a reduction in the mite count from 4.06 average mites per hive to 2.24 average mites per hive for the group. The reduction of mites is consistent with previous studies by [4]Rademacher 2006. The time required to treat each hive with oxalic acid is greater than with MAQS. The oxalic acid application takes approximately seven plus minutes for four hives. Although the cost of the actual oxalic acid is minimal per hive, the application apparatus requires a significant investment of approximately $600.00 for the 4 vaporizers.

Conclusion

Two conclusions can be drawn from this study:

1) The oxalic acid applied 3 weeks in a row is an effective treatment for reducing mite load. The hives treated with oxalic acid saw a significant drop in mite count.

2) The formic acid treatment was not dramatically effective as a mite treatment at the dosage of one strip at this time of the year. An additional study would be needed during the heat of the summer month at this same dosage, which could show improved results because of the heat increasing the speed of the formic acid release. At lower temperatures such as experienced during this testing period two strips may have improved the mite drop. BC

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Take Care Of The Bees

Jennifer **Berry**

THIS PAST

June, Brushy Mountain Bee Farm had a Field Day,which attracted about 150 participants. I was invited to lecture on several topics but more importantly, it gave me the opportunity to meet a whole host of new beekeepers and hang out with my friends Shane Gebauer, Candy Treadaway, Daniel Roath, and Steve and Sandy Forrest. The morning was set aside for lectures, but the afternoon focused more on hands-on sessions, mine in particular having to do with hive inspections for colonies that had had some sort of issue. The colonies set aside for me had been started from South Georgia packages just a few months prior.

That afternoon as I approached the first colony, it was clear to me that something was wrong; few foragers were flying about, and the ones hanging out on the front porch were shiny, black, and shaking. At this point, it was pretty obvious what was going on, but with further inspection, the culprit was revealed. Check out the photos. This is classic *Varroa* infestation: spotty brood patterns, low adult population, greasy, shiny adult bees, and tiny, weak bees with visible symptoms of deformed wing virus (DWV). This colony is sick, but that didn't happen over night. It happened over weeks, months, or even years due to mites being allowed to multiply over and over again till the breaking point was reached.

In the agricultural industry, we call this the economic injury level (EIL), which is defined as "the lowest population density that will cause economic damage." The EIL is part of the Integrated Pest Management (IPM) strategy. It's a value – a number – that, if attained by a pest population, will result in economic damage (a loss of yield, produce, a loss of bees). Therefore, the EIL is "a measure against which we evaluate the destructive status and potential of a pest population."

A lot of words there, but for our purpose of dealing with *Varroa* mites, we define the EIL as when the population of mites has reached the level where, if left alone, that colony is doomed. And actually, because of the presence of viruses, once the mite levels reach the EIL, it may be too late to save the colony. Therefore, we as beekeepers need to reduce mite populations **before** they reach the EIL. We need to act when population levels reach the economic threshold (ET). And if we intervene in the health and welfare of our colony at that point, we may still have a chance to save it.

The colony that I inspected that day at Brushy Mountain Bee Farm is more than likely not going to survive, even if it ends up receiving treatment. It will, actually, take several steps to save it, and even then, the effort may still be in vein. If it were my colony, I would do anything I could to help it survive or at least reduce its suffering. First, let me explain how I would try to keep the colony alive, and in next month's issue, I'll explain the importance of why.

Deformed wing virus was spotted all over this frame.

The first thing we need to do is get the mite population down by treating it with a miticide. Since it's Summer and temperatures are hovering in the upper 90s, I would use Api-Guard, a thymol-based product that can be used when temperatures are high. However, since this particular colony is so weak, I would not use a full dose.

Next, I would switch the placement of the weak colony with a stronger colony. In other words, since there are several colonies in this apiary, I would move the weak colony to where the strong colony was and move the strong colony to where the weaker colony stood. This will use the stronger colony's incoming foragers to help boost the population of the weaker colony.

Then, I would add a few frames of emerging brood from another strong colony. And, if food stores are low, I'd add feed or frames of capped honey if available. But be careful here. Feeding weak colonies can encourage robbing, so I recommend using internal feeders like jars or buckets. And, finally, I would treat every single colony in that apiary. Here's why.

I'm very compassionate when it comes to any living thing that's under my watch. A bird, a plant. a dog, a cat, a tree, a bee, and even those sea monkeys I used to have as a kid. Okay, so maybe I'm too compassionate for my own good, but my point is that I don't want to see anything suffer. And, like I said, those poor bees were suffering.

These are bees that will remain alive in the hive from Fall to Spring. These long-lived bees are the reason colonies are able to overwinter.

So when the students at the field day and myself saw that the colony was infested with mites, saw the suffering caused by too many mites, we all wanted to save them, right then and there. We wanted to get them cleaned of mites. That's important, yes, but there was another reason we needed to help this colony (even though it might not have a chance in hell): *if we don't kill these mites, they will infest other colonies.*

As colonies collapse, those resident bees drift into other colonies with infesting mites still attached. And as neighboring bees start to rob out the dying colony, mites jump onto them, getting a free ride back to the colony next door. Not the best situation especially if the colonies being invaded had low mite counts to begin with, or higher tolerance to mites. We will cover this in more detail next month, since now, we need to focus on getting mite levels down so our bees have a chance of surviving the Winter.

Another option for treating this colony or others during the summer months is by vaporizing with oxalic acid. Oxalic acid is the newest miticide that's been approved for use in honey bee colonies. There are several ways to apply this product: either through a sugar solution by trickling (drizzling), spraying or by vaporization. Since the trickle method can only be used during the cold months while the bees are in a tight cluster, we will discuss this procedure at a later date. And spraying the bees with a diluted sugar solution is only recommended for use on package bees that have been heavily fed prior to application, so we will discuss that method later as well. The method we are interested in right now is vaporization of the oxalic acid using a vaporizing wand or vaporizer. Let's review this quickly.

When oxalic acid is heated, it creates a vapor that is deadly to mites. There are various vaporizers available for sale, but I'd be careful of where you decide to buy one. Lots of folks are making these wands now, and some don't work so well. Just be sure you are buying one from a reputable source. Lots of fly-by nighters out there, so watch your back. Now, back to your regularly scheduled program.

These vaporizing wands are inserted into the entrance of a hive and connected to a power source (such as a battery), which then heats the metal plate, melting the oxalic and creating a vapor. Brushy Mountain Bee Farm has some great information about using oxalic acid on their website, which I would recommend you read prior to using this product. http://blog.brushymountainbeefarm.com/2015/09/oxalic-acid-faqs.html

You don't want to hurt yourself or your bees. Beekeeping is supposed to be fun, right?

Now, over the years, beekeepers have been telling me how vaporizing with oxalic acid three times, seven days apart, even while brood is present, is cleaning up their bees and keeping mite populations at bay. Here we go. This is why I love beekeepers: beekeepers are always thinking outside the box. They're always trying something new, always inventing some new gadget. With that said, I am skeptical of this method of treatment since brood is almost always present in the summer months, and oxalic acid will NOT penetrate their wax cappings, therefore the mites inside the cells are protected from the vapor. And since oxalic acid is a "flash treatment" and only lasts for a short spell inside the hive, mites emerging from cells about an hour after treatment and for the next seven days will NOT be affected by the vapor. This is why I hesitate on recommending this form of treatment regimen when brood is present.

So, when my South Georgian beekeeping buddy Shearer Turton told me he was going to compare oxalic acid using the method above to an alternative, formic acid, I was ecstatic. According to his results, colonies treated with oxalic acid three times, seven days apart did result in a reduction of mites (you can read his study in this issue). But my questions remain; how well did it work, and how well will it help these colonies in the long run? In other words, have the mite loads lowered enough to prevent the population of mites from rebounding, especially during the critical months prior to winter? When brood is present, the majority of mites will be reproducing and will be doing so under the cappings, inside the cells. Plus, during the warm, summer months, the bees (and the mites feeding on them) are outside the hive foraging. So, what is the percentage of mites actually being exposed to the vapor? That's what concerns me. That is why I'm very excited to see the results from the data Shearer is collecting now (July). He is doing another round of washes and counting mites to see where mite populations are several months after the oxalic acid treatment. Hopefully, I'll have numbers to share in October's issue.

Years ago, we studied the effectiveness of applying powdered sugar to colonies to reduce the number of mites. Our results were very disappointing. We found that powdered sugar works to drop mites off bees, but it wasn't "strong enough" for treatment. It didn't drop a large enough percentage of mites to keep those

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populations from continuing to grow and surpassing the ET, eventually reaching the EIL.

Now, let's back up a bit. End of Summer, first part of fall in the southeast, and our bees are beginning preparations for Winter. Okay, actually, they've been collecting honey and pollen and preparing for Winter all year long, but now they are doing something a little different: they are beginning to rear Winter bees. These are bees that will remain alive in the hive from Fall until Spring. These long-lived bees are the reason colonies are able to overwinter. These bees are also physiologically different from Summer bees due to an increase in their ability to accumulate vitellogenin (a protein) and using it as a food storage reservoir inside their bodies.

The problem arises when the mites are feeding upon the developing Winter bees. It compromises their immune system, thereby allowing viruses to be expressed. Simply put, it makes them sick and unable to survive the long, cold, Winter months. So that beautiful colony that was full of bees and honey in October is not so when you open it up in February. The only thing left is drawn comb, plenty of honey and pollen, and a tiny cluster or no bees at all.

What happened? Did the bees abscond? Nope, not likely in the Fall or Winter. Did they swarm? Nope. Again, not Fall or Winter. Did someone steal the bees? Not likely, since the equipment is still there. Then it must be one of the following: CCD? Cell towers? The government? Alien intervention? Zombie Bees? Global Warming? Right? Nope, none of the above. It's just plain, old, nasty, blood-sucking, bee-attacking, ectoparasitic-infesting, virus-passing mites. Arrrrgggghhhhh! That awesome colony of bees in October had high mite loads, so the Winter bees had high viral loads reducing their ability to survive. Starting in October, the bees were slowly dying off. A couple hundred here, a couple hundred there, until no bees were left. And since we were tucked away in our warm, toasty homes, we weren't witnessing the slow passing of the bees.

Pint jar for sugar shake.

So it's time to check your bees and see what sort of numbers flush out. There are two methods for sampling your bees for mites that we recommend: a powdered sugar shake or an alcohol wash. If you've never done either of these, you'll need a quart jar along with several other items depending on the method. To do the powdered sugar shake, you will also need an eight-inch square of hardware cloth in place of the lid in order to shake the mites through. Think canning lids with bands. Next, brush ½ cup of bees (roughly 300 bees) directly off a frame from the upper-most brood box into the quart jar, making sure not to capture the queen. Add a tablespoon of powdered sugar, and shake, rattle, and roll the bees in the sugar for at least 30 seconds, making sure to cover all the bees in sugar. Then, place the jar upside down and shake the mites through the hardware cloth onto a piece of paper so you can count how many fall. Finally, unscrew the band and release the bees back into the hive. Don't dump them out front since the sugar may attract ants. This is a great method if you only have a few colonies, but for multiple samples, the alcohol wash may be the way to go.

For an alcohol wash, take a quart jar and fill it half way with alcohol or window washing liquid. Same as above, brush ½ cup of bees into the jar and make sure not to brush the queen in. Shake the bees vigorously for several minutes. Set a strainer inside a container, and pour the bees in, collecting the liquid and mites that pass through the holes in the container. Count the bees to make sure you are close to 300, and then count the mites This method has been proven to be the most accurate as far as determining mite numbers, but I sure hate killing those 300 bees. I guess it's better to lose 300 bees than 30,000. There's also a new contraption out there called the *Varroa* EasyCheck, which should be available and will make varroa sampling that much easier. Just Google the name and hopefully the information on how to order it will be there. As of this writing, however, it is not yet available for sale.

Okay, so let's make some decisions here. If there were three or more mites dislodged from the 300 bees (that's

Pint jar with alcohol and bees.

1 mite/100 bees), unfortunately the mite population has reached the ET. And since it's September, we have limited options. At this point we will have to reach for some sort of miticide. It's too late in the season for drone brood trapping, powdered sugar, resistant/survivor queens, bottom screens, and other IPM options. If you want to ensure the survival of your colonies, you will need to help your bees by getting those mites off of them NOW.

Since it's September, temperatures are hopefully lowering a little, but here in the South, we can still plan on days in the 90s. It is important that you are watchful of the upcoming weather forecast before applying any miticide. Here at the lab, our first choice is Api-Life Var or Api Guard. They both work wonders for killing mites and they are easy to apply. Again, just follow the directions. There's also formic acid (Mite Away Quick Strips), which works well, but we have always used a thymol-based product. All three of these along with oxalic acid are CNG (Certified Naturally Grown) approved.

Speaking of oxalic, there may be another option you want to consider, especially here in the South. What if we cage the queen for 14 days, and decide on day 21 to vaporize with oxalic acid? This will force all the mites to go phoretic since there will be no more capped brood for the mites to hide in. By caging the queen for 14 days, we are breaking the brood cycle and causing the colony to be "capless" on day 21. The only problem with this method is having to wait an additional 21 days before you can treat. If mite numbers are high, your colonies may not have time on their side. But if mite numbers are low, then consider this: we are testing this method now, so we should have numbers by the end of the year.

Okay, one more thing to consider then I'll stop writing, promise. Earlier, I was talking about how bees/mites drift back and forth. Well, if you have more than one colony in your apiary, and, say, one of those colonies has reached the ET. Instead of only treating that one colony, we are now recommending you treat all the colonies in the yard. I know, this is the complete opposite of what we used to say (only treat colonies whose mite levels have reached the ET, blah, blah, blah). But now with new evidence of mite migration from collapsing or infested colonies, it's time to think of the apiary as the entire colony, as the super organism, so to speak. Again, I plan to go into more detail about this next month.

Next month, next month, always next month. But let's not put off checking our girls till next month or there may not be any girls to check.

Take care of you and your bees! BC

Simple materials used for an alcohol wash.

Beeyard Thoughts

Washboarding Behavior

Beekeeping Wisdom From Senior Citizen Beekeepers.

For The Brand New Beekeepers – Finding, establishing and maintaining a beeyard.

Odds and Ends – What is whiting anyway?

Washboarding Behavior – Again and gain

Well, it's that time of the year and I suppose I should apologize. You may recall that I have written about this unexplained behavior in previous articles and several years ago, I posted a video on YouTube showing this behavior[1]. Yet, here I am again. Collecting yet more photos, videos, and written text. Every Summer, the mystery of this behavior tantalizes me. It is clearly performed in plain sight but the reason(s) remain unknown.

From a colony management standpoint, my bees are telling me something, but I simply cannot understand the message. So, I continue to make photos and wonder what's happening. Then every season, I present this all to you – again.

Worker bees hard at work – washboarding.

For those who may not may not have yet seen this phenomenon, it generally is seen during warm months. Some colonies will show anywhere from a few bees to hundreds of bees "rocking" on the front of the hive in a rhythmic fashion, usually in distinct rows. Front legs and mouthparts are intensively used as though something is being spread on the hive surface or some abrasive procedure is in progress. However, to date, nothing has been found on the surface. For this article, I captured more video and, so much as possible, I used *"close-up"* photography to show you the activity of the bees' legs and mouthparts. This new video is posted at: **https://youtu.be/sEvGaVfiEhk**

Attributes of Washboarding Behavior[2]

Only during warm weather

Bees generally show the behavior during warm months, but the temperature range can fluctuate significantly during those months. There may be an increase in bees doing this procedure at higher temperatures (90°F+) compared to summer temperatures nearer 70°F, but it's clear that there are many other variables that could affect or cause this observation.

Only near an exterior entrance

I don't know of any instances where bees on the outside of the hive were obviously washboarding that were not near an entrance. The entrance commonly getting the most attention is the upper front entrance. However, back entrances or other openings used as entrances may also have a few washboarders.

Bees washboard on the hive inside

It is not uncommon to see bees washboarding on the inside of an observation hive– particularly on the glass. The view you get is from the bees' bottom side so the action of the legs and mouthparts are clearly visible. When quietly opening a hive, others have also observed bees washboarding on the inside walls.

Mostly on an open area on the hive

This in strictly my observation, but it appears to me that the bees

Workers are not washboarding on the ribbed plastic equipment.

[1]Washboarding Behavior in Honey Bees **https://www.youtube.com/watch?v=sxjc4tSKJFs**

[2]My comments are from my own observation, from reading the science, and opinions of others; therefore, future advances may show the attributes I have presented to be incorrect.

need an open area to washboard – a dance floor as it were. The surface can be rough like the exterior plywood siding or as smooth as glass, but I have yet to see the bees washboarding on divided or broken surfaces. In the photo provided, bees are washboarding on the wooden deep, but are completely ignoring the ribbed walls of the top plastic deep. As usual, there can be other reasons other than the ribbed plastic equipment, but this difference is stark.

Not all colonies get involved in the procedure

As I write, about 45% of my colonies are washboarding, and they are doing it to a greater or lesser extent. Some colonies are crazy for the behavior while others are lackluster. However, many colonies do not practice the behavior at all.

The washboarding work crew

It almost appears to be social outing. Rocking bees, with heads toward the ground, do their thing – whatever that is – while other bees amble around looking uninvolved. However, most are working. They roughly form themselves in horizontal rows or lines. While there may be the occasional arrival of a fresh volunteer, I am left with the impression that these rocking bees came from within the hive. I have not a single shred of evidence to support this observation other than there are few bees arriving and departing for the work area.

I suppose I should save something for next year

As I probably said last year, I do not know why they are doing this behavior. These bees are telling something about an issue within the colony or some aspect of the hive itself. I am clearly a slow learner. I simply do not know what they are saying to me.

Go to my YouTube page to have a look at the three (I think there are three that I have uploaded.) short videos I have posted on the subject of washboarding. Others before you have left interesting hypotheses in the comment section of one of mine. *(Please pardon the hokey music I included in this early movie. I have stopped doing that.)* Thanks to all who did leave comments. I produce these simple, short movies to simply give my articles more depth. Washboarding is a behavior that needs to be seen rather than described with text and still photographs. Have a look. Until next year at this time . . .

Senior Citizen Beekeeping (and for everyone else, too)

I knew you were out there – those who have made beekeeping modifications to suit your needs. Even now, I continue to get a slow, steady stream of procedures, ideas, suggestions, and some descriptions of personal ailments.

As I expected, the responses are all over the page, but many of them started with the traditional procedure of simply removing a single frame at the time. Of course, this is impractical for a beekeeper who is either younger or has help, but for those of us who still enjoy the craft and are not trying to push economic bounds, slow and steady is fine.

Wil M. from Alabama asked why I was lifting such heavy boxes at my age. In fact, he said I should *"act my age."* Well, that is actually good advice for all of us. You should know that Wil is somewhat older than my 68 years; therefore, I feel that he qualified to offer us newly aged beekeepers some practical advice. With no end in sight, he and his close friend, *"Hernia"* are still lifting full supers.

Robert O. from New York has also been forced to reevaluate his bee life. He, too, has a hernia companion that has forced him to removed individual frames rather than full supers. Even so, his bees are in beautiful condition.

Jerry D. from South Carolina now moves single frames from mediums or even shallows that he now runs rather than the traditional 10-frame deep equipment that he once used. He blows my shoulder story out of the water. He has had three shoulder surgeries but he is still keeping bees.

Yvonne H. from Missouri has been keeping bees since 1976. As it does to all of us, weight issues related to beekeeping became a problem that she solved by converting to top bar hives. She reports that the heaviest hive part she now lifts is eight pounds.

Brenda E. from Wyoming and her husband began beekeeping using 10-frame equipment. As the two of them grew just a bit older, they converted to eight-frame equipment. When supers are full, her husband uses a converted a logging hook (timber tongs) to lift supers from colonies.

Brenda breaks the propolis seal and attaches the hook to the super handholds. The front loader on their Kubota tractor provides the lifting power.

Brenda's story served to remind me that *Bee Culture's* editors *Kim and Kathy* are partial to eight-frame hives. As I recall, his entire home apiary is eight-frame based. They have good reasons that I am sure he will present to us at some future time.

Logging hooks can be modified to lift supers from hives.

Robert O. has his hives' color scheme coordinated with his home color scheme. Nicely done.

Editor Kim with some of his eight-frame hives. With one exception, all mediums.

Carol C. from Maine is an experienced beekeeper who modified her deeps with improved handles. With this modification, she and her husband could move heavy boxes easier. However, it should be known that Carol is the original beekeeper in this operation. Since most traditional equipment is more suited for the average man, she said that she was forced to come up with "work-arounds."

Though she has now changed her hive stand design, she wrote,

"The picture shows the configuration that I like to use for my stands. There is room for three hives, but I only place two on the stand with a space in the middle to work from. A friend made the "rack" for me, but I can also use an extra empty deep box placed between the hives. By putting the outer cover under the rack or deep I have a place to put frames as I remove them (reducing the weight if I have to remove a very heavy box). The height of the rack/deep is close enough to the height of the bottom brood box that I usually can move the top box over onto it without removing frames. The motion is to the side – at about the same height, no bending required - so much easier on the back and shoulders. Also there is no lifting up from ground level to replace the box."

Note augmented handholds and the rack for either holding frames or moving supers.

I noticed the electric fence around Carol C's yard in the photo of some of her colonies. I suspect there are potential bear issues there. It made me think of a comment I got from *Marshall S.* from Alabama. Do you remember that last month or so, I asked why bee suits were still mostly white? Marshall admonished us all not to make suits in brown. He speaks from experience when he says that the beekeeper looks too much like a bear. His bees noticed that, too.

I need to stop at this point. I still have some other senior citizen innovations, but I will hold them for next time. Silver-haired beekeepers--please keep sending me your techniques. *"Think outside of the 10-frame box!"*

For the Beginner – Finding, Establishing and Maintaining an Apiary

If I had to guess, in my bee life, I estimate that I have been involved in setting up or abandoning about 35-40 beeyards. Each of these yards had an individual personality and specific attributes. Yards come. Yards go. There are many reasons for this waxing and waning of hive locations.

Earlier in my bee life I had considerably more colonies that I either owned or for which I was responsible. Now that I am in the Senior Citizen group that I have been discussing earlier in this article, my 10-15 hives are about all I want. Here's the thing – without anyone saying anything, I sense that I have too many colonies in my home yard. As I have written over and over again, I live near neighbors on two sides. I decided I needed an outyard where I could put some these and reduce the number in my home yard. I hope to begin a short series of articles as I develop this location and move hives to it.

My future outyard in the rough. This is going to be work.

While I do not wish to get into beeyard attributes at this time, I want a location that is (1) a bit isolated, (2) accessible year-round, (3) no gates or restricted access or farm animals around my hives, and (4) a comfortable arrangement with the land owner. A friend of one of my daughters has such a place. So I came to an agreement with him.

New beekeepers, know this – most yards are not perfect. This one has some shortages. The location is farther away that I would like. The terrain, an unimproved pasture that was once cultivated, is rough and bouncy. It faces westward. There is no obvious water source and not many obvious nectar sources.

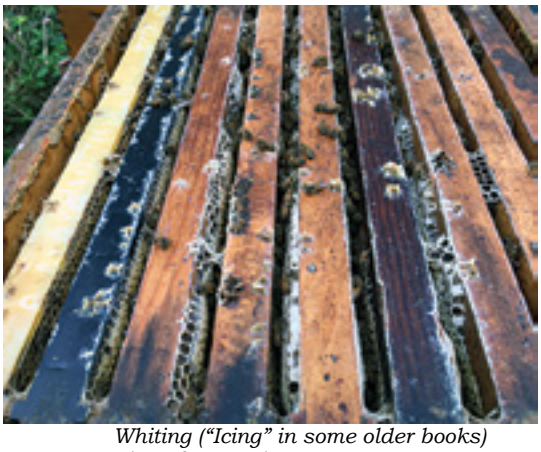
So why move there? Simple answer – because it is available at this moment. I have no guarantee that I could readily find a location any better. If it works out badly, I will move; hence, the perpetual task of setting up and abandoning beeyards.

My first objective is to open a space in the wood line, level it as much as possible, and devise a driveway from the lane to the site. These early stages have little to do with bees but a lot to do with physical labor.

Honestly, I am telling you all of this to shame me into doing the job. As usual, I will be working without help – but that's normally how it is. Any advice before I begin?

Odds and Ends – What is *Whiting* anyway?

I recently opened one of my colonies and on the top super was an obvious white line on all edges of the frames and burr combs. As bees build combs in new equipment or as they refurbish established combs, the



Whiting ("Icing" in some older books) along frame edges.

wax flakes that are on their ventral surface will drag along the edges of the frames and comb edges.

It leaves an obvious trail and clearly tells the beekeeper that a nectar flow is underway and that the bees are actively producing new wax. This is a pleasant time of the season. The bees are busy and are gentle. There are good odors in the air. In general, bee life is good at that time.

Thanks to all

As usual, thanks to all who read and respond to these articles. Also, thanks to all who have reviewed my short vignette movies on YouTube. I had more I wanted to talk with you about, but my allotted space is now filled. Until next month. BC

Dr. James E. Tew, State Specialist, Beekeeping, The Alabama Cooperative Extension System, Auburn University; Emeritus Faculty, The Ohio State University. ***Tewbee2@gmail.com; http://www.onetew.com; One Tew Bee*** *RSS Feed (****www.onetew.com/feed/****);* ***http://www.facebook.com/tewbee2; @onetewbee*** *Youtube:* ***https://www.youtube.com/user/onetewbee/videos***

The Indispensable Honey Bee

1973 vs. 2015: The Beekeeper and His Congressman

G. **Splevin**

In previous issues of *Bee Culture* magazine I have reviewed topics presented at the 1973 conference, "The Indispensable Honey Bee." Reviewing this report from 43 years ago, the similarities today are as if the past has changed nothing for beekeeping or our honey bees.

I am writing this article just after National Pollinator Week. Beekeepers have a number of "holidays" to utilize to educate the non-beekeeper about the value of livestock. National Pollinator Week is the third week of June, National Honey Month is September, and National Honey Bee Day is August 20. In 1973, one Legislative Aide to an Arizona Congressman spoke to the bee industry.

"Due to your unique industry, the association between each of you and your Congressmen is of the utmost importance. Yours is an industry few know anything about; indeed, that is why this conference was called! Therefore, if your Congressman is to know anything about your problems, your needs, or the effect legislation will have on you-you are going to have to tell him. As a matter of fact, it is your duty as responsible citizens to share the concerns of your industry with your individual Congressmen."[1]

Robert McConnell, Jr., Legislative Assistant advised the bee industry that Congressmen cannot "be expected to inform and brief himself on all the issues."[2] It takes beekeepers to educate non-beekeepers, and especially legislators. "You must accept this responsibility and make contact with your Congressman and Senators, and with their staff."[3]

The Legislative Aid spoke of constituents (voters, beekeepers) being "hesitant" to talk or write to their elected officials. Mr. McConnell implored the beekeepers to educate legislators and support them in their efforts to help the bee industry. ". . . their efforts cannot continue to be effective without each one of you making contact with your own representatives."[4]

The industry, and individuals within the industry, he advised should regularly communicate with their elected officials for the bee industry to be effective. "The office of your representative is your objective; you must attack it with information it would not otherwise receive."[5]

Education and communication are to be instructive and informative, without threats. Our elected officials know they are elected, and reminding them of that fact is counter-productive to education and communication of the needs of beekeepers, and the bee industry. "Personal contact is the key to effective communications"[6] and legislative staff discuss issues daily with their Representative and Senator. ". . . very few outside of your industry are familiar with your needs . . . you must educate your representatives."[7]

The bee industry has adjusted since 1973. The two national groups, ABF and AHPA, pay one lobbyist each to work on behalf of the bee industry. Overall-agricultural industry lobbyists in Washington, DC total $35,047,646 in products/services provided by 329 lobbyists for 123 clients.[8] Twice a year a few members of ABF and AHPA

leaders visit Washington to talk with members of Congress. Rarely, do they collaborate with other groups, even other beekeeping focused groups. The industry prefers instead to carry their message of honey bee health and bee industry concerns by their few leaders visiting Congress twice a year, and two lone lobbyists. When other beekeeping focused groups, at the local, state, or national level seek their support, the national bee industry declines it for personal political reasons.

The politics of the leaders of the national bee industry obstructs the work of the bee industry. As a beekeeper it should not matter what political party I am affiliated with, or where my daughter works, or even which nonprofit group's representative I sit next to at a hearing in the State Legislature about apiary laws. My state and regional work for honey bees and beekeepers was just that: for honey bees and beekeepers. The underlying frustration in the 1973 Legislative Aide's report, is frustration that continues today. Our elected officials, our state and federal departments of agriculture, unless they are beekeepers, have no concept of what it is to be a beekeeper, let alone load semi-trucks of bees and migrate from crop to crop. It is important for the bee industry, and the beekeeper membership, of local, state, and national groups to communicate regularly with their elected officials, as well as those appointed agricultural department leaders. There are 435 members in the House of Representatives, and 100 Senators. In my state there are 120 members in the House, and 50 State Senators. I have attended community meetings of my local leaders over the years, and especially as a state beekeeping leader: it was my duty to represent the members of the State Beekeeping Association. Have you talked to or written to your legislator today with your concerns as a beekeeper?

As Mr. McConnell stated in 1973, "I am, however, trying to point out to you that your work is cut out for you."[9] "It is only with the facts that elected officials can truly represent the best interests of the public."[10] The state of beekeeping in 1973 was on a crumbling and shaky foundation, suffering from the high price to produce honey, loss of honey bee pasture, bee losses due to pesticides, and the "Honey Bee Indemnity Program" (which would not be renewed), and the need for greater support from USDA labs to focus on apiculture. In 43 years, our internal bee industry politics have not focused on bees, but the personal politics of individual leaders and members. Over 43 years the bee industry has resigned itself to repeating history. As a former state beekeeping association leader, as a beekeeper for nearly 50 years, the bee industry will only improve if we come together as beekeepers. Two visits a year to Congress by beekeeping leaders and two bee industry lobbyists cannot compete with 300-plus lobbyists from other parts of agriculture. If the 200,000 estimated beekeepers in the United States began to educate and communicate with their state and national elected representatives we could eradicate the 43 years of accomplishing nothing for honey bees and the bee industry.

This beekeeper's hope is the comparative analysis of the bee industry from 1973 to today will spark discussion among my fellow beekeepers about our past and our present; and *do we want them to continue to be the same.* Stay tuned for further discussion on beekeeping in 1973 from this "curious guy." BC

[1]"The Indispensable Honey Bee," published by The American Honey Producers Association, Inc, 1973; page 39, (re-print available from *Bee Culture*)
[2]Ibid.
[3]Ibid.
[4]Ibid.
[5]Ibid, page 40
[6]Ibid
[7]Ibid, page 41
[8]Center for Responsive Politics, Agricultural Services/Products, http://www.opensecrets.org/lobby/indusclient.php?id=a07&year=2012
[9]"The Indispensable Honey Bee," page 41
[10]Ibid

"The Indispensable Honeybee, A Report of the Beekeeping Industry Conference at USDA Agricultural Research Center, Beltsville, Maryland, Feb. 12-13, 1973" is available from *Bee Culture* magazine.

Southwest Honey Co.

Teaching non-beekeepers about the honey bee.

Megan **Ryan**

Fort Wayne beekeepers Alex Cornwell & Megan Ryan of Southwest Honey Co. hold Summer pollinator educational experiences (focusing on the honey bee) as a fun and informational way for the public to celebrate and save the bee population. This idea was brought about by the many community members who had asked various questions about honey bees, wanting a tour of the hives, and the general need for conservation themed programs in northeast Indiana. While area beekeeping associations hold beekeeping classes, these experiences are focused on educating non-beekeepers of how the honey bee helps us, intricacies of the hive, what can be done at home to help pollinators and more fun, hands-on, exploratory topics!

Southwest Honey Co.'s programs have been designed by Megan Ryan, who has a Master's Degree in education. Begun in late May 2016, more than 250 K-12 students have participated in the "Explore The Honey Bee" program thus far and educational experiences are scheduled to run through the fall at The Southwest Conservation Club in Fort Wayne, Indiana. Starting in early July, adults will have the opportunity to join in on the learning and fun with "Bees & Brew," the general adult program and "Bees & Tea," their senior program. These experiences are offered to the public for a low per person ticket (or group) price, where children, adults, seniors, groups and families from the surrounding area can come to have fun and learn together.

For example, the "Explore The Honey bee" K-12 program: ***Fun, hands-on, exploratory and educational!*** *Each student will:*

- *Be in a small class size.*
- *View a sealed observation hive with live bees inside (safe for all ages).*
- *Learn about how neat and helpful honeybees are to us!*
- *Learn about the life-cycle of the honeybee.*
- *Learn about how honey bees work together and communicate to keep their hive strong.*
- *Tour the prairie and learn about the plants honeybees like to pollinate.*
- *Learn about what can be done at home to help honeybees and pollinators.*
- *Sample what natural honey tastes like.*
- *Leave with a take-home packet of educational activities and resources based on information covered during their experience (leveled by age group).*

According to Megan Ryan, lead educator and designer of the study and summer program, "Education is the most effective way to influence and change a community's perspective on the importance of the honey bee population. These educational experiences will include hands-on experiences for many people in our community and provide resources to change the future of pollinators." Ms. Ryan has a Master's Degree in education and will be using her Summer off from teaching at Bishop Luers High School to hold the programs at The Southwest Conservation Club in Fort Wayne.

More than just honey, Southwest Honey Co. believes that the honey bee is the perfect way to portray how the ecosystem and small creatures can have a large impact on the wellbeing of the environment.

Southwest Honey Co. received a grant from the USDA's North Central Region SARE (NCR-SARE) to study the "Symbiotic relationship between farmers, ranchers and honeybees through consumer education." This grant serves as a landmark for the organization whose primary mission is to protect and preserve the local honey bee population through research, education, conservation and fundraising.

The granted study will evaluate the direct impact and correlation between education through activity-based educational experiences and the choices consumers make to participate in active conservation of the natural environment in the community and at home. Information from participant surveys before and after the class will help to gage the impact of the class in hopes to create positive "conservation" thinking and ultimately a direct impact on consumer buying and chemical use habits.

This program was brought to full fruition by support from The Southwest Conservation Club, SARE (Sustainable Agriculture Research & Education), Betterbee and Wheeler's Bees. With the help of these sponsors, the program foresees the attendance of over 1,000 students between May 2016 and January 2018. These estimates include on-site and off-site group and individual reservations of the program. BC

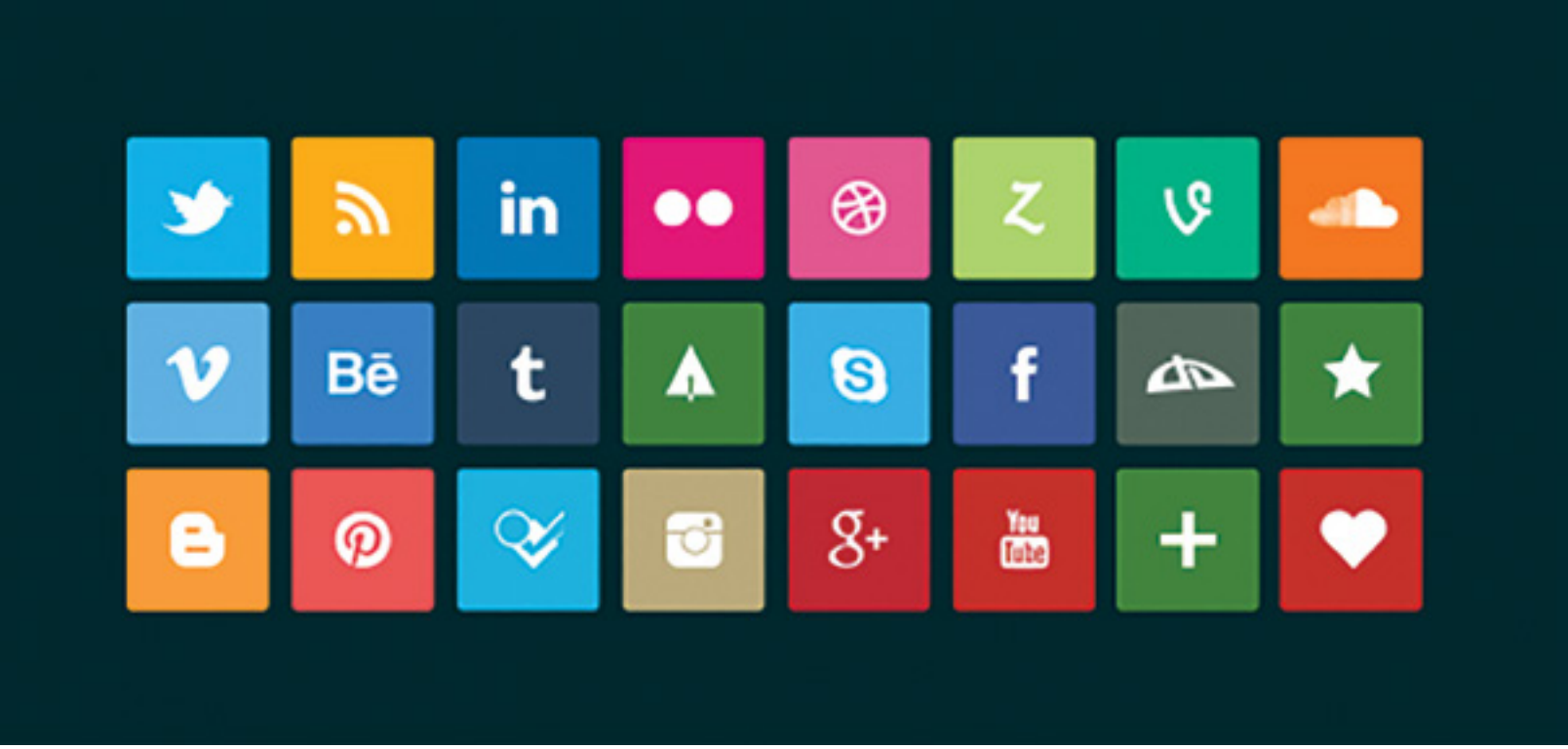
About Southwest Honey Co. *Southwest Honey Co. was founded as an initiative to protect and conserve our local bee population. On a global level the bee population is declining; which if left unaddressed, will drastically change the world as we know it because of all of hard work the honey bee does.*

We exist to promote true conservation, education of the outdoors and the restoration of wildlife. From our hives we harvest local honey that is sold in support of our apiaries and mission to help the honey bee population.

We have partnered with local conservation "minded" organizations to study, report and address the issues surrounding the honeybee. This includes organizations on a local, state and national level.

Our beekeeping practices are "bee-safe," research based and naturally kept. Our apiaries are located on preserved lands, organic farms, and other natural locations.

More information can be found on ***www.southwesthoney.com***



SOCIAL MEDIA PLATFORMS

Every other day there are new ones.

Jessica **Dally**

It seems like every other day there are new social media platforms popping up. For a small business, the sheer number of places to market can seem overwhelming, and really, it is! So what are some other options out there other than Facebook? And are any of these worth it?

Let's start first with the most important question: are any of these platforms worth it?

That question has a lot more to do with YOU and your business than it has to do with anything else. Just like any other part of your business, if you don't do something well then the answer will always be, no, it won't be worth it. Even if your competitors are doing great business on a platform, no amount of poorly done marketing will make a platform worth your time. So if you're not going to do something well, it's often best not to do it at all.

And yet some of these platforms may well be a better fit for you than others. Some folks are just more visual than others. Or it may be that you like making short videos, and you're just a natural in front of the camera. Maybe you enjoy taking pictures of your bees and your product. Whatever it is that you do well, you might as well capitalize on that, right? More importantly, each one of these platforms can help with your marketing on the big channel – FACEBOOK! By creating content on one platform, you can reuse that content on Facebook. It's a win-win!

So what are some of the other big platforms out there?

Instagram

One of my favorite tools. Notice I didn't say platforms?!? To be honest, I use Instagram mainly to make not so stellar pictures a LOT better. By blurring or fading out a background, or changing the color of the picture a bit you can turn an ordinary picture into something far better. Sure, it would be great if I had a professional camera and took more professional shots. But I don't, and I can't, so, for now, I'll use my phone and cheat by using Instagram and photo filters to make what I do have work. You can too.

While you're at it, why not grow your following there too!? How? By hashtags! The thing about Instagram is that it LIVES on hashtags. Every word you can think of is a hashtag. But use them wisely and well. #beekeeping might be an obvious one. And certainly, if you're taking a picture of your honey then #honey is an obvious one. #delicious might well be another. But there's a HOST of other hashtags you could use...

Here's a short list:

#bees #honeybees #beekeeping #beekeepers #queencell #hive #beehive #honey #honeybees #urbanbeekeeping #beefarmer #nature #wildlife #pollination #flowers #garden #beehiverental #savethebees #beesofinstagram #instabee

Instagram.

And of course, don't forget whatever city or town you're in and your business name!

To learn more, you can use Instagram to find others by searching for these hashtags on Instagram and finding who is using these regularly. Find anyone that seems interesting? Follow them and learn by watching what they do!

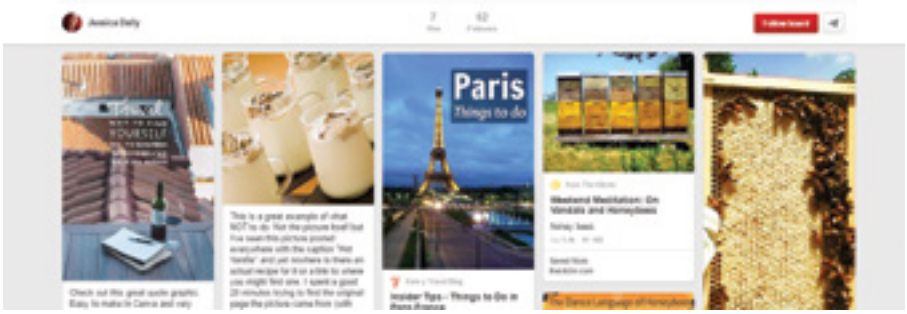
Instagram is listed first on this list because honestly, it's probably the easiest platform to use. It's just pictures really, and there isn't much to it. To learn to do it well you really can just follow others and watch what they do. The biggest thing to remember is to use hashtags. That way people can find you!

Pinterest

Pinterest is basically like a scrapbook for things people think are cool. That said, folks are selling a LOT of stuff via Pinterest. However, this platform is best for those who can sell online. Your local shop may do well here, but you're much better off if you can find a way to ship. So what's the key to selling on Pinterest? The same as Instagram, make your pictures pretty! No one wants to buy something that doesn't look nice.

It's no different than purchasing any major purchase you might make. Think about those pictures you look at when you buy a house. You want to see something that looks nice. Use filters and find ways to make a good background and layout to make your product stand out. Take the junk out of the picture or make the junk look cool rather than having it be a detractor from the product.

An even better trick? Use Instagram filters to create a picture for your Pinterest board! And if you saw my last article, you can use Canva to create graphics for Pinterest! You can also create graphics in Canva that are educational for Pinterest and use those to sell as well. Why is your product better? Let us count the ways!



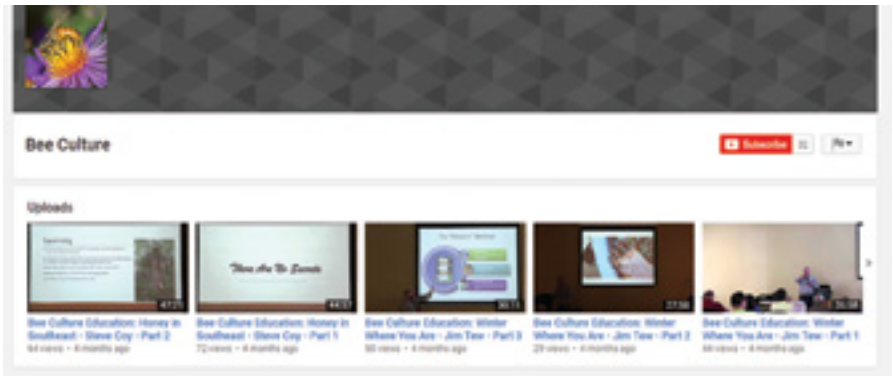
Pinterest.

Pinterest is listed second as it's harder to use but not terribly so. It takes more time than Instagram but for some, it's very fun. And you don't have to make all of your own content. You can "repin" stuff from other people. It truly is like a scrapbook. Just make sure you're giving credit where credit is due and that all of your pins direct back to the original source. You wouldn't want people stealing your stuff so don't do that to anyone else!

On my own Pinterest page (**www.pinterest.com/jessicadally**) there's a board made with some hints and tricks for you to look at. I also have a board called "Awesome tools" with some great tools for small businesses, travelers and others. Just some cool things I've found that might help you while you're going about running your business. Check them both out!

Youtube

A LOT of young people, especially young men LOVE video. That said, it can be particularly time-consuming to make content here. And you have to decide if you're going to go for higher quality content or just record train of thought and basic video that isn't super polished. Either can work, and educational videos help you establish yourself as an expert.



Youtube.

If you like to step in front of the camera, there's no reason you shouldn't. And remember, unpolished videos aren't a bad thing.

Indeed lower quality helps establish you as a real human in a way that something that is very polished doesn't. But do invest in a decent tripod set up (even just some little thing so your video isn't super jerky!) and make sure your sound quality isn't horrible. Experiment a bit and don't just put anything online here. Make sure it's something you'd want to watch.

Like many other platforms make sure you tag your videos with appropriate tags. Similar to Instagram people will use this to find your videos. The biggest thing to remember? Things that seem simple to you are complex to others, especially when it comes to beekeeping! Don't forget to explain the stuff that a brand newbie might not understand. Or alternately, if you're making videos for a more advanced beekeeper, make sure your video descriptions note that so newbies won't be frustrated with your content!

Listed last (ish), this platform can take the most time. For some, it will be easy to make content for YouTube. For others, this is a platform to skip. It truly is up to you if this is something you can manage or not. If you like being in front of the camera, by all means, DO IT!

Google+

Honestly, this platform barely exists anymore, and yet many marketers still publish here for one reason and one reason alone- it can help with your search results on Google. If you have a website, and you really want to score well when people search for your product, one way to gain some extra credit, so to speak,

Google+.

is to publish content to your google+ page. Of course, you need to have it linked to your website, and you need to have your business verified properly. But if you have the time to manage all of that, it's not a bad idea to publish some content here and there to Google+. It truly can help your business.

That said, your fans likely aren't actually there . . . this really is just a strictly business move. So don't freak out when you don't get a ton of likes and shares here. That isn't what you're trying to do. And it will be hard to stay motivated without that feedback. But if you can manage to keep at it, it can indeed help with your organic search results for Google. For this reason, it's the last platform listed. It's really hard to remember to post here.

Others

There are ENDLESS other platforms out there. If there's something out there that you like and you'll do it regularly, by all means, DO IT. There's no reason not to. Just remember a few simple keys to deciding where to be when it comes to your business…

The "RULES"

1) Remember- your business pages are for your business- post personal politics and opinions on your personal page. Your business may well have politics- and that's totally fine. But do make sure that whatever you post to your business page is indeed FOR YOUR BUSINESS! Don't make the mistake of mixing your personal opinion with your business. It can be a fine line to tread so just take a second and think about it before you post it.

2) DON'T be everywhere. YES, big, huge businesses are everywhere. Guess what? They have a HUGE marketing department. With MANY people managing all of those platforms. We're talking a person for each platform, or maybe more than that! You don't have that. So pick the platforms you like and will regularly do. If that's just one, it should probably be Facebook. But if you hate Facebook then pick one you do like. And stick to it. If your business is suffering, then you may well have to do something you don't like, or find someone who will help you with it and pay them. But DO NOT think that being everywhere is better than doing one or two really well. More is not better; it's just more. And often that means doing a lot of things really poorly.

3) Don't make the mistake of thinking that you can hire just anyone to do your social for you. This is the biggest mistake I see in the field. Just because someone uses social media doesn't mean they know how to MARKET on social media. Using social media and marketing on social media is a completely different thing folks. I can't tell you how many millennials I've found that don't know about basic social media marketing tools. If you're going to hire someone, hire a professional, not the kid next door. Yes, you can pay less to the kid next door, but you get what you pay for!

4) If you're not sure how to use a platform, find someone who can teach you. Many good marketers will teach classes on how to use these platforms. You don't necessarily have to pay someone to do it for you. But you may want to pay someone to teach you how to do it well. That is likely money well spent.

5) #2 again… no really, DON'T be everywhere. I know. I already said it. You're a small business. You honestly can't be everywhere. Don't do it! BC

What platforms are you most curious about? What platforms have you tried? Let's talk! Let me know on Twitter at ***@jessicadally****, on Instagram at* ***@jessicadally*** *or on Facebook at* ***JessicaDallyConsulting****.*

BIGGER PICTURE

Jessica **Louque**

Not Beary Friendly

It's a pretty well known fact that I don't have a lot of fondness for wildlife. Sure, at a distance, nature in general is pretty cool, but I'd prefer if a little more of that nature stayed away from the house. There have been been several battles with raccoons, opossums (does anyone else leave the "o" off that word and think it looks normal?), snakes, deer, coyotes, hawks, owls, foxes, and the occasional feral cat colonizing our trash bags. This year, I had the great fortune to add another creature to the "List o' Anger" due to destruction: BEARS!

We moved a couple hundred hives to the coastal region of NC, and a few people warned that there were bears in the area and in the Fall they would likely be a little aggressive. If we were keeping bees there, it would probably be a good idea to put up bear fences. Not *exactly* scoffing at the idea, we decided we would just leave the hives for now and move them out of the area once the seasons started changing. Boy, was that a naïve and stupid idea.

We had about 14 different leases for land across the area, and were trying to put the hives in places with pretty decent vehicle access. Initially, we moved the hives on a semi, unloaded them in a trucker-friendly driveway area, and then dispersed to deliver the hives. Most of our apiary sites were within a mile or two of each other, with the farthest being about 10 miles away. We didn't have stands out yet for the bees, so the intent was to drop them off, open up the screens, and then go back in a couple days and set them off the ground a bit. We didn't want the cat-rats (raccoons and skunks) tearing into the hives or flooding to ruin them.

Keep in mind, at this point in time we are yet again waging war against the local raccoon mobsters. Even with the chickens safely tucked away in their pen, some choose to sleep outside the coop. It's still a pen with two feet of buried wire, a locking door, and a hawk net, so it's fairly safe from predators if we remember to shut the door at night. If it's nice weather though, we still sleep with the window open to be able to hear what's happening. One night recent to these events, I was woken up to the sound of our half-grown chickens screaming. Running outside in boots and pajamas with my current favorite pest gun (a Browning 1911-.22, not too heavy to aim while the target is running away), I see a raccoon nimbly run-crawling across the hawk net away from me. I have also invested in a very cool but previously mocked article of outdoor wear: the toboggan headlamp. Those LED lights are amazing and I find it to be incredibly useful if I run in the morning and it's not daylight yet. It also makes raccoon spotting much easier than having to hold a flashlight and a gun. It turns out that he has now murdered six of our black hen babies (two dark Cornish, a Minorca, two black giants, a black turken) and he broke the neck of my new baby turken rooster who seemed to be trying to protect the black turken hen when the raccoon attempted to pull him through the hawk net and broke his neck. Raccoons are not stupid, I'll give them that. He chewed right through the net in a way that would leave an easier escape route. I hate raccoons. The point is, I was already on an anti-predator rampage.

Back to our bee story – we have a tech team who was going out to check the hives and give status updates on the colonies and their survival of the moving. We received some unexpected news that some of our hives had been completely vandalized by bears. The screened bottom boards suffered the worst of the damage, and were thrown upside down and had the mesh peeled back like a banana. There were bite marks in the frames bigger than my hand and those sections were stripped clean of everything. No wax, no brood, no bees. All of them had on robbing screens and most of those were shredded in an attempt to get inside the solid bottomed hives. It was some definite bee carnage.

The locals were all very stern in their advice that we needed to move the hives out of that site immediately and put up bear fencing around all of our other bees because the bears would be back and all our sites were fairly close. We started gathering supplies and in the meantime one of our landowners, who is a hobbyist beekeeper, lost all of his hives to a bear while ours sat in the field mere yards away from his. This site suddenly became the highest on the priority list. Some other feedback came in the form of not shooting the "favorite" bears. Scott, a cool guy who owns probably the best hardware (and literally everything else) store I've ever been in, showed me pictures of the mama bear and her triplet yearling cubs that he was particularly fond of (especially the chocolate colored one). The chocolate bear was in a picture eating a barrel of peanut butter set out as a bear "trap crop" because it's only about $50/barrel at the peanut factory in Edenton, and "oh-my-gosh" bears are super cute eating peanut butter. I think the trap was to get adorable

Bottom board gone.

Knock, knock, bear's here.

photos of bears eating peanut butter. Not that I wasn't still angry, but it was pretty darn cute. His tongue was even hanging out, flapping in the peanut covered air. They could make peanut butter and honey sandwiches out of our bee frames! Wait, no – bad idea!

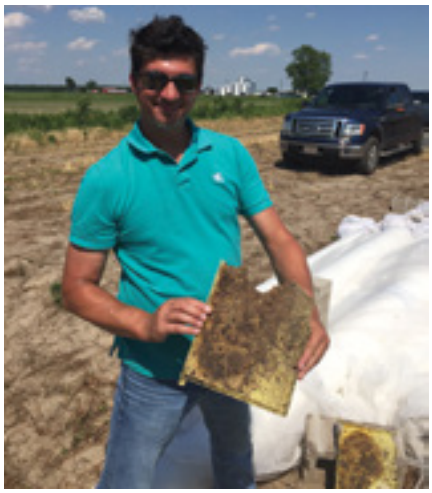
Scott's information was useful in the fact that he did not want us to shoot one of the bears he liked (let's be honest, revenge hunting is a pretty common practice in the Louque family), but he is a really nice person too and helped us out by working with Stan, another of our cooperators, to build a bear fence at one of our sites and show our tech team how to do it in the most effective way possible. The trick was to have five wires, with every other wire live (the second and fourth were grounded). This way you have a warning if you hit a live wire, but if you touch two of them, you're going to get thrown like a bad rodeo clown. We had our teams assembling fences for three days straight and managed not to lose any more hives to bears. Stan had a corn plot near one of our fences, and a large chunk of it was demolished by what looked like a bear trying to make crop circles while drunk. I'm not really sure what it was trying to accomplish in its little bear-like mind, but I have to say I'm glad it was the corn and not our bees (sorry Stan!).

Bobby and I learned two very important things from this. One is that when locals tell you that bears will probably be an issue at some point, it's better to be preventative than to have to treat the problem – just like it's better to keep yourself healthy then to try to make it better after you've already went to crap.

The second thing was how to build an effective electric fence around our chicken coop that should fry a raccoon and throw him like a skeet across a field. Preferably landing from said flight in a crispy critter nugget, sizzling on the ground like a raccoon meteor. Bobby took about a day and assembled a mini fence that the kids could step over (since George is only nine he's not quite tall enough to clear it easily and it might be best described as hurling himself across) and the birds could get through, but when it was turned on at night would not allow anything that was less than three feet off the ground to cross. So far it's been fairly successful, and I'm hoping to use the trail cam to catch something trying it out and hopefully seeing them get thrown into fried raccoon oblivion. Maybe they're smarter than I think though, because I haven't had any evidence as of yet (no burnt nuggets of raccoon fur or anything) that something wants to test the wire.

Hopefully our bear woes have come to an end with our beloved bees. It seems that we have successfully thwarted attempts to make our hives a buffet for the local bears, but I've heard some horror stories of bears overcoming a fence just by sheer strength. If we end up losing this battle again, rest assured that you'll be reading a follow-up article that includes a recipe for a delicious bear steak. We might be participating in bear season this year anyway just to shut down a little of the extremely overzealous population in the East. For now, the bears and our bees are safe and sound sharing space across the countryside, and can hopefully stay that way with the assistance of high-voltage interference in the relationship. BC

Jessica Louque and her family are keeping bees, farming, gardening and living off the land in North Carolina.



Bear frame.

Bear food.

BEAR STORY

Remember those movie scenes where the main character, usually a hero type, thinks she has scared away the beast when, in fact, it was an even scarier thing standing right behind her that caused the beast to flee. When our dog, Winnie, started barking in my direction as I watered our garden early in the evening on Saturday, June 11, 2016, enjoying the warm breeze and watching the wispy clouds floating overhead – daydreaming – I did not even think to turn around to see if there was something behind me. Assuming Winnie was not expecting to see me, I kept watering and told her, "It's just me silly."

Just me indeed! Moments later I heard a young deer in distress and turned behind me to see one of our colonies toppled and nearby stacked equipment pawed through. I followed the fawn's cry along the fence line and got my first glimpse of a young bear, with the crying deer in his mouth. That would be one of many sightings as the evening unwound.

My experience with bears is, thankfully, limited. I did have a bear take down colonies in a former apiary location. That bear had returned to the area a few weekends later – after I adequately reinforced the fence – visiting a friend who was camping in a tent on my property. I never saw that bear, but my friend moved on the next day. As I suited up and reassembled our hive Saturday night I knew that Winnie, and her sidekick Mars, would be inadequate deterrents for this tree and fence-climbing bear, despite the apiary location inside their fenced acreage. Action was needed.

As I rummaged around in the barn trying to locate odds and ends of leftover electric fencing materials – to create a fence inside the fence – my husband, Todd, began yelling my name. The bear was back in the bees, determined to have his fill of sweet bee brood – even if it meant that he had to deal with humans. As I watched the defiant beast from a safe distance, Winnie and Mars tore out of the house and across the yard. The bear, let's call him Ursa, short for Ursa Minor, or "little bear," since he is small and, like the constellations, always reappearing – quickly realized, thankfully, that he was outnumbered; he

scampered up the nearest tree. After grabbing the dogs, while Ursa looked down at us from above, we went back inside and waited for him to scamper back down the tree and, hopefully, mosey on – he did.

Our barbecue plans died along with the coals' embers, as we set to work putting up a temporary electric fence to protect the bees from Ursa's inevitable return. With a few salvaged insulators and partial roll of fencing wire, we managed to erect a zigzag assemblage of fencing at approximately little bear nose height with a top hot line running above the five foot wire fence section he was habitually scaling. We also put webbed strapping around each colony, in case Ursa returned and bypassed the electric wires.

Miss Winne, as Winnie is called when she is not being

a particularly good dog, had been howling incessantly earlier in the week during the overnight hours. To allow ourselves, and nearby neighbors, a good night's rest, we had closed the doggie door Friday night to keep her inside. Saturday night, after the bear visit, we left it open. She howled periodically throughout the night. Perhaps she was howling at the crescent moon or at the chicken-loving fox that has been visiting our neighbor's flock, but I suspect Ursa was out there, waiting for his chance to feast on fine bee fare.

Looking out at the colonies Sunday morning – eyes blurry from little sleep – I could see all were still standing, intact. A more secure and permanent fence solution was needed. I have to admit that as I watered the garden Sunday evening, while the wind pulsed through the treetops and darkness crept over the valley, I kept a more watchful eye on the adjacent woods. For now, Ursa is keeping his distance and exploring elsewhere. Thanks to his youthful inexperience and our dogs' tenacity, our bees are safe, happily foraging on Black Locust blooms and clover. We hope that Ursa is safe too: that he has found a place, other than our bee yard, to forage and feast; a place to raise his young with miles of trees, fields and meandering streams, where he can roam and live happily – free from human intervention.

As for me, I've completed a new fence to deter any further bear visits. My current configuration is six strands electric with six inch spacing for the middle four strands – bee nose height. This extends in front of the colonies and on the outside of the existing pasture fence that borders the woods. One of our challenges is that the bees are set back at the edge of a wooded area that borders thousands of acres of state land. Since the colonies are already inside the existing five foot wire fence (which had a hot wire to contain the dogs), this meant in order to use the back section of that existing fence I had to creatively wrap some hot wires around trees to prevent climbing. The other concern was equipment in the yard. Since we moved to this new location with our bees just a couple years ago, the infrastructure was not in place for proper equipment storage which could have been a factor in bear attraction (see the treed bear just above a shed that was almost ready to move equipment into). This experience only reinforced what I already knew – keeping clean yards with carefully planned and constructed fences is paramount to successful beekeeping in bear country. BC

The Pollinator Stewardship Council

FINANCIAL LITERACY FOR BEEKEEPERS

Knowledge, Communications, Planning, Strategy.

Michele **Colopy**

The Treasurer of any all-volunteer organization has the most daunting of "job" duties. Yet the treasurer "plays a critical role in sustaining the organization, maintaining essential stakeholder confidence and supporting overall mission effectiveness."[1] The treasurer "provides the leadership in the financial life of the organization."[2] Treasurers for all volunteer nonprofits need a "combination of skills and characteristics" to balance the following responsibilities as defined by blogger, Kate Barr:

- Knowledge- Thorough understanding of financial reports.
- Communications- Able to translate financial information and financial concepts for the board.
- Planning- The treasurer can bring great value in preparing for budget discussions and conveying budget information to the board.
- Strategy- Great treasurers look down the road to find the financial options and decisions needed for longer term goals and initiate discussions to connect finance and mission.

Treasurers, and their supportive finance/audit committees, are accountable, and desire transparency for the utmost integrity. Accountant Dennis Walsh lists the *Eight Key Responsibilities* of treasurers:

1-Handle the money with high standards and set a tone of integrity.

2- Manage the filings for the IRS 990 annual reporting, as well as any state filings by nonprofits. Additionally, speakers for bee clubs and conferences are required to complete W-9s for any paid services to the nonprofit by non-employees. Also, check your state for the regulations concerning raffles: Kansas did not allow nonprofits to conduct raffles until last year.

3- Identify and manage risk. Talk to an insurance agent who specializes in nonprofit coverage. It is the cost of defending yourself due to an accident at a bee club activity that can decimate personal finances. Directors and Officers Liability insurance can be costly, but so much cheaper for you and your fellow Board members if a legal action is filed against you and the bee club.

4- Confirm contributions. Whether it is via email or a typed and mailed thank you note – thank your donors, acknowledge their support of your organization, show your appreciation of their faith in you to manage their donation well.

5-Track volunteer time. The annual IRS 990 report asks the average weekly hours of each Board member, so track it. Volunteers at the bee club's County Fair Honey booth, at school beekeeping presentations, at meetings to determine your State Pollinator Plan all add up to commitment, time, energy, and volunteer matching hours that can be used as "in-kind" support to the nonprofit. Tracking the time is second though to recognizing your volunteers, and all that they do for the bee club. A "thank you" is invaluable!

6- Plan and evaluate with a budget. *"Preparing an effective budget starts with asking leaders to estimate what they'll need and to provide specific proposals for financing it. . . Expressed in financial terms, a budget is a map that shows what you plan to do and how you plan to get there. It's a key tool for getting everyone to agree on what your group will and won't do in the coming year."*[3]

7- Prepare timely financial reports. Timely and reliable financial reports support "good stewardship and sound financial decision making" in order to track budget performance.

8- Recruit the next treasurer. "*Like other volunteers, the treasurer will not serve indefinitely. Unfortunately, some all-volunteer organization treasurers entrench themselves and resist transfer of control. Throughout their term of service, effective treasurers encourage and equip fellow volunteers to participate in financial management duties. When it is time to pass the baton, these all volunteer organizations will enjoy the least disruption."*[4]

All board members should work with the treasurer toward their own financial literacy. Far too often Board members will sit in a meeting and *act like they understand* the budget and financial reports. They *need* to understand them; it is their fiduciary responsibility to the bee club, and to the members who elected them to the Board. The National Council of Nonprofits has a number of helpful guides to assist Board members with their financial literacy. (see the end of this article for links) Board members need to understand the financial guidelines when accepting grant funds, donor restricted funds, and awarding valuable member donations to others for research or special projects. Boards are accountable to the membership, and to the IRS, and to their State Attorney General for the management of the nonprofit bee club's monies. Board members need to be aware that IRS 990 annual reports are public record easily accessed through the IRS Business Master File online, or even at websites such as Guidestar. What are the public disclosure guidelines for your state? Do Board members understand financial terms and the difference between a balance sheet and a profit and loss statement? What internal controls does the bee club have to control the funds; what are your checks and balances to

ensure the donations and member dues are protected?

Lastly, Boards need to understand the meaning of an audit. Far too many bee clubs simply perform a comparison of receipts and checks and the bank statement by two other Board members at the end of the year. That is not an audit! An audit, or "audited financial statements" refers to "the work product resulting from the independent examination of a nonprofit's financial records by a licensed certified public accountant."[5] "As an alternative to an independent audit, auditors can provide either a financial statement "review" or a "compilation."" These are not substitutions for an independent audit, but may be suggested in lieu of the costly audit requested by a funder. During the *review,* the auditor only reviews the nonprofit's financial statements, but does not examine internal controls; so transactions by the organization are not reviewed and validated. A *compilation* simply compiles the financial records "into a format required by accounting standards."[6] Audits are required at certain financial thresholds by registered nonprofits in each state; and each state has their own financial threshold. Check with your State Attorney General/Secretary of State for your reporting thresholds which trigger an audit. Some funders may require an audit, and will specify such in the grant application, and the grant contract. Nonprofits receiving more than $750,000 in federal grant funds are required to conduct an audit. If you have questions concerning your audit thresholds, consult a CPA. The resources in the Nonprofit Audit Guide are offered for informational purposes only, as is this article. This author, and the National Council of Nonprofits recommend consulting a lawyer or accountant who has expertise in accounting rules for charitable nonprofits so that you can be confident that your charitable nonprofit is in compliance with all legal requirements. BC

[1] Treasurers of All-Volunteer Organizations: Eight Key Responsibilities, Dennis Walsh, CPA, page 5, **http://www.blueavocado.org/content/treasurers-all-voluneer-organizations-eight-key-responsibilities**

[2] What Makes A Good Board Treasurer? Kate Barr, Nonprofits Assistance Fund, page 2, **https://nonprofitsassistancefund.org/blog/2010/09/what-makes-a-great-board-treasurer**

[3] Treasurers of All-Volunteer Organizations: Eight Key Responsibilities, Dennis Walsh, CPA, page 4

[4] Ibid, page 5

[5] Nonprofit Audit Guide, National Council of Nonprofits, **https://www.councilofnonprofits.org/nonprofit-audit-guide**

[6] Ibid

Financial Literacy for Nonprofit Boards, National Council of Nonprofits, **https://www.councilofnonprofits.org/tools-resources/financial-literacy-nonprofit-boards**

FACTS, FICTION AND FABLES

Robert **Weast**

Langstroth

Curious, quaint and amusing describe our reactions to the following anecdotes. Lest one should feel superior in 2016 to these old tales, one should not forget that if we had lived during those times we might have believed the same things.

Ever since honey bees were used by man, they have been misunderstood and mischaracterized. Wild speculations and conclusions abounded with little to no regard to critical analysis; believing the queen to be a king; calling bee larvae grubs, worms, caterpillars and maggots; banging on pots and pans to make swarms alight; calling bees honey-flies. Native American Indians called the settler's honey bees White Man's Flies and J. Swammerdam in 1737 colorfully labelled the wax moth as the Bee Wolf.

Anthropomorphism: Assigning human emotions and traits to other living things. Before science and careful observation became the norm, beekeepers used fanciful and creative imagination to express the behavior of the honey bee. Note the following examples:

Fable or fact? Folklore of 19th century England and America in parts of the South, relates that mourners at funerals would rap on hives to inform the bees of the death of a family member. Some even dressed their hives in funeral garb to pacify the bees. People noticed that bees would take the loss at heart and would alight on coffins in respect, but little did they realize that the bees were merely securing varnish, or resin, from the coffins, not mourning the deceased.

Queens, especially, were given over to fanciful flights of imagination. Xenophon, a Greek general and historian in 400 B.C. wrote, "While she stays in the hive, she does not allow the bees to get lazy, but sends out those who have to work outside, observes what they bring in; takes it and stores it until it can be used . . . Further she supervises the building of combs in the hive and sees to it that they are constructed well and pretty and that the brood is reared in an orderly way" (Root 1). In 1901, Maurice Maeterlinck (2) offered this imaginary account of swarming bees: "The bees, when they find the queen has not followed them will return to the hive, and scold the unfortunate prisoner, hustle and ill-treat her accusing her of laziness, probably, or suspecting her of feeble mind."

Maeterlinck continues: ". . . when a virgin queen is performing the perilous ceremony known as the 'nuptial flight' . . . her subjects are so fearful of losing her that they will accompany her on this tragic and distant quest of love – when the young queen sallies forth in quest of her lover they will accompany her – eager as they form closely around her, and shelter her beneath their myriad devoted wings."

Maeterlinck

L.L.Langstroth (3) speaks of Her Royal Highness: "Among the bees the good mother is the honored queen of her happy family; they await upon her steps with unbounded reverence – until in short do all they can to make her perfectly happy."

Swarms galore. J. Swammerdam (4) in the 18th century, cited a hive that issued multiple swarms and those swarms in turn swarmed again and again, producing no less than 30 colonies in a single season. I doubt it. Colonies typically issue a single, or prime swarm, sometimes followed by one or two smaller, after swarms. However, Africanized colonies may swarm or abscond.

Peculiar matings. In 1678, M. Rusden (5) stated, "And if the bees do breed without copulation . . . it can be no otherwise but by the wind . . ." J. Swammerdam (4) of Holland, the Netherlands, wrote in 1737 that the queen is impregnated by the peculiar and unpleasant odor – "odiferous effluvia" – that is produced by the seminal effusion of many drones when they are confined in a small space.

R.A. Reaumur (6) of France stated in 1744 that he thought matings to occur within the hive. A Mr. J.S. Davitte of Georgia claimed to have mated many queens in a large, circular tent with free flying drones; others have tried matings in greenhouses and boxes. In the mid-1800s, some claimed to have hand-mated queens with success. I have hand-mated several different species of giant silk moths, obtaining hybrids that would have been impossible to obtain through natural matings, but I doubt it will work using honey bees.

In 1815, R. Huish (7) said that

after queens laid eggs in the cells they were then fertilized by drones. He reasoned since that there were no drones in the early part of the year to mate with queens, they, the queens, laid eggs in the late Fall, which remained dormant all Winter and then hatched in early Spring.

In 1855, Dr. Donhoff of Germany reported that he took a drone egg from its cell and artificially fertilized it and it became a worker. I passed this on to renowned bee inseminator expert Susan Cobey. She stated that it did not likely happen, given the state of the art at that time.

The great unwashed. "Those who belong to the family of 'the great unwashed' will find to their cost that bees are have a special dislike to those persons who are not cleanly . . . and that unpleasant ones (odors) are very apt to excite their anger" (L.L. Langstroth 3). He notes that bees have acute olfactory senses which cause some members to threaten and sting those with offensive odors, especially the "great unwashed." Albert J. Cook (8) contradicts himself in rapid succession: "The common belief, too, that some persons are more liable to attack than others is, I think, erroneous." He continues, "Occasionally a person *may* have a peculiar odor about his person that angers bees and invites their darting tilts, with drawn swords, venom-tipped . . ."

"I am never afraid that a healthy bee will attack me unless it is unusually provoked. And I am almost sure as I hear one singing about my ears that it is diseased" (Langstroth 3). He was advised to render painless a bee sting by deliberately making another bee sting the same spot as the first, which he did. The hapless Rev. found, to his dismay, that far from alleviating the pain, it doubled it! A shot of poisonous venom times two!

Cook

Hissy fits. Langstroth continues, "A word now to those timid females who are almost ready to faint or to go into histeries (sic) if a bee enters the house or approaches them in in the garden or fields. Such alarm is entirely uncalled for." Feminists today might call that sexist.

An article in the March 5, 2016 Des Moines Register reports that beekeeper Deb Willard says that bees generally leave humans alone unless their queen or hive are threatened. This seems like comparing bees surrounding and protecting their queen to Secret Service agents surrounding and protecting the U.S. president.

I recall that on a trip to Rocky Point of Baja California rains produced puddles everywhere, producing myriads, yes billions, of mosquitoes in this desert coast. Enormous numbers buzzed on our trailer's windows trying to gain access which looked like an episode of the TV program Twilight Zone. When we stepped outside, tens of hundreds of mosquitoes began their blood sucking all over our white, delicate bodies, but the native Mexicans standing right next to us had nary a mosquito on them. It may be that bees are attracted to sting those with unique body odors.

Emotional highs. A beekeeper in days of yore, wrote that newly emerging workers were an occasion of joy and excitement to the older workers. Nothing could be farther from the truth, as these young ones are jostled and pushed aside because they are apparently in the way of their busy, older sisters. A Mr. Wildman, of pre-1850, said he witnessed newly hatched workers gathering pollen and honey the same day they emerged from their cells. A tall tale. These babies do very little for their first three days but after the third day they clean cells and by the sixth day their nursing glands kick in and they begin to feed larvae.

Huber

A blind, Swiss apiarian, Francois Huber (9) in 1814, stated that when a queen emerges the bees are thrown into a joyous excitement, so much that he noticed a rise in temperature from 94°F to 105°F.

When bees are deprived of their queen the Rev. Langstroth pondered: "How do they first become aware of it? Perhaps some dutiful bee feels that it is a long time since it has seen its mother, and anxious to embrace her, makes a diligent search for her through the hive! . . . and by their the most impassioned demonstrations manifesting their agony and despair." Nothing at that time was known of the queen substance, also known as queen retinue pheromone, or technically € - 9 -oxodec -2 -enoic acid. This chemical queen substance is transmitted from one worker to the next throughout the colony to "inform" them of the presence or absence of their queen, and they behave accordingly.

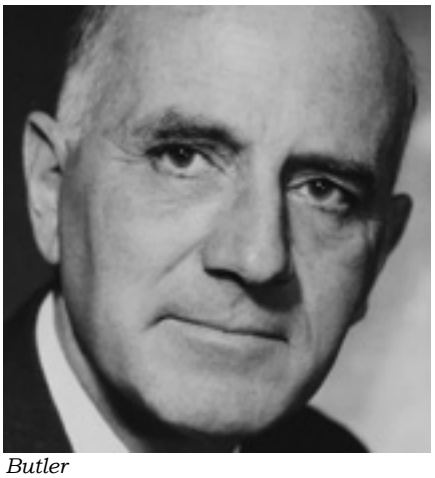
Get out the shotgun. Overstocking occurs when too many hives are placed in a given location. Trouble brews when a beekeeper sets many colonies directly on the same location already occupied by another. An example of limited acreage are the fields of lavender in Oregon and Washington, or maybe fields of buckwheat in Pennsylvania. There is nothing finer than delectable, delicious, lavender honey. But should some beekeeper set up hives when others already have been in place in these cultivated acreages, the original tenant beekeeper would rightfully be upset. The 1940 edition of *The ABC and XYZ of Bee Culture*, Root (1) stated: "Mr. Newcomer should not attempt to crowd in, for he may find some one (sic) beekeeper who will get 'sore' and resort to the shotgun argument." In that edition under Enemies of Bees it is stated "...in large queen rearing yards there is quite likely to be a loss of

young queens if birds are allowed to go unmolested – the owner of a queen-yard would do well to use his shotgun until everything in the way of bee-killing birds is destroyed." This recommendation - killing birds – was repeated verbatim in the 1972 edition. The Rev. Langstroth (6) wisely spoke against killing birds: ". . . I have never yet been willing to destroy a bird because of its fondness for bees; and I advise all lovers of bees to have nothing to do with such foolish practices." A further word to the wise: it is illegal to kill song birds.

An extravagant claim. Colin G. Butler (10) in 1954 wrote, "It has been stated by a number of writers that worker honey bees can fly at what seems to be quite fantastic speeds; some of the most extravagant estimates exceed one hundred miles an hour." One might wonder how this was actually measured. What are the parameters of typical flight speeds? O.W. Park (11) stated the normal flight speed to be 10 to 15 mph with a maximum flight speed approximating 25.5 miles per hour, recorded for both outgoing and incoming bees.

How far will bees fly to reach nectar sources? It is remarkable that in 1927-1930 J.E. Eckert (12) recorded bees flying eight to 8.5 miles to reach flora and weight gains were recorded for bees flying five miles to forage areas. Cook (8) reported that marked bees flew 2½ miles, unloaded and returned in 30 minutes. Prevailing winds can effect the speed and duration of flights. Typically, bees range no further than necessary and flights of two or 2½ miles, or further, are probably made because nearby sources are poor or unavailable. This can be good news for those beekeepers surrounded by intensive agriculture. If a town is two miles distant from their beehives the bees can forage among the numerous and varied city grown flowers and trees.

In the 1800s, many beekeepers placed rye or wheat flour in trays outside the hives which the bees would collect until natural pollen became available. Because the bees seemed eager to collect the flour it was assumed that it was good for them. In fact, Langstroth actually poured flour into empty combs to save the bees the time and energy from gathering it. It was not known at the time that flour didn't provide the



Butler

varied and necessary proteins and amino acids for larval development. Moreover, during a dearth of natural pollen, bees will collect all sorts of fine particles, such as coal dust, sawdust, fine particles of cement, powdered chicken and horse feed, and even dry, black earth. No doubt, they would eventually clean house of this worthless ruble, including flour.

Mad Honey. This dark, reddish honey is called "mad' because it can produce hallucinations when eaten. Bees gather the nectar from *Rhododendron* species ponticum and luteum which contain a neurotoxin called grayonotoxin. This evergreen shrub grows on the mountain sides of the Black Sea region of Turkey. Mad honey is also known by the locals as "deli bal" which they consume for its medicinal benefits, such as hypertension, diabetes mellitus and some stomach diseases as well as its "value" of producing psychedelic optical illusions. When tasted, it produces a burning sensation in the throat, and eating more than a teaspoon can produce low blood pressure, irregular heartbeats, numbness, blurred vision, fainting, nausea, but rarely death. It was used by Roman and Greek warriors centuries ago as a weapon of war, making it available to their enemies as food (Xenophon 1). Today, mountain people in Nepal, using long poles and baskets, rob what they call Red Honey or Crazy Honey from the cliff dwelling honey bee *Apis dorsata*. They eat this honey for its hallucination effect. This honey is also derived from *Rhododendron* species.

This is no exaggeration: Edible honey was discovered in the sepulcher of Egyptian King Tutankhamen, aka King Tut's tomb, after having been buried there for 3,300 years. It seems that as long as stored honey is sealed and strictly kept from absorbing moisture in the air, it can be preserved indefinitely. Burying the deceased nobility with the embalming properties of honey was a common practice at that time. The Egyptians also placed bees and honey in tombs as an offering to the spirits and the dead (Root 1).

Apiarian science today continues to unravel the mysteries of the honey bee, and disproves, one by one, the myriad of homespun "theories" and fanciful tales of this most fascinating insect. The quest for unravelling the ever changing dynamics of this living organism, with its ever emerging questions and problems, goes on and on.

I wish to thank Janine Weast Searcy for proofreading the text. BC

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DOWNTOWN

The Quest To Offer Hands On Education

Adventures In Apprenticeship

You folks have heard this part here before: when we teach urban beekeeping here, we emphasize, over and over, how important it is to do adopt best practices and maintain the highest standards because so many other people and colonies are affected when bad decisions are made. Some of the best students who complete our short courses truly take this to heart, and want to extend their learning period – before taking on colonies of their own – by spending a year or more as an apprentice or a helper to an established beekeeper. We also have a number of students who are just not in a place in their lives to take both a course and get set up to keep city bees inside a few weeks' time, so they wait a year and seek experience so they don't forget the course material.

This is where I fail them most, but not for lack of trying. In this city, we do link students with mentors, and encourage lots of contact at meetups and via social media, but this mostly works when students have their own apiaries.

Our students ask us, every year, how they can participate as helpers and to learn by experience (in fact, many members of the public ask this, as well). In the history of beekeeping, in fact, most people learned directly from the bees at someone else's elbow! So this is a serious and respect-driven request, but it has proven a challenge.

Why? In this city, at least, most beekeepers have between one and four hives (mostly one) and they tend their bees relatively quickly when time and weather allow, around working hours and when prodded into various activities (testing and treating for mites, feeding, starting Winter prep) by online discussions and in-person presentations. They are not in the field every day, and often don't know more than a day or so in advance that they will be working bees at a given time. It's a challenge to promise that the needs of the bees and an opening in a personal schedule will coincide for the same time each week to ease organizing, for example. Where folks have done better, they are in frequent contact by text message or phone, arranging tasks on the fly. My schedule, spread across town and driven by numerous organizational partners, makes this kind of coordination punishing, generating many dozens of exchanges a week, so I just don't get it done.

So this is not one of those articles that presents a solution: instead, this is an attempt to start a discussion and hear your thoughts and experiences. There are proven models out there toward which we are working: Denver, Pittsburgh and Kalamazoo maintain club apiaries for educational (and other) purposes, and many British beekeeping associations have done this for decades. Clubs use these sites for classes, public outreach, queen rearing, and other creative purposes. Until we in DC get our collective hands on a piece of property (we're working on it) we have tried several other methods. These include assigning students to care for publicly owned hives at community gardens, an experiment with "hive futures," and, currently, a partnership with our local parks department to restructure and expand the role of beekeepers at gardens and rec centers. So far, the latter is the one that has the most potential.

"Foster Hives"

In the Spring of 2011, we set up hives in six community gardens that were paid for with a grant from Whole Foods Markets in order to give students who had completed our course and who otherwise would not be able to set up apiaries an opportunity to apply what they learned, and to create public outreach opportunities around urban beekeeping. Student volunteers were organized into small groups (two to four) and were asked to look after an assigned hive under the supervision of a mentor. The colonies were started from packages, and needed considerable feeding, monitoring for colony growth, mite testing, and observation to ensure that they were neither vandalized or becoming a problem for other gardeners. Participants were meant to exchange contact info and stay in touch, discussing and learning from the growth of the colonies, and socializing with gardeners.

While launched with excitement and goodwill, the lack of a personal sense of ownership by participants doomed this project. Conscientious hive tenders were afraid to make decisions or take actions

The DC Parks Urban Beekeeping Program apiary on the roof of a recreation center in Ward 6. The DC flag includes three red stars and a stripe! Beekeepers Quinn Libson and Joshua O'Rear got their first opportunty to keep bees in town through this program.

independently out of concern that they might make a mistake with consequences for all; others simply never felt individually responsible for the welfare of the bees with additional students in the picture. Most waited to be told what to do, and did not attempt to develop their own diagnostic or priority-setting skills. Several times, participants left town without informing us. Rather than being swept up in the experience, they felt obligated and, to a certain extent, nagged.

In the following year, we added the option of co-locating a personal hive in return for overseeing the "public" hive, which worked better for colony health, but was limited to those with the means to buy their own bees and gear, and to only one or two beekeepers per site. Also, the beekeepers whom we introduced to the gardens usually had to be prodded to interact with the gardeners, reducing the benefit of the apiaries to the community and making it harder to sign up additional gardens.

"Hive Futures"

In 2013, we tried an experiment designed to expand access to the experience of keeping bees by reducing the barriers to entry from the cost of bees and equipment. We lent woodenware and tools and gave splits to three beekeepers who agreed to do outreach throughout the year, and – taking a page from Heifer International – would split any colonies they wintered successfully to donate to next year's participants.

We asked participants (who had taken our course) to do their best, acknowledging that wintering a new colony is not guaranteed to succeed and that they were not liable if it didn't, and asking them to develop and report their own opportunities to do outreach. I asked them to volunteer for one or two of our own events, as well.

Initially, this program appeared to do much better: the participants found apiary sites on their own and appeared to be enthusiastically tending the bees. In two of the three cases, however, the beekeepers had to use out-apiaries with limited times of access and less-than-ideal site conditions, and the third was vandalized.

As resource-challenged beekeepers with complicated transport needs, over time their bees suffered. Colonies were not fed sufficiently, were not tested or treated for mites in a timely fashion, and did not Winter. The participants were ashamed of this and became more reticent to communicate. It also turned out to be difficult to get the woodenware back.

Even though the project participants "owned" the bees, this experiment did not succeed in aligning the needs of the bees with the efforts of which the beekeepers were capable. Maybe we made it too easy to get started when actually carrying through was going to be much harder. Newbees who own and site their own colonies have a depressing rate of failure, as well, but do not carry the additional weight of failing to provide opportunity to another, future participant. The beekeepers who tried "hive futures" dropped out of the community: a double loss of bees and friends.

Partnering with Parks and Rec

This year, the DC Beekeepers Alliance signed a partnership agreement with DC Parks to manage an urban beekeeping program in selected parks based on some of the lessons learned above (http://dpr.dc.gov/service/urban-beekeeping-program). In addition, we worked with government officials to make the process open to all, fair, with clear requirements for qualifications and responsibilities, and with direct ownership of all bees and materials by participants.

This program is designed for beekeepers who have already completed an acceptable course of instruction (we require at least 12 hours and proof of attendance) or have equivalent hands-on experience. It therefore does not satisfy the desire of many city residents to learn by doing.

Participants are required to apply and be approved, identify a mentor or accept one, register their colonies, participate in outreach, apply best management practices as outlined by the DC Beekeepers Alliance (sorry, no treatment-free beekeeping), and supply their own bees, woodenware and protective gear. We provide sites, storage, mentors if necessary, a supportive community, communication and coordination between participants and the DC government, and access to harvesting and other tools.

Right now, we have six participants at four apiaries, and are especially pleased that it has connected us to people with beekeeping education and experience

from channels other than our own course and outreach efforts. We have a considerable waiting list, as well.

We have limited the number of sites this year in order to watch for and learn from the mistakes we will certainly make, scaling up later with the benefit of hindsight! We also learned just how limiting it was to offer past opportunities only to those who came through the channel of our own beginners' course: we are now connected with people who got certifications in other states and who bring really useful skills to the rest of the community, and who expand our circle of colleagues and friends.

The application process and clear statement of requirements (including updating a mentor) has kept us in better contact thus far than in previous years, without the overlay of nagging and obligation to something other than one's own goals.

A True Teaching Apiary?

Right now, we are in talks with a large agency to get permission to establish a teaching apiary on a Federal property. Our goal is to actually provide a hands-on approach to learning apiculture, perhaps altering our beginners' course curriculum to include first-hand experience for complete novices. We intend to mine the experiences of our colleagues in urban clubs around the country concerning what works, what doesn't, and how to organize ourselves to maintain a 7/24 facility. Nothing we have done so far has re-created the old fashioned experience of standing next to another human, getting to know another universe for a wider range of our fellow citizens. It also provides the foundation for so many other services, projects, and learning from which our experienced beekeepers could benefit. Wish us luck! BC

Toni Burnham keeps her bees and helps educate and mentor local beekeepers in the DC area.

NATIONAL HONEY MONTH

Let's Party!

Ann **Harman**

September is National Honey Month! So it is a perfect time to have a party celebrating honey. And since September is the month when we say goodbye to summer the honey party could be held outside with interesting things fixed on the barbeque. The local bee club could certainly have a party. In an urban or suburban location a honey party could be a way to introduce the neighborhood to honey cookery.

To make this meal a real celebration of honey, every dish has to contain honey. Now before you say 'aaaccckkk – too sweet!' remember that many dishes made with honey are not sweet – the honey, in small quantities, enhances the flavor without a sweet taste. Besides the quantities of honey can be as small as a tablespoon and each dish will have different flavorings, even some quite spicy.

Beekeepers usually have honey cookbooks handy but non-beekeepers do not. Well, ask them what sort of dish they would like to make and give them a honey recipe for it. In that way you have introduced them to the delights of cooking with honey. You might make some new customers that way.

Here are some recipes for your honey BBQ banquet. All of them are from the National Honey Board. Visit the website frequently to find new recipes – www.honey.com

This is a handy recipe that can be used as appetizer or something to nibble on during the honey party.

Caramelized Nuts With Honey And Chile Pequin Pepper

¼ cup honey
3 cups mixed nuts, plain
1 tablespoon butter
1 teaspoon sea salt
1 teaspoon chili pequin pepper or powdered cayenne pepper

Heat honey and butter in a pot (thick-based pot works best) over low heat, stirring with a spatula until blended. Add the pepper and salt. Add nuts, stirring every so often to make sure the honey covers them completely. Place the coated nuts on a baking sheet lined with parchment paper, making sure to leave enough space between them so they do not stick together. Let stand until cool. Heat the oven to 250°F and bake the nuts for 10-15 minutes. Remove from oven. Let stand until cool and serve.

Sparkling Honey Fruit Spritzer

You can make two or three batches, one without wine, one with red wine and another with white wine.

1/3 cup honey
1 cup frozen berries (strawberries, raspberries, etc.)
1 lime, thinly sliced
1 orange, halved and thinly sliced
3 cups orange juice
(red or white wine can be added to taste)
3 cups sparkling water
ice cubes

Combine honey, berries, citrus slices and orange juice and wine (if used) in large pitcher. Using a wooden spoon, press down on the fruit to juice and to mix the fruit with the honey. Cover and refrigerate for two hours or longer. Add sparkling water and ice when ready to serve.

Honey BBQ-Marinated Chicken Drumsticks
(you could also use the wing drumettes)

1 pound chicken drumsticks
½ cup ketchup
½ cup honey
¼ cup vegetable oil
2 tablespoons soy sauce
2 teaspoons lemon juice
¼ teaspoon crushed peppercorns
¼ teaspoon hot chili sauce
salt, to taste

Place chicken in large shallow dish or large plastic bag. Combine the rest of the ingredients and pour over chicken. Refrigerate for 1 hour. Prepare to grill; then grill to desired doneness.

Here is a variation on ordinary coleslaw that would be a good accompaniment to the barbequed chicken. This recipe will make 8 to 10 servings.

Bees In The Garden Coleslaw
1 head green cabbage, shredded
1 medium green pepper, diced
½ cup diced sweet red pepper
½ cup mayonnaise
1/3 cup honey
2 tablespoons vinegar
½ teaspoon salt
½ teaspoon dry mustard
½ teaspoon celery seeds
¼ teaspoon black pepper

Toss cabbage and peppers in large bowl. Combine rest of ingredients in medium bowl, then toss with cabbage mixture. Mix well. Cover and refrigerate until thoroughly chilled.

For a dessert you could make some honey cookies or make this sauce to serve with ice cream, pound cake or sliced fruit.

Honey Strawberry Puree
2 cups fresh or frozen strawberries
¼ cup honey
2 tablespoons orange juice
1 teaspoon grated orange peel

Combine all ingredients in blender or food processor; process until smooth. Makes two cups.

Now you need some ice cream to put the sauce on. The nice thing about honey ice cream is that it should not be kept in freezer too long, several weeks, because it tends to get rubbery. So, make it and eat it!

Honey Ice Cream
2 cups milk
¾ cup honey
dash salt
2 eggs beaten
2 cups heavy cream
1 tablespoon vanilla

Heat milk in medium saucepan over medium heat but do not boil; stir in honey and salt. Pour small amount of hot liquid into eggs; stir and quickly return to milk mixture. Cook and stir over medium-low heat five minutes. Cool thoroughly at room temperature. Stir in cream and vanilla. Refrigerate until cold. Freeze in ice cream maker according to manufacturer's directions. Makes about five cups.

Honey Tasting?

If you decide not to do a honey banquet, how about having a honey tasting? This could be a fun meeting of your local bee club, as well as for an afternoon party. If you are familiar with the descriptions of wine then be aware that honey now also has those descriptions. If you plan on a honey tasting have a copy of *The Honey Connoisseur* by C. Marina Marchese and Kim Flottum available. See if you agree with the descriptions in the book. You can have some plastic coffee stirrers available for tasting or some of the tiny plastic spoons. You will need some small paper cups and water (do recycle the paper cups).

Where will you get the honey for the tasting? If you are doing this for friends who are not beekeepers perhaps you can borrow or buy some small jars from other beekeepers. No matter who the tasting partygoers are (beekeepers or not), go ahead and buy some honey, both from your local supermarket and from some specialty shops. If you can find a few jars from different countries the tasting party will be even more fun.

If you live in an area with abundant September plants, pick a few blossoms that are pollinator friendly and make a bouquet for the table. Packets of seeds for pollinator plants are plentiful and could be given to guests who wish to plant more pollinator friendly flowers next season. If the guests at the honey banquet are not beekeepers, be sure they go home with a souvenir two-ounce bear of your honey.

National Honey Month is not just for beekeepers – it is for everyone! BC

Ann Harman keeps her bees, cooks with honey and teaches others about bees and honey at her home in Flint Hill, Virginia.

Dear Queen Buyer –

Thank you for buying a queen from our small queen-rearing operation. We appreciate your support and loyalty. Over the past few years we have purchased scientifically selected, instrumentally inseminated breeder queens that possess genetically controlled traits for mite tolerance. We have also sought out local breeder colonies that have survived our strong and long local winters and produced large honey crops. We have attempted to improve our local drone population by producing abundant daughter queens that carry these and other desirable traits. Unfortunately, a few swarms have issued from our colonies, but this also has a positive benefit on the drone population for several miles in all directions.

Please take a few moments to review this page to understand the importance of properly caring for your queens both before you put the queen into a colony and after the queen has been introduced into a hive of bees.

#1: Remember, Your Queen is a Living Animal

Think of your queen bees as a pet dog, cat or chicken. Protect them in transit and while introducing them into a new home. Queen bees of all ages (virgin, newly mated or several years old) require frequent contact with worker bees and must receive food and water. Your queen should have worker bees either in the cage with her or surrounding her in a packaging container designed for queen shipment. Small queen shipments usually contain worker bees (which are carefully removed from the brood frames while taking a drink of honey from cells on the brood frame).

Queens also need water during transit. This may be a drop of water put directly on the queen cage, or water obtained from the worker bees attending her. This will prevent her dehydration, a common cause of queen death during shipment and introduction. When the temperature is above 75°F, dehydration can occur in a matter of an hour when queens are put into exposed locations.

While sealed queen cells do not require feeding, they benefit from a stable environment with uniform temperature. Either carry sealed queen cells in an incubator or with worker bees stabilize cell temperatures.

#2: Never Let Your Queen to Become Overheated or Chilled

It is very easy to overheat and dehydrate a queen in an auto or truck cab. Do not leave the queen in the sun or inside the cab when you go into a restaurant, even for a few minutes. Avoid letting the queen dehydrate and overheat.

If the weather is cold (less than 50°F), put the queen cages into a pocket of your coat or jacket while you run errands or check bees. Don't leave the cages on the top of the next hive for more than 8 seconds (yes, I just made that up, but I think it makes my point).

If you plan to carry queens around all day, perhaps while you visit several bee yards, make up a queen bank consisting of a frame of brood and nurse bees. Put this into a nucleus box (screened so they cannot fly out in the car or truck). Add a second frame containing some honey and more bees. Put the queens in a queen-holding frame that is positioned between the two frames. The bees do the best job of keeping the queens alive through feeding and hydration.

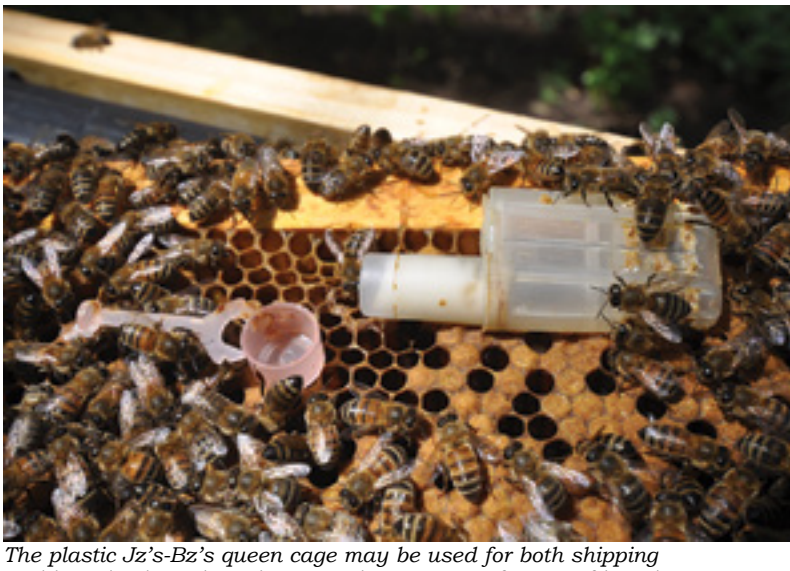
If you have less than a dozen queens, make up a box to carry queens with a tight fitting lid, like a cigar box. Put an activated hand warmer or two in the bottom of the box and cover it with a small dishtowel. Put the queens in their cages on top of the towel. Or leave out the hand warmers and shake a few hundred worker bees into the box. Put a sponge filled with sugar syrup for the bees to feed and hydrate. I've kept queens like this for several days when the weather is warm, and I always have a safe place for my queens as I work colonies.

#3: Check the Queen Candy

When we put queen candy in the shipping cage (the white material), we take care that it is not too moist. Unfortunately, queen candy takes up moisture, and the surface may become too liquid and the queen may become stuck to the candy. If this should happen, immediately remove the queen and put her into a cage with dry queen sugar or with no sugar mixture at all. Add young nurse bees and allow them to clean her body of all sugar residue before introduction of the queen into a colony.

#4: Colonies Set Up To Accept Queens

NEVER introduce queens into a colony that has another laying queen, might have another laying queen or has laying worker bees producing eggs. The workers most certainly will kill your new queen and we cannot



The plastic Jz's-Bz's queen cage may be used for both shipping and introduction. Place the queen between two frames of brood with the plastic cap on the tip of the candy release. Return on the their day and the queen will be introduced to the bees, her pheromone spread throughout the hive and an bees familiar with her odor. Note how the bees have added propels to her cage.

7 Rules For Queen Buyers To Remember

Larry **Connor**

replace queens abused in this manner. If you have any question about the queen-status of a colony, it is better to wait and see what the colony does (by producing a new laying queen as evidenced by brood), or by taking steps to stimulate the laying worker bees from producing eggs and conflicting pheromone signals.

Just because you have inspected a colony and did not see a queen does not mean the colony is queenless. New queens – virgin queens – are smaller than laying queens and are harder to see. They also seem to hide under worker bees as they search the comb looking for sister queen cells and queens to destroy. This behavior makes them very difficult to find a queen in even a colony of moderate strength. Keep in mind that you may have inspected the colony when the queen is making an orientation, cleansing and mating flight.

With the growing use of darker-race queens, it is difficult to see the queens against dark combs. Mark these queens for easier queen finding in the future.

During normal queen replacement, the bees will start to polish cells just before a new queen will start to lay eggs. Areas of the comb that had previously been filled with pollen and honey will be empty and the bottoms of the cells shiny, ready for the queen.

#5: Timing is Everything

Consult your records against the calendar to see what options the bees may be expressing in queen rearing. Remember it takes 16 days for a queen to complete her metamorphosis from egg to larvae, but if a colony already has brood in production, the bees will select larvae one to three days of age (after the egg hatches) to use to raise a queen. That means that that colony has suddenly lost a queen, perhaps by a beekeeper error, and the queen will require between 10 to 12 days to complete her development into a new young queen.

But don't forget that the queen must also reach her sexual maturity and mate with drones located about one mile from the hive. I feel that the average time from emergence to egg-laying for a queen is about 12 days, but there can be delays due to cold or stormy weather, and the queen may not mate and start laying eggs until she is 14 to 16 days old.

This means that when you look at a calendar, that you must add these numbers together, allowing the 10 to 12 days for metamorphosis and 14 to 16 days for the queen to reach maturity, mate and begin laying. That means that it will take between 24 and 28 days before you can expect to see eggs. If you have trouble seeing eggs and larvae, you will need to wait up to another nine days before there is sealed brood, putting us at 33 to 37 days after the colony was last worked. (The visually-challenged beekeeper should obtain a magnifying lens and a high-powered LED flashlight to see the eggs and newly hatched larvae at the bottom of the cells).

All this shows how easy it is for a queen-right colony to be examined by an inexperienced beekeeper who rules the hive queenless and introduces a new queen, only to have her lost or killed by the queen in development.

Here is a chart of time requirements for various hive functions regarding queen production in European bee stocks. African stocks develop faster, a fact that should be kept in mind wherever Africanized honey bees are found, such as Florida, Texas, Arizona, New Mexico and parts of California.

Biological Event	**Days for the event to occur (average)**
Worker egg to queen emergence	16
Worker egg to worker emergence	21
Drone egg to drone emergence	24
Worker egg to queen mating	28 (16 days for queen, 12 for mating)
Worker egg to brood (eggs)	31 (16 days for queen, 12 for mating, three for egg development)
Worker egg to emergence of a new queen's brood	52 (16 days for queen, 12 for mating, three for egg development and 21 for new brood development)
Development of Drone Layers	28 (21 for all brood to emerge and seven without brood)
Minimum days for a ripe queen cell to be left in a hive, the queen emerge, mate and lay	15 (12 for mating and three for laying some brood (proof of laying, nothing more))
Recommended days for a ripe queen cell to be left in a hive, the queen emerge, mate and lay	22 days (12 for mating and 10 to allow the queen to fill all cells with eggs and mature physiologically).

#6: Very Common Problems

Queen Failure in Package Bees – Because the queen placed into a package of bees is not the mother of the bees in the package, there is a strong sense of queen

replacement by these new colonies. Nucleus colonies, on the other hand, usually have had the queen in place for three to five weeks before they are delivered to the customer, and the bees and workers are better adjusted to each other.

Package bees frequently experience queen introduction failure. This is when the worker bees never accept the new queen, and the colony is hopelessly queenless. Many queen shippers send additional queens with package bee shipments to cover such losses, but most new beekeepers don't know enough to recognize that there is no queen in the hive (they are still trying to tell sealed brood from sealed honey). If the beekeeper has access to sealed brood, she should obtain a frame of brood (one with a mixture of ages of bees, but ideally with an area of eggs and small larvae so the bees in the package can start to raise their own queen). If this is not possible, combine the bees in the queenless package with a queen-right colony, perhaps another package with a well-laying and accepted queen, so the worker bees are not lost.

Early Queen Failure in Package Colonies – Too often, the package queen starts to lay eggs but stops, or is killed and replaced by the worker bees within a month or so of the package introduction. If there are queen cells in production in such a hive, the bees will eventually have about a 75% chance of producing a new queen, and the package colony is saved. This is when the introduction of a mated and laying queen is ideal for the benefit and overall outcome of the colony. The time needed to get a new queen laying is shortened by many weeks.

#7: Best Queen Introduction Methods

We have very good luck placing a queen into a colony confined in the shipping cage with a plastic cap or cork firmly in place, preventing the queen's release. We leave the queen like this for three or more days and then return to remove the cap or cork, and let the bees consume the candy to liberate the queen. The three days allow the queen to produce her odor – her pheromones – and provides a time for the queen to be fed by the worker bees. If there is something wrong with the queen, and the beekeeper returns after three days and finds her dead in the cage, then the beekeeper knows that something must be done, rather than wasting days and weeks trying to determine if there is a queen present or not. When it comes to bee management, knowing bad news almost always wins over not knowing anything.

Plastic and metal queen introduction cages (also called push-in cages) allow the beekeeper to put a queen over an area of emerging brood (or with nurse bees) and stimulate food exchange during introduction.

We have used push-in cages for queen introduction and will use them when there is a valuable queen to be introduced. The key is either place the cage and queen over emerging worker brood or add worker bees to the cage prior to the introduction.

Queen liberation in less than three days often leads to early queen death. New queens will be suffocated by balling (hundreds of workers pile on her body and overheat her until she dies), or she may be stung. Like a change in human politics, a new queen is in a delicate position until she is able to prove herself as an egg-laying, pheromone-producing machine worthy of her subjects' trust and support.

I hope this helps you understand some of the challenges of introducing a new queen into a colony and just how complicated queen rearing can be. BC

Dr. Connor has been invited to the College of Lake County (Grayslake IL) on Saturday September 10th. On October 13-16, he has been invited to the British Columbia Beekeepers Association Conference being held in the Metro Vancouver area. Bring your copies of Dr. Connor's books, and he will be glad to autograph them.

The Successful Beekeeper

Ross **Conrad**

As we head into Autumn and reflect on the past beekeeping season, what criteria do we use to call it a success? For each beekeeper, the answer to this question is liable to differ. Success cannot be defined in one sentence, as it is comprised of many things and one could argue that the definition of success depends on the individual and one size does not fit all.

All beekeepers encounter numerous small successes such as: getting through the season, or perhaps just the day, without getting stung; successfully introducing a new queen to a colony, or bees that are healthy enough to produce excess honey that can be harvested at the end of the season. Then there are the larger more far-reaching successes and characteristics which are more definitive of successful beekeepers everywhere. What follows are some thoughts on the successful beekeeper.

Successful beekeepers don't have to buy new bees every year

These days, having colonies that live through the Winter and are alive in the Spring is one of the definitive traits of the successful beekeeper. Having strong colonies in Spring has become much more difficult since *Varroa* mites, Small Hive beetles, *Nosema ceranae*, Neonicotinoids, and Colony Collapse. If your bees keep dying and you have to buy new bees every year, you are not a successful beekeeper. However you may be on your way to becoming a successful beekeeper, since you will have plenty of opportunity to learn from your mistakes. As Sophocles from ancient Greece is quoted as saying, "Success is dependent upon effort." It takes a lot of effort to pick yourself up and keep going when it would be so much easier to quit. However, even the most successful apiculturist is no longer a successful beekeeper once they give up keeping bees.

Not only do successful beekeepers endeavor to persevere in keeping the bees they have alive, they tend to learn how to generate new hives from their own resources. Whether it is by making splits or nucleus colonies from surviving stock, capturing swarms, or removing hives from structures, successful beekeepers find a way to increase hive numbers and replace lost hives without having to regularly spend a lot of money on bees. Successful beekeepers are selling nucleus colonies every year, not buying them. Successfully overwintered colonies tend to be those in which pests and diseases are controlled, nutritional stress is minimal or absent, and hives in cold climates are kept dry inside.

Now at this point I realize that I have already probably offended a number of readers and since I am an equal opportunity criticizer allow me to really rile up the bee's nest.

Ongoing education that lasts a lifetime...one of the secrets of successful beekeeping."

Successful beekeepers can be found using all types of hives

In my opinion there is no "best hive" in which to keep bees. What is considered 'best' is much more a result of a number of factors such as the goals of the beekeeper, geographic location, type of honey bee, available resources, philosophy and aesthetics of the beekeeper, and beekeeper knowledge.

The bees themselves don't seem to care what kind of box they inhabit as long as it is large enough to hold enough food for the Winter dearth. Good husbandry is much more important to successful beekeeping than the type of equipment used. The next time someone espouses on the virtues of a particular type of hive, consider how long they have been keeping bees, the number of hives they keep and their Winter survival rate (are they buying replacement bees every year? See above).

Successful beekeepers avoid toxic synthetic chemicals

Toxins are a part of the natural environment. Plants produce toxins to protect themselves from pests and predation. Honey bees have evolved to be able to detoxify many toxins ingested along with nectar or pollen. Unfortunately when more than one toxin is ingested at the same time, the combination can overload the bee's immune response and cause detrimental effects.

This situation is compounded by man-made synthetic chemicals and other pollutants that make their way into the hive. While some of these chemicals originate with industry, the majority come from agriculture and beekeeper-applied miticides primarily used to control *Varroa*. *Virtually all commercially available beeswax today is contaminated with small quantities of toxins.*

"You know you are on the road to success if you would do your job, and not get paid for it."

Oprah Winfrey

Significant problems surface when chemicals are absorbed into the beeswax comb and synergistically combine with each other to create even greater toxicity. Exposure to such toxins has been shown to make bees more susceptible to diseases and *Varroa*, and can negatively impact honey bee longevity and fertility.

In this day and age, adding to the 'natural' background toxicity levels of the comb in a hive by introducing additional chemical miticides when so many natural, "soft chemical" treatment alternatives are available appears foolhardy. While these alternative miticides can be stressful to the bees during application, most appear to leave minimal-to-no harmful residues in the comb and have yet to result in the buildup of *Varroa* tolerance to the miticides despite over a decade of use in some instances.

Successful beekeepers work to minimize the levels of toxins in their hives by avoiding agricultural pesticides and synthetic miticides, and regularly rotating out old comb within the hive. Part of success is understanding the difference between a need and a want. You may not *want* to use any chemicals in your hives, but you *need* to control *Varroa* mites.

Successful beekeepers take care of their needs and have a healthy balance between costs and benefits

One way to measure success is to look at what had to be given up in order to achieve success. Successful beekeepers tend to be good at managing time and resources. For example, they make time for their beekeeping but are sure to leave time to attend to the other important activities and relationships in their lives.

Another surefire way to succeed is to help others to succeed. When you understand that you cannot keep what you don't give away, you will count success not by how high you have climbed but by how many people you have brought along with you. Successful beekeepers tend to be mentors, and teachers. They lead beekeeping workshops and classes sharing their knowledge and, well – success.

Successful beekeepers are passionate about bees and are always learning

I am liable to receive some angry emails for writing this, but too many backyard beekeepers appear satisfied with not understanding what they are looking at when inspecting their hives. They try to get by with a limited knowledge of bees and beekeeping by allowing nature to mostly take its course and only occasionally open the hive to be sure that there are still bees inside or to take some honey. Such beekeepers have a passion for bees, but their lack of knowledge is highly unlikely to lead to successful beekeeping.

Today knowledge is all the more important as beekeeping and the world are changing at an increasingly faster pace. What you as a beekeeper may have done just a few years ago, may no longer be appropriate. By keeping up with the latest beekeeping news, inventions, products, and science, you place yourself in the best position to take timely action appropriate to changing conditions and challenges.

Unfortunately, beekeepers who fail to seek out new knowledge and information are missing out on one of the best parts of beekeeping: learning about bees and their care. Bees are so fascinating the more I learn, the more I want to know. One of the best ways to learn early in one's beekeeping journey is to find another beekeeper to act as a mentor. No matter what a person does in life, those who "make it" usually credit their success to a mentor or a group of mentors who really helped nurture them along to where they are today. Your mentor has already gone down the road that you want to travel and can guide you to your destination faster than if you go it alone.

Have a bee related question your mentor can't answer? There are many ways to get an answer: classes and workshops, books, journals and periodicals, documentaries, forums, blogs, websites, Podcasts, DVD and YouTube videos. Try using multiple sources of information, find out what works best for you and never stop learning new things about bees and beekeeping. Successful beekeeping is a life-long learning challenge and one measure of success is always doing your best…and that takes passion. Work without passion is drudgery, creating undue stress and empty achievements. BC

Ross Conrad is the author of Natural Beekeeping: Organic Approaches to Modern Apiculture, *Revised and Expanded 2nd edition published by Chelsea Green.*

"Failure is simply the opportunity to begin again, this time more intelligently."

Henry Ford

Hives that survive the Winter and are healthy and strong when the first nectar flow of the season starts is a key to success in beekeeping."

Got A Question?

Ask Phil

Phil **Craft**

He Knows!

Send your questions to Phil at
phil@philcrafthivecraft.com
www.philcrafthivecraft.com

A beekeeper in Indiana writes:

I have a queenless hive that has killed two queens I've tried to install over the past month. There are no queen cells, brood, drone cells, or any evidence of a laying worker. I decided to pull frames from other hives and started a successful nuc that has a good laying queen. My plan is to install the nuc into the queenless hive. There are still a decent amount of bees in the queenless hive and my nuc is ready to be moved. There are still more bees in the queenless hive then my nuc I'm worried about those bees killing yet another queen. I was planning on installing the nuc later this week. What do you think?

Phil replies:

Good solution. I always recommend re-queening strong existing hives, laying worker hives, and hives which have been queenless for a long period of time with a queen right nuc. That way the bees in the nuc protect the queen when it is joined to the queenless hive. I have had a 100% success rate with this method - at least I cannot recall a failure. As they say in financial investing though, past performance is not a guarantee of future success.

Most requeening takes place because the beekeeper wants to replace an existing queen with a younger one or one with more desirable genetic characteristics such as less defensiveness, more hygienic behavior, better honey production, or quicker spring build-up. It is usually accomplished by inserting a caged, mated queen into a hive from which the old queen has been removed. (That normally means killed, but there are situations in which a beekeeper might retain the old queen for use in another hive.) It is also necessary to introduce a new queen when a colony, like yours, has lost its old one. That can happen for various reasons, but in early to mid-Summer it is often a result of a colony's swarming. Sometimes the virgin queen, who should have taken over the roles of egg layer and pheromone producer, fails to mate successfully or to return from one of her mating flights. The interval between the departure of the old queen and the failure of the new one means that there are no longer any larvae in the hive young enough for another attempt. Result – a queenless colony. Such colonies are sometimes much more difficult to requeen by the traditional method.

A conventional queen cage is usually effective for introducing queens into new packages, and even better for nucs, but when a colony has been queenless for more than a week or two, experiences like yours are not unusual. I have been talking to beekeepers and giving advice for many years now, and this is the story that I hear again and again. The queen is installed, everything appears okay, the bees free the new queen, and she is never seen again. Obviously, there must be a better way.

Step one: Set up a nuc with two or three frames of bees and brood and install the new queen in it. Either a nuc box or a standard 10 or eight frame box will work - whatever you use for your hives' brood boxes. After a week or two, when the new queen is out, and the bees are rearing her brood, it's time to combine the nuc and the queenless hive.

Step two: The newspaper method is the most common way to combine two hives, and not only when one of them is queenless. In the fall, beekeepers often take a weak colony, which has too few bees to have a good chance of surviving the winter, and merge it with a stronger one. (Of course, when combining two queen right hives, one of the queens must first be killed or serious fighting will occur.) First remove the lid and inner cover from one hive and cover the top with a single, full size sheet of newspaper; I usually tape the sides down because the wind always seems to be blowing at my place. With a hive tool, make three or four small slits in the paper, then place the other hive body, hive bodies, or in this case the nuc, above it. I always put the weaker hive on top, since it will not have its own entrance. That enables the bees in the stronger colony to continue to fly while the two become acclimated to each other. If the nuc was in a nuc box, you can place a third hive body over the existing hive and newspaper, then move the frames from the nuc into the third box.

Step three: As the bees eat through the paper, pheromones from the upper box permeate the queenless one and the bees get used to the idea that this is what their queen smells like. Not only the queen pheromone, but all the odors of the two hives blend together. Within a couple of days the bees will eat through the newspaper, and you should have one big, happy family, or hive. It's best to wait a couple of weeks or so, until you are confident that all is well, before rearranging frames to get rid of the extra box. In a hive that has been queenless as long as yours, there are probably enough empty frames which you can remove to get back to two boxes.

Nucs are so useful that I always keep some in my bee yard for re-queening purposes. I make them up in the spring from my strongest colonies as a swarm prevention strategy. Small, captured swarms occasionally provide me with material for a few more. Some nucs I eventually move into full size hives to increase the number in my apiary; some I keep small by periodically moving frames of brood and bees to weaker hives or other nucs. From time to time I may remove a queen from one to sell to a beekeeper who needs one quickly, but I try to keep three or four nucs always on hand. If I discover I have a queenless hive, I can re-queen it in ten minutes – no ordering a queen, no installing a queen cage in the hive – just use the nuc. That interval is important, because the survival rate of a requeened colony is inversely proportional to the amount of time it spent without developing brood to replenish normal losses.

That brings me to one final suggestion. You say that your queenless hive still has a decent amount of bees, but after two unsuccessful attempts at requeening, it cannot have any eggs or brood left. I would place a couple of frames of capped brood in the hive while you are setting up your nuc. The brood pheromone will help suppress the urge of workers to lay and the soon-to-emerge young bees will boost the colony's dwindling population. Here's hoping third time's a charm.

A beekeeper in Maine writes:

Despite many years raising livestock, stringently attending to quarantine guidelines for purchased animals, I foolishly broke my own rules to save a few bucks buying used equipment. Sure enough, for the first time ever, I discovered dead wax moth larvae in stored equipment and chalkbrood on frames from a winter-killed hive. This equipment was all frozen solid over the long Maine winter, but now poses a question about cleaning up the mess.

I have cleaned and scraped the wooden frames and plastic foundation, but remain concerned about using this equipment again. What is the likelihood of surviving eggs in the case of the wax moth? Is there a compound or procedure to eliminate chalkbrood bacteria if the foundation is used again? What about the wax? I use wax removed from foundation to coat new plastic foundation to enhance acceptance. Is this still an acceptable practice or am I just perpetuating infectious agents?

Phil's reply:

I don't think you have anything to worry about. In fact, it is quite possible that the used equipment was not responsible for your wax moth issue and it may be innocent of causing the chalkbrood as well.

There are two distinct species designated as greater

and lesser wax moths, however several kinds of small moths exist which beekeepers refer to collectively as wax moths and whose larvae are considered pests of managed honey bee colonies. They are widespread in the environment and, as a result, are common nuisances in our apiaries. After maturation and mating, adult female wax moths fly into hives seeking out cracks and crevices in which to lay their eggs – narrow spaces from which it will be difficult for bees to remove them. When they hatch, the larvae feed on wax, honey, nectar, and pollen, wreaking havoc and destroying comb. Adult wax moths require neither food nor water, existing only to mate and lay eggs, so they themselves do no direct damage. Moreover, they are easily attacked and ejected from the hive by bees in thriving colonies. It is only the comb in vulnerable hives (weakened by varroa or other factors), and in unprotected, stored comb, which is susceptible to the predations of wax moths.

Not knowing the timeline, I can't be certain whether the used equipment you purchased came with wax moth eggs included at no extra charge, or whether the infestation occurred during storage. Eggs can hatch in as little as three to four days under ideal (for them) conditions, and take as long as thirty days in cool weather. Regardless of when they were introduced into your equipment, the procedures for dealing with wax moth eggs and larvae are the same. Damage to comb can be prevented with proper storage, either by keeping the frames frozen or by treating them with dichlorobenzene (Para-Moth). After damage has occurred, freezing the comb overnight will kill any remaining eggs and larvae, and scraping off the wax will make the frames unattractive to infestation by adult female moths. Your cleaned up woodenware will be at no greater risk from wax moths than new equipment would be.

The chalkbrood should be no more problematic. Not a pest, but a fungus, it is a disease of young larvae. The initial infection occurs in larvae three or four days old, and begins to grow shortly before bees cap the cells. The larvae subsequently die, coated with a white fungal growth which hardens, forming what beekeepers refer to as "chalkbrood mummies" inside the brood cells. Bees typically remove the mummies from the cells and from the hive, dumping them outside the entrance. A little pile of desiccated bodies is often the beekeeper's first signal that her hive is infected with chalkbrood. Fortunately, it

is considered a minor disease, though severe or persistent outbreaks can occasionally occur. Chalkbrood is most often observed in the early spring, especially during wet, cool weather. Wet bee yard locations also seem to favor the development of the fungus. There is no treatment, chemical or otherwise, for its control. None has been developed, mostly because none is required. Symptoms usually disappear, and colonies rebound, without any intervention by the beekeeper. In that, it is analogous to an intestinal virus in humans. After a period of illness, the disease runs its course and the patient recovers unaided.

Unlike viruses and bacterial infections, chalkbrood is spread by spores. Infection begins when larvae ingest spores during feeding by adult bees who have previously consumed them while cleaning cells or eating infected honey. Some diseases with similar mechanisms, such as American foulbrood, are spread by spores which are extremely virulent and can remain viable for decades. Though chalkbrood spores can persist for up to three years, they are far less infectious. Frames containing large numbers of infected larvae (ten percent or more, as in the accompanying photo) should be destroyed, but is not necessary to destroy all brood frames in infected hives as one would do with American foulbrood. However, I would not recommend moving frames from hives exhibiting chalkbrood symptoms to healthy ones. As far as reusing your frames and plastic foundation goes, the cleaning and scraping you have already done should be sufficient. I like the idea of coating plastic foundation with an extra coating of wax to make it more acceptable to the bees, and it's possible that melting the wax to brush it on would kill any spores, but why take a chance? Even when you know your stomach ache will be over in a few days, you are still weak and miserable while you have it, and any condition which weakens a colony makes it more vulnerable to other threats. Use wax from your symptom free hives. Once again, it is possible that the chalkbrood you saw was unrelated to the used equipment, especially if you did not purchase used comb. Like a number of other diseases, chalkbrood is commonly transmitted by robbing, and by the drifting of bees which can occur in any hive.

A final observation. In the wild, wax moths play a beneficial role in preventing the spread of brood diseases. Whereas conscientious beekeepers remove and destroy old and diseased comb, in nature that job is performed by wax moths and, in more recent years in the U.S., by small hive beetles. Yet in feral colonies, brood diseases spread at a lower rate, partly because they are more dispersed than the hives in our apiaries. BC

GLEANINGS

SEPTEMBER 2016 • ALL THE NEWS THAT FITS

OZ HONEY ISSUES

The Australian beekeeping industry is disputing researchers' claims that Australian honeys are the most contaminated in the world with natural poisons linked to chronic diseases cancer.

Fairfax Media newspapers cite research published in the Food Additives and Contaminants scientific journal show that while products meet more relaxed Australian food safety standards, all but five Australian honeys tested had more contaminants than the European Food Safety Authority would consider safe or tolerable.

It says pregnant and breastfeeding women in particular should be wary, experts say, with unborn and breastfed infants at higher risk of organ damage from such toxins.

"The news affects varieties of honey sold by many leading brands and widely available on supermarket shelves," the newspapers report.

The Australian Food Code bans the use of poisonous weeds such as Paterson's curse (also known as Salvation Jane) and Fireweed in human food. Their flowers are laced with chemicals called pyrrolizidine alkaloids that are considered the most common cause of poisoning in humans and livestock worldwide.

But Food Standards Australia and New Zealand allows honey to be sourced from the restricted plants, as long as it is blended with other honey to dilute it.

"Removing source plants is not feasible for many areas where apiaries are kept," a FSANZ spokesperson is quoted as saying. "Contaminants should be kept as low as achievable, therefore blending is the most practical way of reducing the levels of pyrrolizidine alkaloids. The newspapers report that last October, German researchers from the Federal Institute for Risk Assessment found that even low-level exposure to these chemicals can cause gene mutations linked to chronic lung disease and cancers such as leukemia and breast cancer.

The European tolerable intake is 0.007 micrograms per kilogram of body weight, per day. The Australian intake is 1 microgram per kilogram of body weight, per day.

The blending approach used in Australia is out of step with other world health authorities such as the European Food Safety Authority, the UK Committee on Toxicology and the German Institute for Risk Assessment who direct against the dilution of contaminated food.

"The result is that nearly every Australian honey was contaminated according to Irish researchers, who analyzed the level of pyrrolizidine alkaloids in supermarket honeys here and in Europe," the report says.

The Australian Honeybee Industry Association tells Fairfax Media said the Irish report exaggerated the likelihood of toxicity by assuming larger honey consumption and lower body weight than is normal in Australia.

It says the amount of honey produced from agricultural weed has declined dramatically over the last decade because of modern farming techniques.

"Industry is fully aware of the problem with Paterson's curse honey and alkaloid content," a spokesperson says "This honey is not produced in commercial quantities in Australia.

"There is not one case documented of human health being unfavorably affected from consumption of honey containing very low levels of alkaloids.

"Australian consumers of Australian honey have nothing to fear and should continue to enjoy our great Australian honeys."

Alan Harman

NEW BATON ROUGE RESEARCH LEADER

USDA is pleased to announce the appointment of Dr. Robert Danka as the Research Leader for the Honey Bee Breeding, Genetics and Physiology Unit (HBBGPU) in Baton Rouge, Louisiana effective immediately.

Dr. Danka is a Research Entomologist who first came to the HBBGPU as a graduate student in 1983 after having earned B.S. degrees in Biology and Entomology and a M.Sc. degree in Entomology from Pennsylvania State University. He joined the permanent staff of the laboratory in 1987 after completing his Ph.D. in Entomology at Louisiana State University.

The majority of Dr. Danka's research has been in three areas: crop pollination by honey bees; the biology and management of Africanized honey bees; and genetic resistance of honey bees to biological hazards. This research has occurred widely across the United States and at sites in Latin America, Asia and Europe. His recent efforts have focused on ways to strengthen the application of ARS' scientific discoveries in the area of honey bees that have resistance to *Varroa* mites; these mites are the primary health threat to honey bees worldwide. A current emphasis is on bee breeding with private partners to foster better adoption of mite-resistant bees by the beekeeping industry. Dr. Danka's research has been published in 75 peer reviewed articles and 42 popular and extension articles and technical reports. He has been invited over 200 times to present research results to scientific and beekeeping groups at international, national, regional, state and local meetings. The high visibility of the research topics lead to frequent consultations with the media and the public about honey bees. His service includes editorships for the Journal of Economic Entomology and for the Journal of Apicultural Research, collaboration and mentoring as an adjunct faculty member in the Department of Entomology at Louisiana State University, and leadership as an officer in several professional organizations. His contributions in research and technology transfer have been recognized with extramural funding and with awards from ARS, the FLC, the Entomological Society of America and several beekeeping organizations.

Dr. Danka has served as Acting Research Leader of the HBBGPU since the retirement of Dr. Thomas Rinderer on January 3, 2016. Please join me in congratulating Dr. Danka on his appointment as Research Leader of HBBGPL.

treatment and didn't have to come back and do it again.

In the meantime, treatments got better, so we were killing the mites under cappings and if you paid attention to the details, you saved your bees, and saved money.

But at the same time, what the mites were doing kept getting nastier. They were spreading viruses like a cold in a classroom, and spreading more of them. And it turns out that once the viruses were in the hive infecting the bees, the bees in turn started infecting each other. And worse, these viruses caused bees to die younger, and younger and younger. So a beekeeper could measure mites, hit a per cent level of infection, treat, and still lose the colony because the viruses inside were running rampant and even without a mite in the hive the colony would die. And even worser, (more worse?, worestest?) as the colony was collapsing, the bees inside were abandoning hearth and home heading for better places to be than the death trap they were in, taking mites if there were any, and all their internal viruses with them, sharing the stench of death everywhere they went.

Add this one thing in. It ain't natural to put five or 5000 beehives in the same place at the same time, is it? No, given a choice, much research has shown that a colony every square mile or so, in most places, works out best for everybody. These artificial gatherings we arrange make it easy for those abandoning bees to find a better place to live. No mites, no virus, a queen, lots of food. Not like what they just left.

Ok, so what. Because our bees do such a fine job of sharing what they have, doesn't it stand to reason that if a single colony in a beeyard has reached some level of infestation requiring treatment – that is, a level that occurs before the mite population explodes, before the virus epidemic runs all over all the bees, before, before, before. This has reduced the treatment level to a fraction of a percent, but more, much more importantly, the thought is, treat everybody. Every colony in the bunch. Everybody. Now. Don't wait for the next one to reach some magic level of infestation. The rule is, or is becoming, treat everybody, now, once a single colony reaches that tiny, tiny level of mite habitation.

We are, is seems, no longer looking at a colony as the organism, rather, we should be looking at the beeyard as the organism, whether five or 5000 colonies in the bee yard.

Lots of beekeepers have already been doing this. Why treat just one, they ask, I'm here, I'll treat everybody…just in case. Well this isn't such a bad idea it turns out…and it's not the prophylactic treatment mindset we used to use when treating every colony in the beeyard for AFB, just so they won't get it, and because I can.

IPM saves the crop and saves money, whether for apples, sweet corn or honey bee colonies. Saving the colony is saving you money. You have few choices. Use the best weapons you have, do the best that you can. This is war.

•

And finally, that shot at the top. That's a blossom from a Sourwood tree, a member of the Lilly Of The Valley family. Nothing unusual about it really, except perhaps that the photo was taken in August, in Ohio, in my yard. I've got it in a protected spot, right next to the Bee Bee Tree, so it might just do OK where it is. I bought it at the Indiana meeting this spring from Rockbridge Trees. We'll see how it goes, but if it does OK, next year I can say my honey is Sourwood Infused, and the price just went up.

•

September. National Honey Month, and we can see the end of a long, hot Summer. I've spent more time watering plants this year than maybe ever. Come on rain!

DENSITY VS. DIVERSITY

Higher numbers of pollinators can significantly increase crop productivity of small-sized farms, while large farms experience a similar yield benefit only if increases in pollinator density are accompanied by diversity, a new five-year international study finds.

More than two billion people rely on small-scale agriculture in developing countries, and while much evidence demonstrates that pollinators can beneficially affect crop yield, how these helpful critters affect small-scale farms compared to larger farms is mostly unknown.

To gain more insights, Lucas Garibaldi of the Research Institute of Natural Resources, Agroecology and Rural Development in Río Negro, Argentina, and colleagues in Brazil, Portugal, Netherlands and France analyzed 344 fields of small and large holdings in Africa, Asia, and Latin America.

They report in the the journal Science Advances that they recorded the number of pollinators, their biodiversity and the yield of each crop over a five-year period.

For small holdings less than two hectares, their analysis found that yield gaps – the difference between crops that yielded the most produce compared to those that yielded the least – could be closed by 24% through higher pollinator density.

They say the remaining 76% of the yield gap may be partially closed by technologies that optimize other agricultural factors, such as nutrients and water.

In contrast, for larger holdings, a similar yield benefit from pollinator density only occurred if accompanied by high pollinator diversity.

The researchers suggest that large crops may benefit less from pollinator density because these are more likely to be pollinated by flower visitors with longer foraging ranges – usually generalist species, such as honey bees.

Although pollinator dynamics are being increasingly threatened in agroecosystems because of declining floral abundance and diversity, the researchers say there are opportunities to reverse the trend by a number of different means, including planting flower strips, more targeted use of pesticides, and restoring natural areas adjacent to crops.

Alan Harman

VETO-PHARMA AWARD

The pharmaceutical plant where the Véto-pharma range is produced was honored on December 8th in Châteauroux (first administrative city of the Indre county – Center of France), by receiving the Top Innovation award at the 8th ceremony of 2015 Indre top of best companies.

The Top of Best Companies reveals and rewards men and women, businesses and projects, committed in an exemplary initiative bound to the development of the company. For eight years, the awards reception organized by La Nouvelle République – First Press magazine in the Center of France – and the Chamber of commerce and industry of Indre (CCI) had become the major appointment of the department for economic players.

This ceremony is supported by several partners amongst which the department of Indre, Châteauroux city and the Guild of Arts and crafts.

Over 500 people were present at the awards reception, including elected officials, representatives of department attached to the economic and industrial development, journalists, business leaders involved in the economy of Indre, but also from other regions of France, coming to share their experience.

The innovation award was handed to Mr. Jean Jolivet, Development Manager, representing Véto-pharma's CEO Mrs. Raphaèle Massard, by the Vice Chairman of the Department Council and Mayor of Chaillac which supports the development of the pharmaceutical industrial plant since its creation in 1988.

When Mr. Jean Jolivet was interviewed by the President of the Chamber of commerce and industry of Indre, several key points have been highlighted: the development and production of pharmaceutical and nutritional products for animal health companies, leaders in France and abroad, particularly for honey bee health, thanks to its production line dedicated to Apivar® where more than 5 million treatments are produced per year and distributed in over 20 countries ; its Research and Development, in collaboration with Véto-pharma's teams, to find new solutions against disease and predators of the honeybee ; and last but not least, the dynamism of all the teams mobilized and committed for many years.

CALENDAR

♦INTERNATIONAL♦

The 8th Caribbean Beekeeping Congress will be held in September 12-16, at Rovanel's Resort and Conference Centre, Store Bar, Tobago.

For more information visit **www.acboonline.com** or contact **caribbeanbeekeepingcongress@yahoo.com**, 868.682.9467.

Nepal - Honey Bees and Honey For Food Security, October 23-24. Tours of the Himalayas October 25-26.

For information contact **rtlaboriosa@gmail.com**.

♦ALABAMA♦

The Alabama Beekeepers Association will hold their Annual meeting September 30 and October 1 at the Clanton Conference and Performing Arts Center in Clanton.

Speakers include Jerry Hayes, Jim Tew and Shane Gebauer.

Details can be found at **www.alabamabeekeepers.com**.

♦CALIFORNIA♦

American Apitherapy Society October 21-23, The Redondo Beach Hotel, Redondo Beach.

For details visit **www.apitherapy.org**.

♦CONNECTICUT♦

Back Yard Beekeepers Association 2016 Speaker Schedule – October 27: Anne Frey, TBD; November 17: Jennifer Tsuruda, Clemson TBD.

Each month we have timely weekend hands on inspection workshops, bee school, mentor program and more. For dates and locations and more information please visit **www.backyardbeekeepers.com**.

♦LOUISIANA♦

20th Annual Field Day will be held at the USDA Honey Bee Lab in Baton Rouge, October 8.

You must pre-register and the cost is $30 by September 30..

For more information or to register online visit **www.labeekeepers.org** or contact Lanie Bourgeois, 225.767.9299.

♦MARYLAND♦

NAPPC International Conference October 18-20 at the USDA Animal and Plant Health Inspection Service in Riverdale.

Speakers include Kevin Shea, Bruce Rodan, David Inouye and more.

For information visit **www.NAPPC.org**.

♦MINNESOTA♦

POLLINATION September 11, 10020 Norell Ave No., Stillwater.

Details can be found at **www.pollination.pbt.me**.

♦NEW JERSEY♦

Mid-State Beekeepers October 15 at the Ramada Inn, Bordentown, 9:00 a.m. to 3:00 p.m.

The guest speaker is Jim Tew.

Details can be found at **www.njbeekeepers.org**.

♦NEW YORK♦

4th Annual Greater New York Bee Conference hosted by the Long Island Bee Club, October 9 at Farmingdale State College.

Speakers include Richard Fell, Peter Borst and Kristen and Michael Traynor.

For more information contact Joan Mahoney, **saw_whet@hotmail.com**.

Empire State Honey Producers Association will be held November 4-5 at the Embassy Suites Hotel, Syracuse.

For information visit **eshpa.org**.

♦OHIO♦

East Central OH Beekeepers Association September 17 at Zanesville Eagles #302 Conference Hall.

Michael Palmer, Tom Seeley and Steve Repasky are the speakers.

For more information visit **www.e-coba.org**.

Medina County Beekeepers Association will host Joann Dunlevey, OH Dept of Ag, September 19 at Root Candles, Medina, Ohio at 7:00 p.m.

For information visit **www.medinabeekeepers.com**.

Cleveland Pollinator Symposium October 22 at Squire Vallevue Farm, Hunting Valley, 8;30 a.m. - 4:30 p.m.

OH State Beekeepers Association Fall Meeting, November 5 in Plain City.

Speakers include Jamie Ellils and Steve Repasky.

For information visit **www.OhioStateBeekeepers.org**.

♦OREGON♦

OR State Beekeepers Association will hold their Annual meeting October 28-30 at the OR Garden in Silverton..

Speakers include Tom Seeley, George Hansen, Ramesh Sagili, John Skinner, Elina Nino, Judy Wooand more.

Details can be found at **www.oregongarden.org**.

♦PENNSYLVANIA♦

Philadelphia Honey Festival September 9-11 at three historic sites – Glen Foerd on the Delaware, Bartram's Garden and Wyck Historic House, Garden and Farm.

Details can be found at **www.phillyhoneyfest.com**.

Education is what you get when you read the fine print. Experience is what you get when you don't.

Pete Seeger

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If you are having an annual meeting or teaching a beginning beekeeping class, we are happy to send you magazines to give to your attendees and students. BUT – we need to receive your request four weeks before your event so that we have time to process your request. Please email Amanda at Amanda@BeeCulture.com with the number of magazines needed, a complete mailing address and a contact person.

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On our way back from dropping off a load of bees on the Colorado Flat Tops, Frank remarked, "This is a good old truck."

He soon rued those words. You should have seen Frank and me, with 144 years of life experience between us, pushing that 1983 flatbed Ford one-ton up the gentlest of inclines to get it off the road.

Mine is not your everyday 1983 Ford, mind you. Rather, a converted E350 van with an aftermarket 20-foot wood plank bed. This truck is mostly aftermarket. Like the rebuilt 1978 460 engine, and an add-on four wheel drive. If you push the 4WD lever too far when you're going from four wheel drive to two wheel drive, you'll land in no-man's land between high and low range. Now you can't get back into two wheel drive without shutting off the engine. But you can't use the key to shut off the engine, because in no-man's land the automatic transmission won't go into park. You have to pull the distributor wire.

I learned a lot of this stuff out on the road.

I don't own a cell phone, and Frank didn't bring his, but I do carry tools. We pulled the engine cover inside the cab and right away figured out the engine wasn't pumping gas. I could hear the main fuel pump on the frame hissing, or I thought I could, so I figured the problem must be a second, low-pressure fuel pump located inside the rear tank. The front tank has a hole in it, so I don't use it.

We caught a ride to my gal Marilyn's house a couple of miles down the road. Her neighbor Tom mechanics out of his garage, and he has common sense and 40 years experience, if not all the latest diagnostic tools. Marilyn called AAA for a tow. They asked what kind of a vehicle is it, and as soon as the agent heard the word "flatbed," she said no way. Marilyn explained this was a converted van, and they'd tow a van, right? Right. Finally Marilyn asked to speak to a supervisor. The squeaky wheel gets the grease.

I had it all wrong. Tom replaced the main fuel pump. The beast *doesn't have* an in-tank pump. Imagine that! Twelve years I've owned this truck, and I was so sure. I even found an old receipt that says I replaced one. That makes no sense at all. Now a lot of ancient E350s with a 460 engine do have the in-tank pump, but remember, there's not much that's original on my rig. Somewhere along my twisted path I got a wrong idea stuck inside my head. Not the first time.

Maybe I was too quick to call for a tow. Tom told me if your fuel pump quits, sometimes you can get it running again by tapping it with a hammer, just like you can a stuck starter motor.

Frank suggested I was lucky my fuel pump went out when it did, because I was set to drive over the Colorado Rockies to pick up 100-plus honey supers from yet another Tom, this one a beekeeper downsizing his operation. I could see myself holed up in a cheap motel in a some strange town, waiting on repairs. That image so haunted me that I ultimately decided to rent a U-Haul truck and leave the flatbed at home.

I figured I'd rent a 10-foot truck one-way from Boulder to my place, just shy of 200 miles. The friendly lady at the U-Haul 800 number told me her dad kept bees in Ohio, bless his heart, and she informed me I could rent a truck for $347, plus tax. I said I'd sleep on it.

When I called back to make a reservation, a different U-Haul agent told me forget it. There wasn't an available 10-foot truck within 50 miles of Boulder. But this gentleman said he could rent me a nine-foot "cargo van" in Boulder for $168, for 24 hours. I told him that might be big enough, and I liked the price. The catch, he explained, was this had to be round-trip, so I'd have to first make

it on my own to Boulder, then find my way home after the round-trip.

I was calculating if 116 medium supers would fit in that van, when I saw a bright light. If I could rent a van round-trip from Boulder, why not round trip from where I live near Glenwood?

Where did I get the idea that I ought to rent a truck one-way, rather than round-trip, in the first place? And why would anyone rent round-trip from the *wrong end* of a trip? And where was my guiding hand Marilyn when I was poised to make a really dumb move? I need all the help I can get.

I finally got my supers, but my adventures with U-Haul were just beginning . . .

Ed **Colby**

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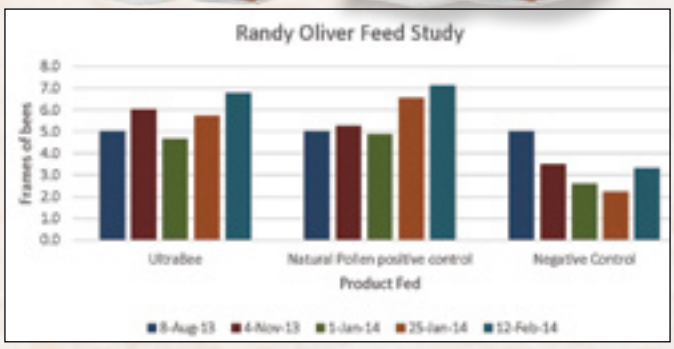

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