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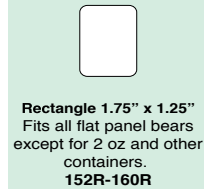


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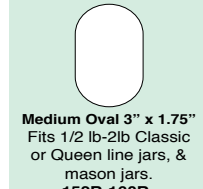
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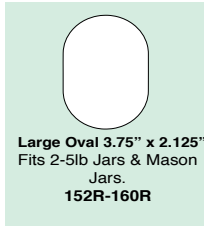
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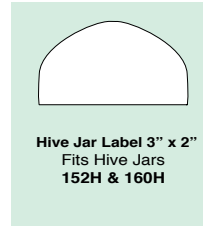
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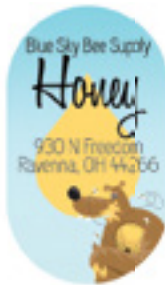


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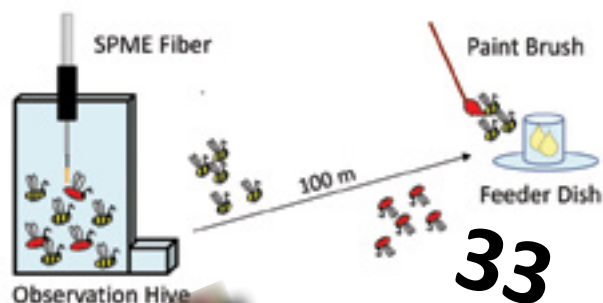
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Marina Marchese



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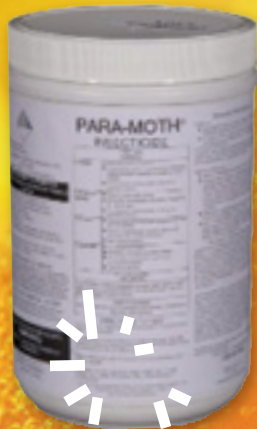


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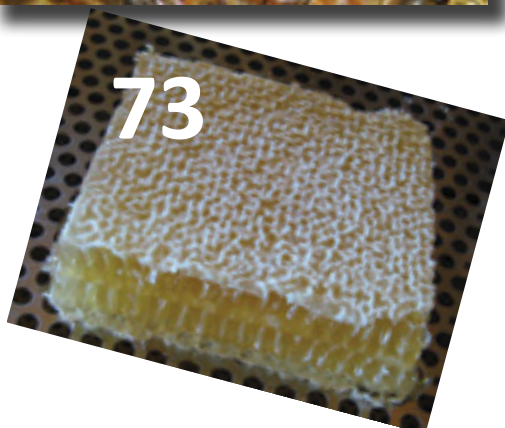


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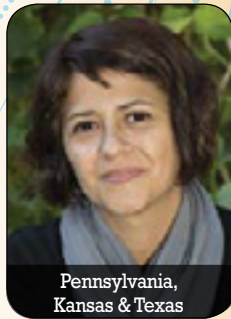
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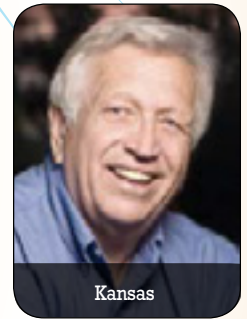
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Synopsis of Honey Bee Repellent Recommendations

This year, as in years past, the public has shown interest in honey bees and has reached out to our laboratory to understand and deal with honey bees in their daily lives. Honey bees in Central Texas, as well as many other parts of the U.S., experienced an unusual Spring. The unprecedented wet, cloudy weather meant that bee plants in bloom may be visible, but nectar foragers are often unable to collect what they need from them. Because of this, some local restaurants are finding their outdoor eating spaces being visited by honey bees, as foragers cash in on the convenience of sugary drinks as alternate food sources. This sort of behavior comes as no surprise to most beekeepers. After all, we have seen how quickly honey bees go for sugar syrup when we have to give hives supplementary feed. To restaurant owners who serve sugary drinks outdoors, however, having bees foraging around their food and clientele is quite the buzzkill.

While our laboratory does conduct honey bee research, we do not focus on repelling honey bees. To the contrary, we focus our research efforts on increasing the overall number of honey bees foraging around our area. Therefore we reached out to members of the **American Association of Professional Apiculturists (AAPA)** to ask for recommendations on how to repel honey bees from outdoor eating areas. We were impressed at the immediate response from prominent researchers around the globe and we want to share them.

Respondents pointed out that honey bees cannot detect sugar per se from a distance. Instead, bees can quickly learn to associate odors, usually floral, with a source of sugar. Restaurants who are experiencing high honey bee traffic have accidentally trained foraging bees to come to them. Most of the responses to our local restaurant owner's query involved less bee deterrents, and more tactics to retrain the bees away from those areas. The suggestions given by the

AAPA members are summarized below:

- Double check that the insects that are attracted to the food source are actually honey bees rather than wasps or something else – *J.J. Bromenshenk* (Bee Alert, MT)
- Clean up all sugary spills as quickly as possible, and screen off the important places – *Eric Mussen* (University of California, Davis)
- Consider using the Non-Toxic Time Release Insect Repellent used by nurseries spray to keep bees out – *Charles Nye* (University of Illinois at Urbana-Champaign)
- Cover garbage cans in the dining area – *David DeJong* (University of São Paulo)
- Empty and wash out the trash cans frequently as well as clean up all exposed sugar after washing the tables with bleach water – *Marla Spivak* (University of Minnesota, Twin Cities)
- Put self-closing lids over trash cans and foragers will stop being trained to seek food there – *Randy Oliver* (ScientificBeekeeping.com)
- Do not let trash cans get over-full so sweet trash is exposed. Any dumpster bins should have a cover – *Ann Harman* (beekeeper)

We hope that some of these suggestions may help to stop honey bees from foraging in areas where they are not welcome. We hope you have a good bee season!

Julia Rangel and Friends
Rangel Honey Bee Laboratory,
Texas A&M University

Bee History

Much of my reading over the years has been historical accounts describing early adventures in the American wilderness, but I don't remember ever seeing any specific observations on the subject of honey bees in that vein until recently, when I found mentions in two books. They were both from journals of the 1830s, when honey bees were making their way across the country.

You may of course be aware of these accounts, but in case you have not seen them, I thought you might find them interesting.

William "Big Foot" Wallace, as quoted by John Duval:

There is something singular about the movements of bees. They

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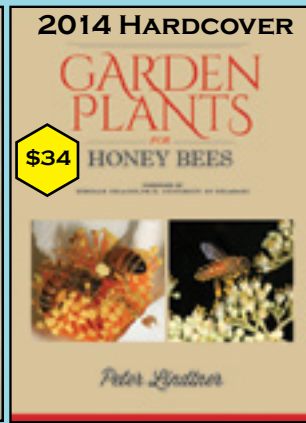


are never found a great way from the settlements, but usually precede them 50, 60, or a 100 miles, so that whenever they make their appearance among the Indians, they know that the white people are coming soon – and yet, they do not remain long in their wild state after the country becomes thickly settled. In many places where "bee trees" were numerous when I first came to Texas [1837], they are now seldom if ever found.

Was this at least in part due to the "bee hunters"? Davy Crockett mentioned a bee hunter in his journal, but did not explain his line of work.

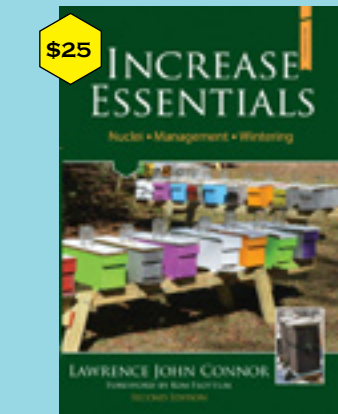
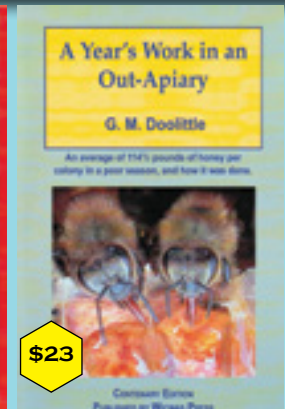
Captain Benjamin Bonneville, explorer in the fur industry during the earlier 1830s, wrote and was quoted by Washington Irving:

The feuds of White Plume [a Kansas Indian chief befriended by Bonneville], however, had not been confined to the red men; he had much to say of brushes with bee hunters, a class of offenders for whom he seemed to cherish a particular abhorrence. As the species of hunting prosecuted by these worthies is not laid down in any of the ancient books of venerie, and is, in fact, peculiar to our western frontier, a word or two on the subject may not be unacceptable to the reader. The bee hunter is generally some settler on the verge of the prairies; a long, lank fellow, of fever and ague complexion, acquired from living on new soil, and in a hut built of green logs. In the Autumn, when the harvest is over, these frontier settlers form parties of two or three, and prepare for a bee hunt. Having provided themselves with a wagon, and a number of



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empty casks, they sally off, armed with their rifles, into the wilderness, directing their course east, west, north, or south, without any regard to the ordinance of the American government, which strictly forbids all trespass upon the lands belonging to the Indian tribes.

The belts of woodland that traverse the lower prairies and border the rivers are peopled by innumerable swarms of wild bees, which make their hives in hollow trees and fill them with honey tolled from the rich flowers of the prairies. The bees, according to popular assertion, are migrating like the settlers, to the west. An Indian trader, well experienced in the country, informs us that within 10 years that he has passed in the Far

West, the bee has advanced westward above a hundred miles. It is said on the Missouri, that the wild turkey and the wild bee go up the river together: neither is found in the upper regions. It is but recently that the wild turkey has been killed on the Nebraska, or Platte; and his travelling competitor, the wild bee, appeared there about the same time.

Be all this as it may: the course of our party of bee hunters is to make a wide circuit through the woody river bottoms, and the patches of forest on the prairies, marking, as they go out, every tree in which they have detected a hive. These marks are generally respected by any other bee hunter that should come upon their track. When they have marked sufficient to fill all their casks, they turn their faces homeward, cut down the trees as they proceed, and having loaded their wagon with honey and wax, return well pleased to the settlements.

Now it so happens that the Indians relish wild honey as highly as do the white men, and are the more delighted with this natural luxury from its having, in many instances, but recently made its appearance in their lands. The consequence is numberless disputes and conflicts between them and the bee hunters: and often a party of the latter, returning, laden with rich spoil, from one of their forays, are apt to be waylaid by the native lords of the soil; their honey to be seized, their harness cut to pieces, and themselves left to find their way home the best way they can, happy

to escape with no greater personal harm than a sound rib-roasting. ("Rib-roasting" is defined by Farmer and Henley (*Sland And Its Analogs*, c1900) as a thrashing.) Bee hunting must have been a widespread and rather lucrative occupation in the 1830s, worth some risk, when sugar was so expensive it was generally kept under lock and key.

Lew Diehl
Houston, Ohio

Super Separator

I started beekeeping in 2006 when I helped an 84-year-old friend handle a swarm of bees. I wore a veil, short pants, and a T shirt. I had hundreds bounce off my bare legs with not one sting. I was hooked. Seeing the bees march into the hive reminded me of people going into church when the bell rings. Six legged stinging insects exhibiting kindness.

The thing I disliked most about beekeeping was opening a hive which had been well sealed for Winter. At times it took me forever to get the sections apart. Some times I even damaged a frame. The longer it took the more distressed the bees got.

Years ago, I had done some ocean fishing and used stainless steel wire leader. I had a roll that sat around and collected dust. Last Winter I got the idea of making a long garrote using the wire with dowels for handles. I hoped I could use it to separate joined boxes more easily, like a long wire cheese cutter. I made one and put it into my bee toolbox.



This Spring my wife (a fellow beekeeper) and I were trying to separate hive boxes. Both of us struggled with our hive tools for some time trying to pry the boxes apart. I decided at that point to try my new "invention". We got the



boxes separated in 20 seconds, and were amazed. The benefits we saw were:

- the bees did not get as excited
- fewer bees were inadvertently killed
- nothing was damaged
- this was fun!

Rainier Heller
Walnut Cove, NC

Conrad's Constitutional Freedom

With respect to Ross Conrad's excellent article *The Constitutional Freedom of Misinformation* in the August 2015 issue, I have been researching the history of Genetic Engineering (GE) and am finding the same types of arguments used by GE proponents as Ms. Logomasini and the Competitive Enterprise Institute (CEI) are using to deny the role of neonics in CCD. The key to understanding the purpose of such disinformation is buried on the article's third page, under Claim #11: CEI "seeks to advance economic liberty by fighting government regulation...."

Instead of being impressed by the credentials of those who spew such disinformation, we consumers need to cast a more critical eye on who is likely to benefit from it. CEI purports to advocate sound science, but when you look at the facts (as Ross Conrad did), you will find that CEI routinely refutes scientific evidence in favor of promoting reduced government regulation intended to protect consumers.

Who is likely to benefit from less government regulation? Well, let's look at who funds CEI. The long list of contributors includes companies and coalition organizations related to the chemical/agriculture, energy/oil, and pharmaceutical/biotech industries.



What I don't understand about these people who so blithely risk the health and lives of humans and other species: In their aggressive pursuit of the almighty dollar, don't they ever stop to think about what kind of world they are creating for their children and grandchildren?

More of us need to follow Conrad's lead in outing shameless deceivers like Ms. Logomasini.

Gail Damerow
Tennessee

Gail Damerow is the author of many books and articles on chickens and chicken coops, homesteading, horses, mules, goats, fences and even ice cream. Ed.

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Look At What's New —

Some Important Operations In Bee Management. T.S.K. and M.P. Johansson. Originally published by IBRA, now Northern Bee Books, UK. Available in bookstores, the web and from *Bee Culture's* book store. B&W, 6-1/2" x 9-1/2", 145 pgs., \$18.00.

If you've been around this industry for more than a couple of decades, you may remember Toge Johansson as a contributor to the journals. His articles all tended toward the academic side of the business, but his real interest was always the practical application of that information. This book is a collection of the most practical information you will find, anywhere. Whether a single colony backyard hobby beekeeper, or you've been running a few hundred for years, you will find useful information here.

For instance, chapters cover Handling bees, Uniting colonies, Using nucs, Wintering, Rearing queens, Feeding sugar, pollen and pollen substitutes, how to get water to bees, bees space and much, much more.

One simple trick for storing pollen. Mix 2 parts fresh pollen (from pollen trap) with 1 part granulated sugar, cover with a half inch of sugar and you can store for 2 years at room temperature. Some degradation of quality will occur, but not too much. How about 9 ways to use nucs, or 10 points for successful wintering, or how to get bees away from a water collection spot in the neighbor's yard. The list goes on. Get the book.

Kim Flottum



red headed honey is a Southern Michigan based beeswax cosmetic company, located outside of Camden, MI. We craft our products from honey bee byproducts that we sustainably harvest from our hives. While making all natural skin care products for you to enjoy remains our main focus, we also share in a mission to bring more awareness to declining honey bee populations. We have over 10 years of experience developing natural beauty products always keeping the health and happiness of the honey bee in mind. Our product line produces a nourishing honey lotion using organic Jojoba Oil, Honey and Vitamin E, which smells just like a freshly extracted jar of Spring honey.

Our favorite product is our Propolis Healing Salve, which contains plenty of antibiotic Propolis (sustainably harvested from our hives), Tea Tree Oil for its antiseptic properties all set in Hemp Seed Oil. This salve is effective in helping with eczema, psoriasis, burns, scraps or wounds. We also offer seasonal products such as Coconut Body Butter and a Royal Jelly Eye Cream. We only use the royal jelly from swarms cell and the wax from these cells which is higher in Vitamin A and E. We then mix those products with Bulgarian Rose Oil.

You can find something for everyone on our website, www.red-headedhoney.com or contact us directly at 707.616.4278.



The **B-Funnel** is a new way to install package bees that can mean less stress on both the bees and the beekeeper. The B-Funnel is installed on the front of a Langstroth style hive using the strap provided and is held in place with hook and loop ends on the strap. The Queen is installed in the hive between two frames and the outer cover is placed on the hive, then the package of bees is opened and turned open side down onto the B-Funnel.

The B-Funnel channels the bees directly into the hive with less bees in the air. It assists the bees in finding their new home, and can be removed as soon as the bees have left the package. The beekeeper can easily see when all of the bees have left the package and eliminates the need to disturb the hive to retrieve an empty package from inside the hive.

The goal is to reduce the stress on the bees during package installation and assist the beekeeper by making the process more visible. No more guessing when to retrieve the empty package box.

Once removed from the hive after installation, the B-Funnel conveniently stores flat, ready for the next time it is needed. The B-Funnel is constructed of corrugated plastic and is designed for repeated use.

For more information on the B-Funnel visit www.B-Funnel.com.

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BEE HEALTH DEPENDS ON COMMENSAL MICROORGANISMS.

Introducing Strong Microbials DFM Honeybee, concentrated direct-fed microbial supplement.

Variables affecting honeybee colony health. Honeybee colony health worldwide is considered to be in decline. A 2012 causal analysis workshop by honeybee experts focused on this problem identified nutrient deficiency as a possible cause, with infections and pests as other possible causes¹.

Important functions of commensal microbes. Nutrient absorption in the gut, as well as food preservation, requires commensal microorganisms. Besides digesting and fermenting food, commensal microorganisms synthesize essential B vitamins, and aid in defense against pathogens.

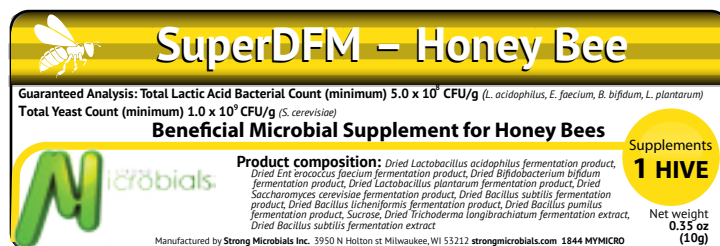
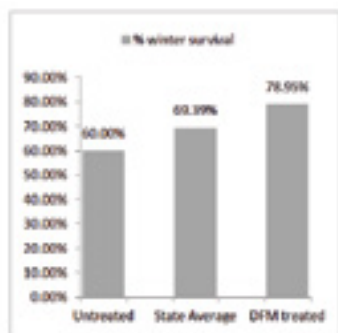
Commensal microbes help develop immune system², reduce inflammatory disease³, promote longevity³.

Chemical treatments suppress commensal bacteria. Preventative use of antibiotics and antimicrobials is widespread in commercial beekeeping practice to reduce infections. In addition to pathogens, **antibiotics and antimicrobials decimate the native hive microbial community, leading to dysbiosis.**

Feeding direct-fed microbial supplement restores commensal microorganisms. DFM (direct-fed microbial) is a mix of live concentrated bacteria and enzymes. DFM is **fed dry** by mixing with powdered sugar and sprinkled over top bars of brood chamber. DFM is applied two weeks **after** any treatments for nosema, foulbrood, varroa and two weeks after any essential oil treatment.

Our DFM ingredients include:

- Commensal *Lactobacillus* and yeast that aid in digestion of pollen and fermentation of beebread⁴⁻⁷;
- Commensal *Bacillus*. *Bacillus* species found in hive environment exhibit potent fungistatic activity⁸⁻¹⁰. *Bacillus* species can specifically suppress pathogens that cause honeybee diseases chalkbrood, nosema, and foulbrood¹¹.



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Brushy Mountain

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www.beelinewoodenware.com | 269-496-7001

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Approved by the EPA, with most states following, **Brushy Mountain** offers **Oxalic Acid** for *Varroa* control. Oxalic Acid is one more tool in a beekeeper's tool box to combat varroa mites. The label allows for three different methods of application. To achieve the highest possible efficacy, the colony must have little to no brood, making a great option as a late or very early season treatment. The Oxalic can be mixed with syrup and trickled on the bees using a syringe to accurately measure out the solution. It can also be vaporized using a specially designed vaporizer which connects to a car battery to melt the Oxalic powder. In about a minute and a half the powder melts and turns to a smoky vapor that disperses throughout the colony. Last, it is the only product which is registered for use on packaged bees, which by design is 100% broodless.

The packaged bees can be treated by spraying them with an oxalic solution resulting in a near mite free colony.

Currently, it is offered in a 35 gram packet which is the exact amount needed when following the mixing instructions on the label. The packet is sold by itself or as part of a kit which includes some personal protective equipment and a syringe for the trickle method. Simply mix in your syrup and treat. For \$5.95 you can treat up to 20 colonies using the trickle method, 35 colonies using the vaporizer (available for \$125) method, or 25 three pound packages making it the most cost effective treatment option.

For more information contact Brushy Mountain Bee Farm at 1-800-BEESWAX (1-800-233-7929) or visit BrushyMountainBeeFarm.com.

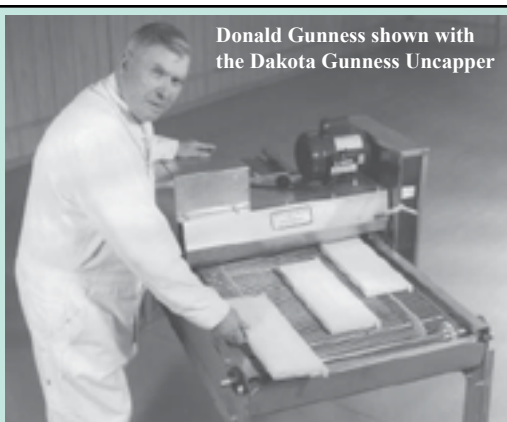


Over the past five years, **Full Ark Tees** has designed several nature-centric t-shirts. Among others, they have produced squirrels, frogs, cicadas, monarch butterflies, hummingbirds and dragonflies. In March of 2015, at the Michigan Beekeepers Association's 150th Anniversary Conference, they introduced their newest design: the Honey Bee (pictured).

The original offering was unisex t-shirts in two colors. They were so well received that the company has expanded its Honey Bee line to include five colors of unisex t-shirts, two colors of ladies' v-neck t-shirts, two colors of hooded and hoodless sweatshirts as well as various children's t-shirts, hoodies and onesies. Canvas tote-bags are also available.

Full Ark Tees are designed by award-winning artist Matt Schellenberg and hand-screen-printed by him and his family in Farmington Hills, Michigan. They use 100% cotton shirts (except in certain cases—for example our hoodies are 50% cotton and 50% polyester) and water-based inks which are very friendly to the environment (we use our clean-up water to water our grass and the clover that our neighborhood bees so often visit!).

You might run into Full Ark Tees at a local beekeepers' conference but you can always browse their full line of Honey Bee apparel at www.etsy.com/shop/FullArkTees. For answers to any questions you might have, please email Matt at fullarktees@gmail.com.



Donald Gunness shown with the Dakota Gunness Uncapper

"These machines are very dependable. They are durable and easy to operate."

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We sell liquid sucrose and 55% High Fructose Corn Syrup as feed for your bees.

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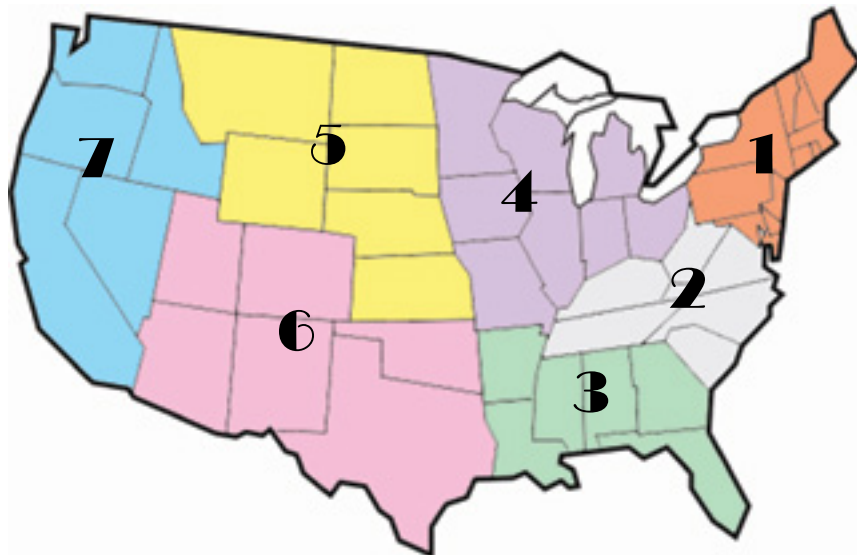
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SEPTEMBER – REGIONAL HONEY PRICE REPORT



Colony Losses, Crops And Queens To Date

We asked our reporters this month to assess both Winter and Summer-so-far colony losses. We went back to Winter because Winter losses sometimes take a bit to show up. We get out early, the colony looks good in a quick peek, but it's already dead and nobody told it yet. So they hang on for awhile, then start looking bad, but by then Spring is busy and we don't get back as fast as we should and it's dead before we know it. But it didn't get counted as a Winter loss

– was it a Winter loss, a Spring loss, a Summer loss? Well, sometimes it's a gut call what to call it, but usually we have a pretty good idea – so our reporters had a second chance to look at their losses and report back.

And those Winter loss numbers have changed. Upwards. Just like we suspected. Region 1 – 35%. 2-28%. 3 – 21%. 4 – 31%. 5 – 32%. 6 – 48%, and 7 – 24%. Most all some to quite a bit above the averages we recorded early this Spring. It's all in the timing. Over all the regions we recorded a 31% Winter loss – just like the past few years.

But Summer-so-far losses. We haven't asked that before. And because BIP group is looking, we decided to also. These numbers were significantly different than the BIP numbers from last year and so far are quite encouraging. Region 1 – 2%. 2 – 6%. 3 – 19%. 4 – 5%. 5 – 4%. 6 – 9% and 7 – 10%. Over all regions, Summer-so-far losses are only 10%, a not-too-bad Summer so far.

Summer losses are often related to queen failure, so we looked at that as a possible contributing factory, 58% or our reporters said they had

to replace 10% or fewer queens this Summer so far, but that means that over 40% have had to replace more than 10%, with 8% of them replacing more than half. There's something afoot here. Stay tuned.

Finally, keep a good thought for our 93 years young reporter J. M. Rosalee from Shreveport, LA. He lost all 20 of his colonies in a flood – honey, equipment, bees, everything. But, he assures us, he'll be starting again next season so keep those honey report forms coming. You can't keep a good beekeeper down, can you!

REPORTING REGIONS								SUMMARY			History	
	1	2	3	4	5	6	7	Range	Avg.	\$/lb	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS												
55 Gal. Drum, Light	2.22	2.00	2.29	2.29	2.25	2.03	2.45	1.90-2.45	2.23	2.23	2.29	2.17
55 Gal. Drum, Ambr	1.95	1.98	2.07	2.34	2.10	1.96	2.40	1.60-2.60	2.11	2.11	2.18	2.14
60# Light (retail)	203.50	166.47	171.67	194.39	171.00	177.00	240.00	119.40-300.00	191.06	3.18	207.09	193.73
60# Amber (retail)	199.67	166.80	180.00	197.95	199.78	182.00	300.00	115.20-300.00	191.96	3.20	203.05	194.15
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1 1/2# 24/case	80.37	75.40	89.89	65.97	51.84	104.80	120.00	51.84-144.00	81.86	6.82	81.97	83.63
1# 24/case	120.22	107.60	120.72	104.91	106.32	97.44	134.20	48.00-156.00	113.23	4.72	116.23	113.45
2# 12/case	105.60	98.00	105.08	94.25	97.44	93.00	114.50	72.00-144.00	101.38	4.22	109.37	102.00
12.oz. Plas. 24/cs	97.91	86.50	98.79	85.13	74.40	96.00	103.13	64.80-144.00	93.45	5.19	97.27	91.11
5# 6/case	122.43	109.50	122.85	104.93	102.30	105.00	130.00	84.00-180.00	113.94	3.80	114.83	116.47
Quarts 12/case	179.11	128.35	131.74	116.42	125.64	133.50	141.00	105.00-252.00	139.95	3.89	139.09	134.35
Pints 12/case	105.44	89.50	78.67	83.52	94.49	75.00	97.00	60.00-138.00	89.99	5.00	91.97	88.17
RETAIL SHELF PRICES												
1 1/2#	4.81	4.12	4.00	3.71	3.90	4.37	6.00	2.90-6.29	4.41	8.82	4.42	4.19
12 oz. Plastic	5.65	4.81	4.98	4.58	4.81	5.75	6.40	3.39-8.00	5.24	6.98	5.48	5.10
1# Glass/Plastic	6.68	6.54	6.76	5.82	5.79	6.75	9.00	2.00-10.00	6.56	6.56	6.82	6.42
2# Glass/Plastic	11.87	10.83	10.90	10.40	10.42	11.07	16.00	5.50-18.00	11.37	5.69	11.53	10.77
Pint	10.82	8.25	8.24	7.36	8.50	9.36	10.20	6.00-14.00	9.01	6.01	9.39	9.03
Quart	18.68	14.81	13.89	13.04	16.13	14.65	17.60	8.50-30.00	15.64	5.21	15.43	15.11
5# Glass/Plastic	26.57	24.19	26.95	25.23	24.26	24.85	30.00	15.00-38.00	25.59	5.12	25.16	24.23
1# Cream	8.92	7.50	9.28	6.68	9.61	7.19	9.00	5.00-16.00	8.05	8.05	8.59	8.06
1# Cut Comb	10.75	10.50	7.50	9.70	8.17	10.50	19.50	5.50-25.00	10.52	10.52	10.06	9.39
Ross Round	8.67	6.75	8.74	9.75	8.74	8.25	8.74	6.00-12.00	8.48	11.31	8.55	8.79
Wholesale Wax (Lt)	6.27	5.25	3.84	6.86	6.00	7.25	4.63	3.00-16.00	5.88	-	6.27	5.92
Wholesale Wax (Dk)	5.59	4.92	3.00	6.25	6.33	4.00	4.00	2.50-12.00	5.41	-	5.37	5.02
Pollination Fee/Col.	90.36	59.17	52.50	69.17	80.00	93.53	185.00	35.00-185.00	77.07	-	80.93	87.22



\$15.7 million

was paid to beekeepers
in 2014 – were you
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10 Year Payment History

example for grid 20138 Merced County, CA

2014	\$34.90
2013	\$78.00
2012	\$34.36
2011	\$14.69
2010	- 0 -
2009	\$18.94
2008	\$55.70
2007	\$44.26
2006	\$34.73
2005	\$27.45


10 Year Average
payout per hive

\$34.30

- 15.35 cost

Average Profit **\$18.95** per hive

Only ONCE in the last 10 years
where you didn't get
your investment back...
other years, it added profit
to your bottom line.



Let us show you a customized example for your area. 2015 looks to be a good year for the program, too! Many of our beekeepers have already received checks for the 2015 policy year. Call Kevin to find out how to get yours — 402.360.2626. We will be visiting California beekeepers in July and August. I'd like to meet with you personally.

Call for an appointment.





INNER COVER

Everything suffers when you can't take care of everything. Take our garden. Our timing early on was perfect. We snuck in between storms and stuck in the tomatoes and squash and peppers and cabbage and beans and radishes and basil and cukes we wanted – sometimes starting just as the showers were quitting, and finishing just as they were starting again. But we got them in on time, or even early so they should do well, we figured. But the 40 days of rain and no way to get to it to work after it

was planted and it simply went to weeds. Let me tell you about the weeds. Last Summer we didn't even get a garden in. Gone too much, wet too much. Work too much. Suddenly it was August. Did a few tomatoes in pots on the deck and a few beans, but that was it. Farm Market sellers did good by us last year – and, this year.

Anyway, two Summers ago, a neighbor who has since left (to cheers from everybody in the neighborhood) decided he'd fix his wet basement by changing the topography of his lot, and the course of the drainage from his front yard. It used to run straight across his driveway, straight into the north east corner of my basement. Some time ago we put in drainage pipe and shunted that waterway away and had a dry basement. Then the new drainage from his lawn changed the course and it now went into the south east corner of my basement. So, because this guy's a jerk, I had to put in more drainage pipe and it almost is perfect again.

Well, the guy who put in the pipe also does top soil and asked if I wanted a load added to my not-being-used garden plot so it could overwinter and be ready to go this Summer. Good idea, I thought, and in it went. We spread it out and let it sit all Winter, and this Spring waited for the first batch of weeds to come up, tilled them down and then the rain started (see above).

But it was the weeds in that top soil that surprised me. Grasses I've never seen. Broadleaves from another planet. Sedges and plantains and things I'm not even sure are plants came back with a vengeance. Again and again and more and

more, smothering anything that was supposed to be there in only days. We tried. We really did. Small rototillers, shovels, finally resorting to small, then big weedwhackers just to get to the plants that are producing about 10% of what they should be.

You can imagine what's left. After a decent day whacking those alien weeds, it looks like I'm growing tomatoes and squash and beans and cukes and peppers in sod. A nice, green, lush carpet of living, breathing sod. Thank goodness for the Farm Market.



During our recent trip to the UK to visit friends and do a bit of business we were able to see quite a bit of the country. We were in Cornwall first off, which is the farthest

south west point of the island, and we stayed in the most southern point of the most southern point. Indeed, there were palm trees scattered here and there. We had to take a four plus hour train ride from London to get there so got to see much of the landscape in that part of the country. But those hedges! Along almost every road, and almost every mile of train track. You'd get a short glimpse of a field with something blooming but then whoosh – hidden again by the hedge. But I got to see enough to get a feel for the dairy, sheep and grain crops growing there.

Those hedges, however, serve several purposes. They keep cars on the road – I don't think you could drive a car through one, though maybe a large truck could barge through. But they are, or many of them are blooming plants enjoyed by bees, and thus beekeepers. When in Ireland last year I found that many of them were hawthorns. Good for bees, but no people would ever make it through one. Those I saw this time were a mix of plants, but many of them were bloomers, and protected by the beekeepers.

Another sight, along those roads that weren't hedged, were the plants simply growing by the side of the road. I was told that they used to keep the roadsides well mowed and trimmed, but budget cutbacks made them stop and these weeds took over. We should be so lucky. Butterfly bush, *Buddleias*, simply thrives in the climate there, and they were everywhere, larger than I've ever seen them. Eight, 10 some almost 12 feet

Gardens Gone Bad. Roadside Bliss.



Fire Weed.



The Northern Ireland swarm – cold and hungry and not very nice.

tall and almost as wide were growing everywhere. In yards, gardens, wild by the side of the road, in fields. They were in full bloom at the time and there were a rainbow of colors showing. What a treat.

And in some places, where there was lots of sun (not an easy place to find considering all the hedges blocking the light and making roads and roadsides shady most of the time) you would see willow herb growing. There would be a large patch, maybe six feet wide and 20 to 30 feet long about every 50 yards or so, or until the shade took over. The photo shows one of those patches. You and I don't call this weed willow herb however. Every beekeeper in the U.S. calls it Fire Weed, and it makes almost perfectly clear, water white honey that's to die for when it's pure.

Here and there would be a small canola field – oil seed rape as it's called there – and lots and lots of dairy pasture with clovers and thymes and all manner of blooms in full force. One of which was the yellow loosestrife plant, which was common, and legal.

We stopped by Northern Ireland on the way home to visit Michael Young and his family. Michael is a familiar face here, training people to judge honey using the King's Rules, rather than those we are familiar with here. It's a different animal, but interesting. On the way from the airport he gets a swarm call. "OK, we'll be there" he says and off we go. You

can see where they decided to go. Why, I have no idea, but nearly impossible to get at between and wooden fence and the stone fence. And, they'd been there, said the wooden fence's owner, for several days. And they weren't in too good a mood. They were hungry and it was cold. So we managed to find a spray bottle, some sugar and warm water and fed the heck out of them, which is just what they needed because they left later that afternoon before we could return with our equipment. An Irish swarm that wasn't meant to be.

•

I've been meaning to share the hat the Treasure Valley Beekeepers gave me last year when I was in Boise at their honey bee celebration. They did a bang up job that we wrote about at the time, and treated me like a king. Thanks for the hat, for the good time, and the wash tub full of great gifts they sent along afterwards.

•

Make sure and read Ann Harman's story on the National Honey Board. When they first started they were supported by honey producers, so beekeepers were a lot more involved then. And, the Board was a lot more involved in honey production, beekeeper's meetings and communicating with beekeepers. Now

that they are packer and importer supported we don't see as much of them as we used to, and that's too bad I think. If you haven't, visit their web page www.honey.com for a ton of useful marketing information, and take advantage of all they have to offer. It will only help, everything is free and professionally done, and I don't think you can go wrong.

They also fund a lot of honey bee research focusing on keeping bees alive so there's honey to be had. They do a lot of market research also which you can take advantage of so you can better figure out who your customers are, and what it is exactly they want.

And as long as you're reading about honey, look in on the story of honey kitchen regulations in Missouri. If your state has laws like they did before they were changed you are going to have a tough time selling honey. Learn some lessons from what those folks were able to accomplish and maybe you can get your state's laws changed.

But whatever you do, it's September, really, really time to get thinking about winter. Remember... take care of the bees that take care of the bees that go into winter. And, keep your veil tight, your hive tool handy and your smoker lit. You'll be better off if you do.



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It's Summers Time –

Vacations, Chickens and Losing A Treasure

Home, home again. We had an amazing trip to England and Northern Ireland. The best part of this trip was the chance to see friends we've made in the beekeeping world. Kim and I have been so blessed by the beekeeping industry and *Bee Culture Magazine*. It has given us so many opportunities to meet some incredible people on this almost 30-year long journey that we have been on.

This trip was 95% vacation. Kim did manage to slip in one bee talk to a small group down on the southern tip of England. About 50 people came out on a Monday night to hear him speak. Jeremy of Northern Bee Books arranged the evening and it was a treat. But the rest of the time we spent relaxing and seeing some sites that we hadn't seen before.

After the seven hour plane ride we arrived at Heathrow Airport – a huge place and somewhat intimidating. You walk and walk and walk and finally make your way into a huge room with the serpentine rope line that you experience when you go through security. We were in line and hundreds of others waiting with passport in hand and hoping that they let you through with no hiccups. Even though you know you haven't done anything inappropriate, it's still somewhat unnerving. We made it through with no issues, claimed our luggage and then walked and walked and walked some more to catch the Heathrow Express which would take us to Paddington Train Station in downtown London. We then had a four and a half hour train ride to our first destination. I love trains so it was enjoyable – nap for a while, look at the scenery, talk to Kim. It was a pleasant trip.

Ruth and Jeremy were down in the Cornwall area of England in a village called the Lizard. It is truly beautiful there. We arrived late Saturday afternoon. We went on a long hike along the ocean on a sunny Sunday afternoon – we must have walked at least a couple of miles. It was grand. We were able to have a short visit with Brian Sherriff who makes incredible beesuits. Brian is one of our long-time friends and advertisers. He still cuts out all of the suits himself at almost 90 years of age. It was a treat to visit his cutting room and training facility. More about that at another time.

Kim gave his talk on Monday and on Tuesday afternoon we took the train to Reading where our dear friend Peter Smith picked us up and we spent a few days with him. He took us to Windsor Castle. Wow – 900 years old! It's hard to imagine that people still live, work and rule there. It took several hours to tour the grounds. St. George's Chapel is there and people still go to church there every Sunday and actually every evening.

Peter spent his life working with geologists, soils engineers and water engineers. He went all over the world testing and surveying using boreholes to see if places were structurally sound enough for building bridges, constructing tall buildings and, not least, drilling wells for water supplies. If I understand it correctly the boreholes are dug so far down (sometimes 100's of feet) and that would indicate what's under the surface. Peter went to places like Nigeria, Iraq, and almost every continent in

the world. He is fascinating to listen to. Peter is a true British Gentleman.

After a couple of days with Peter it was off to Belfast to visit our friends Michael and Rae Young. Michael is a chef, beekeeper, meadmaker, chicken keeper, artist – there's not much that he can't do. Michael took us to the Titanic Museum – that was a very cool two-and-a-half hours. It contains a lot about the history of the city of Belfast as well as the Titanic information. A great day. Then there was the birthday party. It was Sienna's 10th birthday. She is Michael's oldest granddaughter. Michael has four daughters and four granddaughters.

This trip was a great vacation for us. Vacation is not always a common word in our world. We spent time with good friends, we did tourist things, we drank a lot of tea – I ate fish and chips probably five times. I love fish and chips and what better place to get them than the original place. It was wonderful. Thank you to all of our friends who housed us, drove us around and treated us like family.

The chickens and ducks fared well while we were gone. None went missing. Brandyn did have to catch some of them now and then, but nobody perished. The two remaining Barred Rocks are the ones that kept escaping. So this week we relented and clipped their wings. It seems kind of a harsh thing to do, but it must be just like getting a haircut because they didn't even flinch. The young chickens are just over four months and we're not getting eggs yet. Kim is still a little grumbly about having 18 chickens and only getting three or four eggs a day. Hopefully that's going to change soon. It has become apparent that the two ducks we have left are a male and a female. They look exactly Mallard like, but are much smaller. They are so cute. They have now started to respond loudly when we let them out in the morning and they respond to my whistle. She follows him around wherever he goes. They are never far apart.

The funniest thing – every time we clean out their swimming pool they won't go back in for a couple of days. Very weird. We got them a bigger pool so hopefully they can go all the way under when they want. No sign of any eggs from them yet either.

I lost a treasure this past week. My children's grandmother, Mamaw as they called her. Technically speaking she was my ex mother-in-law. But she never treated me that way. She loved me the same as when I was an actual member of her family. She was 83 and she had suffered a lot more than anyone should have to. She was the best grandmother any boy could have. She was the best cook in the world, but most of all she loved them well. She held them when they were little. I would pick them up from a night with Mamaw and their little heads would smell like Estee Lauder – her favorite perfume. I knew that she had held them all night long. She played with them – she was a whiz at Yatzee. They were really excited about the few times they would actually beat her.

My boys and their cousins are all grown up now, but they all loved and cherished Mamaw. And more recently she had great grandchildren to love on. If there was a baby around she would love it.

And she treated me like her own. We had a wonderful relationship for over 35 years. I will miss her. She was a real treasure in my life. Thank you Mamaw.





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MAKING CONNECTIONS FOR POLLINATOR HABITAT

It takes people.

Michele Colopy

Guidance documents to develop pollinator habitat abound, created by nonprofits, university extension, State and Federal agencies, land restoration companies, and seed companies. Pollinator habitat brochures, pamphlets, and guides do not by themselves make change. It takes people to implement the guidance documents, and to work together to ensure the habitat is created and maintained. Pollinator Stewardship Council realized this, and sought others to support habitat projects to ensure pollinator habitat gets created.

Restoring pollinator habitat is not the sole action to improve the health of honey bees and native pollinators. We know honey bees and native pollinators are suffering from a combination of pests, pathogens, pesticides, and poor forage. Addressing any of the four issues facing pollinators is difficult: there will always be *someone* who will not like some proposed solution or action. Even planting pollinator-attractive flowers, trees, and shrubs can cause ill-will in a neighborhood of dandelion-free grassy deserts. The sense of order and control offered by a chemically-saturated, non-native grass lawn gives some land owners a sense of purpose and status in life. But, planting pollinator-attractive habitat reminds others of Ladybird Johnson's efforts to "beautify America," and to restore beauty and a natural balance to urban yards, streetscapes, and city parks.

Whether it is Ladybird Johnson or President Obama increasing awareness of our ecosystem, their ideas need people to make connections with other people to ensure the restoration of pollinator habitat.

The Pollinator Stewardship Council started connecting beekeepers from the Ohio State Beekeepers Association and local bee clubs with corporations, a university farm,

Scott's Miracle-Gro, the Ohio EPA, and two environmental education nonprofits. At the beginning of this year the Ohio Environmental Education Fund (OEEF) (a fund of the Ohio EPA) awarded a grant "Beekeepers Collaborating to Create Pollinator Habitats" to the partnership of Medina County Beekeepers Association, Ohio State Beekeepers Association, and the Pollinator Stewardship Council. The grant is funding the development of pollinator habitat on a combined total of 33 acres of corporate land in northeast and southwest Ohio. Three corporate land partners have committed to creating and maintaining the habitat for a minimum of five years. The land partners are CEMEX – a global leader in the building materials industry, the Dayton Veterans Affairs Medical Center, and Professional Services Providers of Wadsworth, LLC.

Most of the land partners' land is currently planted in grass and surrounds their corporate offices. The land will remain the private property of the land owner, and will be transformed into pollinator habitat across 2015. The land partners will contract with local beekeepers to place beehives on the property. The land owner may also opt for simply having butterfly houses and Mason Bee houses positioned on the property. Citizen scientists, local beekeeping club members and land

owner employees, will survey the land up to twice a year for five years noting the diversity of insects, and other animal life that are utilizing the habitat. This data will be available in a public database. Educational materials will be provided to the corporate partners to share with their employees and customers. The local bee clubs will provide scholarships to four 4-H students within the land partner areas, with the 4-H students writing articles for the corporate newsletters about honey bees and their beekeeping experience. The beekeeping partners will encourage other corporations and the public to convert their grassy lawns into pollinator habitat through 24 presentations. To secure buy-in to the project the land partners were responsible for preparing their land for the pollinator habitat. The land partners were connected to professional conservation land managers, like Ohio Prairie Nursery. Grant funding demands cash and/or in-kind donations to match the awarded grant funds. The land partner had to pay to prep their land (in-kind funds), the beekeeping associations donated their time as citizen scientists surveying the land for insects, giving 24 presentations, and for the 4H scholarships to beekeeping classes for four students (in-kind donations). The grant paid for seeds, pollinator "houses," half



VA land being hydroseeded with pollinator habitat seeds.



CEMEX land: Thirty acres in need of goats!

the cost of beginning beekeeping kits for four 4-H students, educational materials, and habitat signage.

Each land parcel offers diverse examples to inspire others. The smallest plot at Professional Service Providers of Wadsworth was a typical grass yard. Instead of exposing the entire lawn area, planting beds were created. The pollinator beds had to be high enough from the roadway for the spray of the snow plows and their salt spray to not impact the flower beds across the Winter. Seeds were purchased from bbbseeds, and butterfly and Mason Bee houses were purchased from BestNest.com. The grant funder encouraged, but did not require all grant funds be expended through Ohio businesses.

Three acres of grass on the campus of the oldest Veteran's Administration (VA) medical facility is being transformed into pollinator habitat. Seeds were purchased from Ohio Prairie Nursery and hydroseeded in June. Butterfly houses and Mason Bee houses were provided, as part of the grant, and placed in the habitat. Our partner at the VA is a beekeeper, and a member of the Greene County

Beekeepers Association.

The largest parcel of land has the most potential with surrounding park lands, wetlands, and minimal agriculture. Thirty acres of land owned by CEMEX will be planted in the Fall. The amount of weeds, and invasive plants on the land has made it a challenge (and an expense) to prepare for planting pollinator habitat. Restoring lands includes ensuring success, which may include soil testing for healthy mineral content, and seeking alternatives to reducing the lands' current invasive vegetation. What we really needed were goats! Goats would have "pruned" the vegetation on this land, thereby reducing the herbicide use. But alas, we could not find any goats to rent in Ohio. This land has to be planted in the fall due to the amount of vegetation on the land. Our partner at CEMEX is also a beekeeper from the Greene County Beekeepers Association.

A second habitat project of the Pollinator Stewardship Council is supported by a GRO1000 grassroots grant, and the students of the Maria L. Baldwin School in Cambridge,

Massachusetts. This project is creating pollinator plantings near crops on the working, educational farm in northeast Ohio, Squire Valleevue Farm. Local beekeeper, Bobbi Pincus, helped make the connection between Pollinator Stewardship Council and the Squire Valleevue Farm. Ms. Pincus and the Pollinator Stewardship Council travelled to the Farm to discuss another project idea, when by connecting with staff at the Farm, the habitat project developed. The project will provide for pollinator plantings in the food growing areas: the May Squire garden, Research garden, and the Berry garden. These pollinator habitat strips at the Valleevue Farm will demonstrate that agriculture and pollinators can co-exist, increasing crop yields, and supplying pollinators with diverse food sources. The grant partners will create a "guide" to the plants and the pollinators in the pollinator habitat, posting it on the Farm website complimenting their other guides of plants, mammals, etc. that reside on the Farm.

The Maria L. Baldwin School in Cambridge Massachusetts' challenged students through their Bee A Reader program to learn about honey bees. Across five weeks the students exceeded the school wide goal of 5,000 hours of reading. They solicited sponsors from family members, friends and neighbors. During the program, students in all grades learned about the importance of bees to agriculture, the crisis currently facing them, and the challenges facing bee populations due to pests, pathogens, pesticides, and poor forage.

The Scott's Miracle-Gro GRO1000 grassroots funding is a program to

This year, *from 4,836 responding beekeepers*, 46% said that they treated a majority of their colonies with a known varroa mite control product the previous year.

These beekeepers lost far fewer (26.8%) colonies than those who did not treat.

This is the fifth consecutive year where this correlation has been documented.



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help local communities with garden and green space development. The pollinator habitat projects are part of the Scott's Miracle-Gro Company's GRO1000 Initiative, designed to create 1000 gardens and green spaces throughout the U.S., Canada, and Europe by 2018, the Company's 150th anniversary. Scott's recently placed bee hives on their corporate property in Marysville, Ohio. (for additional information see Ohio State Beekeeping Association third quarter 2015 OSBA newsletter at <http://www.ohiostatebeekeepers.org/resources/osba-newsletters/>)

Pollinator habitat guides, brochures, or National Strategies will achieve nothing unless we connect the people. Kim Flottum tells beekeepers to help decrease Winter bee losses we must, "feed the bees that feed the bees that go into Winter." Planting pollinator habitat, increasing the diverse forage for our honey bees and native pollinators will help (not solve, but help) the health of our pollinators, giving them healthy, diverse pesticide-free pollen and nectar for their Winter stores. Planting pollinator habitat connects beekeepers with corporations, helps corporations see beekeepers as their customers, their neighbors, and helps corporations fulfill their own corporate environmental ethic and stewardship. Increasing pollinator forage, and reducing the pesticide exposure to pollinator forage is an attainable goal. It just takes people talking to people, and working together for honey bees and native pollinators. **BC**

Note: the deadline for this article was prior to bloom on these habitats. Visit our website at www.pollinatorstewardship.org for additional photos of these pollinator habitat projects.

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Questions and Answers

There is always more than one way to solve a beekeeping problem, and almost always one of those ways is exactly right for you. Last month we asked how you get old beeswax comb off of plastic foundation so you can reuse the frame. My way was to soak the frames, wax and all, in a rain barrel for a couple of days to soften the wax and make removal an easier task. We're still looking for other ways to do this so if you have a technique that works for you send it in an email with Q&A in the subject line and let us know.

This time, David Taylor sent in his response...

My solution would be to use a 12 setting heat gun from Harbor Freight. The settings range from 430 degrees to 1,160 degrees.

I have used this on lower settings to remove wax from bottom boards and it is fast and easy.

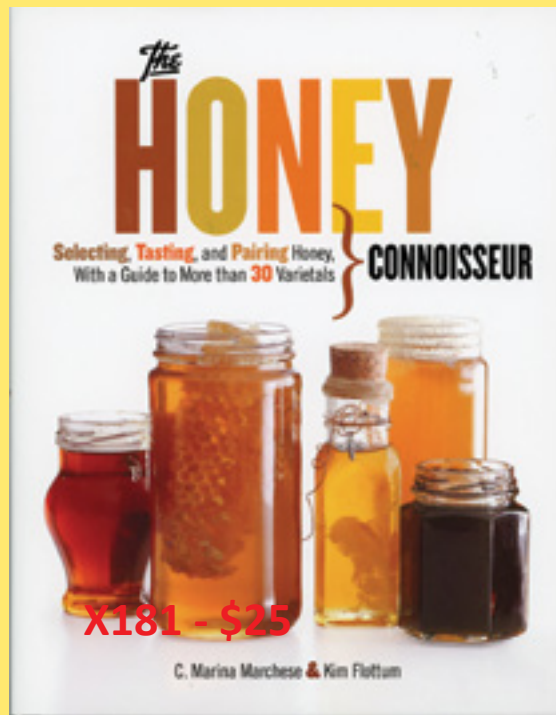


Please send in your questions on other topics also. We're going to put as many as we can in each issue.

We got a lot of tips on how to liquify your honey without melting those plastic jars, so we'll be including some of those tips.

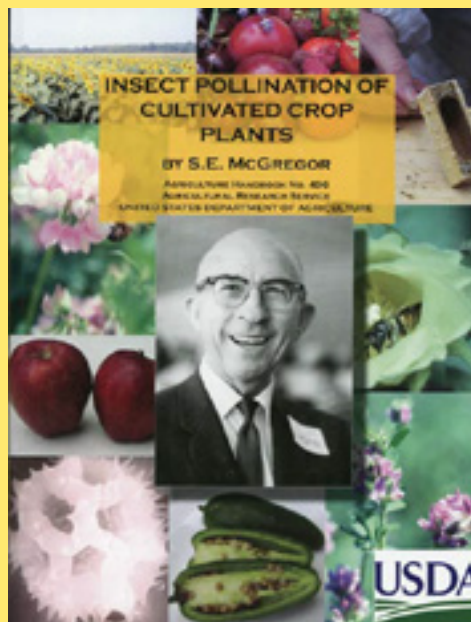
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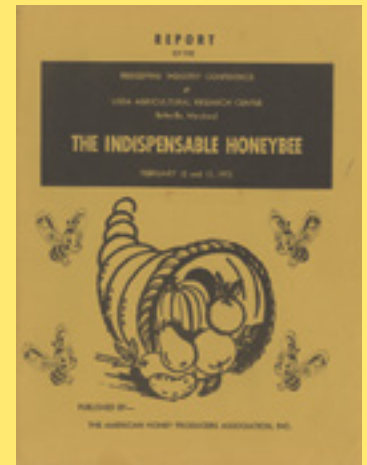


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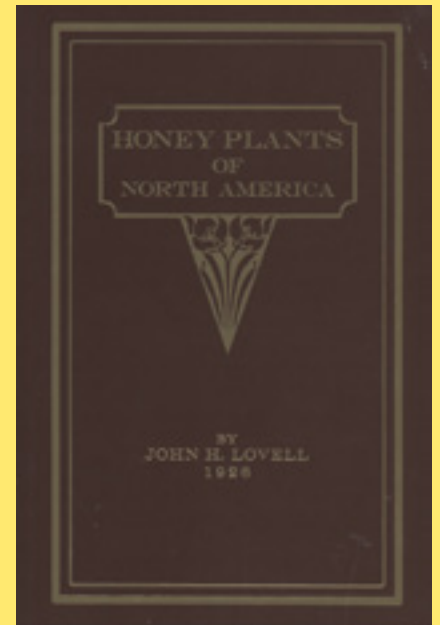
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A Closer LOOK

IMPACTS OF GM CROPS ON HONEY BEES

Clarence Collison

Because of the social nature of honey bees, transgenic pollen collected by a foraging bee may be stored in the hive and subsequently ingested by many other adult and older larval bees.

Genetically modified crops are increasingly being grown worldwide but there continues to be concerns in regards to their impact on honey bees, as well as other pollinators. Transgenic plants may have direct or indirect effects on bees. Direct effects may be defined as those that arise when a bee ingests the protein that a transgene encodes. Indirect effects may arise if the process of introducing the transgene into the plant results in inadvertent changes to plant phenotype. Direct effects on bees may arise if transgene products (proteins) occur in the pollen, nectar or resin of a transgenic plant. These effects will depend on the nature of the transgene product and on the amount of it consumed by the bee (Malone and Pham-Delègue 2001).

Toxicity tests with purified transgene products are often the first step in assessing risks to honey bees from transgenic crop plants. Bees may be affected by transgenic plants in two different ways. First, direct ingestion of the gene product in pollen or nectar may have an effect on the bee although, as nectar contains only small quantities of amino acids, the building blocks of proteins (Baker and Baker 1977), it is far less likely to carry the gene product than pollen which has a large protein component. Because of the social nature of honey bees, transgenic pollen collected by a foraging bee may be stored in the hive and subsequently ingested by many other adult and older larval bees.

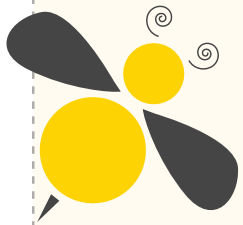
Secondly, expression of a foreign gene may result in pleiotropic (multiple effects from a single gene) effects in the transgenic plants that may make them more or less attractive or nutritious to bees. Picard-Nizou et al. (1995) found that some transgenic canola plants carrying a chitinase gene produced a greater volume of nectar with a higher sucrose content than unmodified plants. As the behavior of pollinating insects such as bees relies on a series of complex sensory responses (Gary 1992), even minor alterations in plant biochemistry may alter bee behavior.

“There have been suggestions that Bt proteins produced in insect resistant crops might be contributing to recent declines in honey bee abundance, but Cry1Ah corn carries no risk for the survival, development, colony performance or behavior of the honey bee.”

Early studies only investigated the impact of a single transgenic protein or transgenic plants expressing single transgene proteins on bees. However, newer crop varieties often express two or more transgene proteins, which may be referred to as stacked genes.

The early commercialized transgenic crops contained Bt genes which were isolated from *Bacillus thuringiensis*, a soil-dwelling bacterium which produces a range of insect-specific toxic proteins (Cry1Ac, Cry1Ab, Cry1Ba, Cry9C, Cry3A, Cry3B, Cry1F etc.). Different strains of *B. thuringiensis* produce different suites of toxins. Usually each toxin is specific to a particular order of insects and Bt genes encoding toxins with lepidoptera (moth larvae), dipteran (flies) or coleopteran (beetles) activity have been isolated. Cultured *B. thuringiensis* spores and vegetative stages have been used for many years in biopesticide preparations where their lack of hymenopteran (bees, wasps, ants) activity has ensured a good safety record with bees (Duan et al. 2008). Despite this, there have been suggestions that Bt proteins produced in insect resistant crops might be contributing to recent declines in honey bee abundance.

Honey bees are most likely to be exposed to insecticidal proteins from transgenic plants via pollen. An assessment of the impact of such exposure on the honey bee is an essential part of the risk assessment



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process for transgenic *Bacillus thuringiensis* (Bt) corn. A field trial was conducted to evaluate the effect of transgenic Bt Cry1Ah corn on the honey bee (Dai et al. 2012). Colonies of honey bees were moved to Bt or non-Bt corn fields during anthesis and then sampled to record their survival, development and behavior. No differences in immature stages, worker survival, bee body weight, hypopharyngeal gland weight, colony performance, foraging activity or olfactory learning abilities were detected between colonies that were placed in non-Bt cornfields and those placed in Bt cornfields. They concluded that Cry1Ah corn carries no risk for the survival, development, colony performance or behavior of the honey bee.

To assess the possible hazard for honey bees of CryIIIB protein from a Bt derived gene, the toxin was supplied, mixed in supplemental syrup to colonies. Two different toxin concentrations were used at levels of about 400 and 2000 times higher than the expected protein content in pollen from Bt-transgenic plants. Hives were sampled every week to record larval survival and pupal dry weight. Frames of bees were counted at the beginning and the end of the experiment as an index of colony strength. No toxic effects on larvae were observed. Pupal weight was not significantly affected by diet regime. These results indicate that transgenic crops producing CryIIIB toxin may represent a suitable environment for pollinators (Arpaia 1996).

Laboratory feeding studies showed no effects on the weight and survival of honey bees feeding on Cry1Ab-expressing sweet corn pollen for 35 days. In field studies, colonies foraging in sweet corn plots and fed Bt pollen cakes for 28 days showed no adverse effects on bee weight, foraging activity, and colony performance (Rose et al. 2007). Brood development was not affected by exposure to Bt pollen but significantly reduced by the positive insecticide control.

Ramirez-Romero et al. (2008) assessed the potential effects of two concentrations of Cry1Ab protein (3 and 5000 ppb) on young adult honey bees. They evaluated the effects of the Cry1Ab on three major life traits: survival of honey bees during sub-chronic exposure to Cry1Ab, feeding behavior and learning performance at the time that honey bees become foragers. The impact on learning was tested using the proboscis extension reflex (PER) procedure. The same effects were also tested using a chemical pesticide, imidacloprid, as a positive reference. The tested concentrations of Cry1Ab protein did not cause lethal effects on honey bees. However, honey bee feeding behavior was affected when exposed to the highest concentration of Cry1Ab protein, with bees taking longer to imbibe the contaminated syrup. The bees exposed to 5000 ppb of Cry1Ab also had disturbed learning performances. Bees continued to respond to a conditioned odor even in the absence of a food reward. These results show that transgenic crops expressing Cry1Ab

protein at 5000 ppb may affect food consumption or learning processes and thereby may impact honey bee foraging efficiency. However, given the difference between the expected maximum dose of exposure under natural conditions (potential maximum accumulation into the hive) and the observed dose effect (5000 ppb), they concluded that the negative effects of Cry1Ab protein on foraging behavior is unlikely in natural conditions.

There is no evidence that the switch to Bt crops has injured honey bee colonies in the United States. To the contrary, it has benefited beekeeping by reducing the frequency of pesticide applications on crops protected by Bt, especially corn and cotton. On the other hand, the switch to genetically engineered crops with herbicide resistance has eliminated many blooming plants from field borders and irrigation ditches as well as from the crop fields themselves (Johnson et al. 2010).

A two-year field trial (2001 and 2002) and a one-year semi-field trial (2002) were conducted to evaluate the effect of transgenic herbicide (glyphosate, Roundup®)-tolerant canola *Brassica napus* L. pollen on larval and adult honey bee workers. In the field trial, colonies were moved to transgenic or non-transgenic canola fields (each at least 99 acres) during bloom and then sampled for larval survival and adult recovery, pupal weight, and hemolymph protein concentrations. No differences in




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larval survival, adult recovery, and pupal weight were detected between colonies placed in non-transgenic canola fields and those in transgenic canola fields. Colonies placed in the transgenic canola fields in the 2002 field experiment showed significantly higher hemolymph protein in newly emerged bees compared with those placed in non-transgenic canola field; however, this difference was not detected in the 2001 field experiment. In the semi-field trial, bee larvae were artificially fed with bee-collected transgenic and non-transgenic canola pollen and returned to their original colonies. Larval survival, pupal survival, pupal weight and hemolymph protein concentration of newly emerged adults were measured. There were no significant differences in any of the parameters measured between larvae that were fed transgenic canola pollen and those fed non-transgenic corn pollen. Results from this study suggest that transgenic canola pollen does not have adverse effects on honey bee development and the use of transgenic canola does not pose any threat to honey bees (Huang et al. 2004).

Protease inhibitors are another group of insecticidal proteins expressed in several transgenic plant species. Some purified protease inhibitors have been shown to reduce the longevity of both adult and larval honey bees when fed to them at high doses. For example, larvae fed Kunitz soybean trypsin inhibitor (SBTI) in an

artificial diet (1% w:w of total protein), delayed development and increased mortality compared with those on a control diet (Brødsgaard et al. 2003). Since pollen is only a minor component of the natural diet of larval bees (Babendreier et al. 2004), this concentration is likely to be greater than that which bee larvae would be exposed to in transgenic crops. Adult honey bees fed with SBTI and other protease inhibitors at concentrations about four times the effective leaf expression levels for such proteins also have reduced longevity (Malone et al. 1995, 1998, 2001; Burgess et al. 1996). Behavioral changes have also been observed in some bees fed with protease inhibitors. Cowpea trypsin inhibitor added to the reward syrup in a conditioned proboscis extension assay reduced the ability of adults to learn this response (Picard-Nizou et al. 1997).

Genes encoding chitin-degrading enzymes have also been isolated from a number of biological sources. As chitin is an important structural component in fungi and insects, chitinase genes have been engineered into plants in order to protect them from fungal infection and pest attack. As with other insects, chitin is an important component of the cuticle (exoskeleton) of bees. Thus bees might be affected by ingesting chitinases expressed in transgenic plants. Acute toxicity tests with 10-day old adult honey bees fed sugar solution containing a chitinase purified from tomato (11 µg per bee) showed that this transgene product had no significant impact on bee survival after 24 or 48 hours (Picard-Nizou et al. 1997). Bees injected with 1.69 µg of chitinase were similarly unaffected.

Biotin-binding proteins (BBP) are a lesser known group of insecticidal proteins, recently expressed in transgenic plants (Hood et al. 1997; Murray et al. 2002). Honey bee adults and larvae fed with avidin at concentrations exceeding realistic exposure levels were unaffected by this BBP (Malone et al. 2002).

Brødsgaard et al. (2003) have suggested that some proteins expressed by transgenic plants and ingested by adult bees may pass intact through the gut epithelium, are transported to the hypopharyngeal glands, and secreted with the jelly fed to larvae. Such a mechanism would increase the potential exposure of bee larvae to transgene products. Malone et al. (2004) found no evidence that aprotinin (a trypsin inhibitor), avidin (BBP) or Cry1Ba had passed intact through the bee gut epithelium and accumulated in the hypopharyngeal glands. This indicates that these proteins are extremely unlikely to be passed on to bee larvae via secreted jelly. Direct feeding of pollen to larvae is by far the most likely route for their exposure to transgene products, if they are expressed in pollen. **BC**

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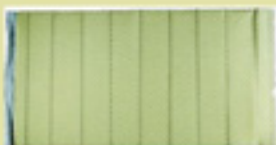
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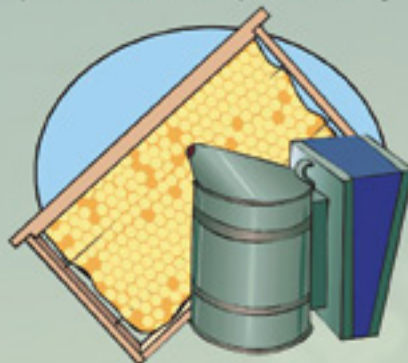
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Waggle-Dancing Bees Emit Body Odors

New Evidence Of An Important Role For Scent In Bee Foraging Communication

David **Gilley** & Corinna **Thom**

Bees and beekeepers share many things including the incessant drive to find food and eat it, behavior referred to as “foraging.” Human and bee foraging has been intertwined by agriculture into a tight mutualistic relationship, the success of which depends on deep knowledge of our partners’ biology and behavior (much like certain human-human relationships!). The scientific method has been of great help here, and continues to reveal amazing details of honey bee foraging behavior. The following is a story of some recent discoveries we have made about how bees communicate with each other to coordinate colony foraging. It probably will not change the way you work your bees this afternoon, but any detail of bee behavior could someday become relevant for beekeeping practice. And I think it will appeal to the curious biologist that I know is part of every beekeeper.

Knowing it All

The remarkable ability of honey bee colonies to discover and use food sources lies at the heart of what makes them successful across the world and useful to us as beekeepers. We know much about how bees achieve these amazing feats from the science of Karl von Frisch, Martin Lindauer, Tom Seeley, and many others (see von Frisch 1967, Lindauer 1971, and Seeley 1995). We know that the collective brain behind a honey bee colony’s foraging success is the waggle dance performed by successful foragers to communicate to potential recruits the location of a profitable food source. We know that waggle dance recruitment functions within a web of communication, involving close coordination between active foragers and other task groups such as food-storage bees and unemployed forager bees. We understand this dance signal to be a language which can be decoded to convert symbolic movement into real-world distances and directions, that this language has dialects, and that it can be modified to indicate food sources that are very near or very high-quality. We know something about the way in which information is transferred from dancers to dance followers, and we understand that there are elements to food signaling beyond the dance language, such as transfer of food odors. We know more than can be nutshelled here, but do we know everything? Recent experiments by teams of students and scientists such as myself suggest a new dimension to the communication process by which honey bees recruit nestmates to food sources. The identity of this new dimension: bee body odor.

Discovering a New Smell

While I was working as a post-doctoral researcher

at the USDA honey bee research lab in Tucson, Arizona, I received a visit from two honey bee biologists of the German tradition: Dr. Harald Esch of the University of Notre Dame, and Dr. Corinna Thom of the University of Arizona. We of the Tucson Lab were at the time working on the problem of queen supercedure and Africanization of European bee colonies (Gilley et al. 2006). For this work we were refining a technique of chemical sampling called solid-phase microextraction (“SPME”) in which volatile chemicals are absorbed onto a coated fiber, separated into individual compounds by gas chromatography, and identified by mass spectroscopy. This technique is more commonly used for detecting volatiles in organic liquids such as wine or from contaminated water, but also allows for nondestructive sampling from live organisms such as bees [Figure 1].



Figure 1. A live queen, in flask, is sampled for volatile compound emissions using a SPME fiber. The fiber is protected by a wire-mesh guard during sampling. Inset: diagram of a SPME fiber.

Drs. Thom and Esch were both impressed with the technique, wondering if it could be used to tap into the food-communication system on which they had both done research in the past. Some of their past work suggested that colonies could be stimulated to forage by exposure to air piped in from an actively foraging colony (Thom & Dornhaus 2004). We decided to try our luck, to see whether SPME samples we took of the air on the dance floor area of observation hives would reveal obvious chemical signals beyond the abundant odor “noise” present throughout the hive. To our scientifically tempered delight, four compounds revealed themselves in samples from the dance floor but not from other areas of the hive, nor from the dance floor at night, when foraging is shut down.

Documenting a Phenomenon

Could the compounds detected on active dance floors be chemical messages produced by forager bees? An alternative idea that would need to be addressed with evidence is that the compounds were odors from flower petals or from fresh nectar brought back to the hive by the foraging bees. To determine the source of these compounds, we marked bees arriving at an unscented food source and then took SPME samples of both marked foragers and unmarked non-foragers [Figure 2]. The outcome was that the compounds were present in samples from marked foragers but at high levels only from those marked foragers that waggle-danced. We therefore dubbed these the “waggle-dance compounds” (Thom et al. 2007).

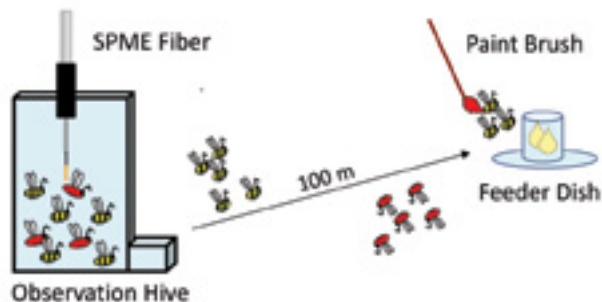


Figure 2. Experiment to determine the source of dance-floor compounds. After being trained to the feeder dish, bees arriving at the dish were marked with paint so that they could be identified when they returned to the hive. SPME samples of marked bees showed high compound levels only from waggle-dancing bees.

Now that we knew that something interesting (and undocumented) was going on, we recruited help from our chemist, Dr. Judith Hooper, who identified the waggle-dance compounds as long-chain hydrocarbons. These four hydrocarbons are known to be present on honey-bee body surfaces (Blomquist et al. 1980) and are known pheromones in other insects such as wasps (Steinmetz 2003) and flies (Howard et al. 2003).

Getting the Biology Right

Do the waggle-dance compounds function as a honey-bee foraging pheromone? Answering this would require demonstration that the dance compounds modify bee foraging behavior. Happily, most of the compounds are available for purchase commercially, so we were able to produce a mixture that mimicked natural compound

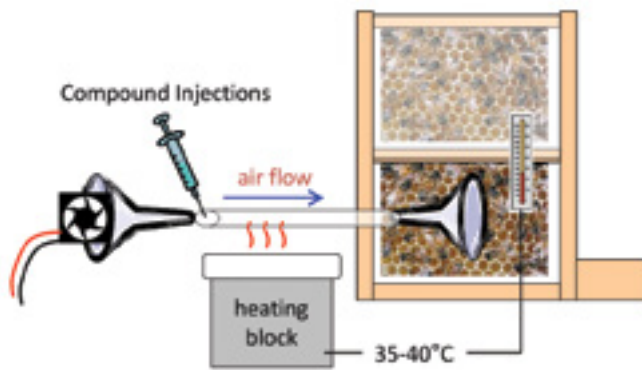


Figure 3. Experiment to determine whether dance compounds affect foraging behavior. The compound mixture was injected into heated tubing through which it was blown by a fan onto the dance-floor area of the observation hive. Heat was adjusted so outflowing air matched normal beehive temperature. Foraging behavior was measured by monitoring bee arrivals at a feeder dish.

levels and inject it into a hive to see if bee behavior changed as a result of exposure [Figure 3]. This kind of manipulative experiment, including an unmanipulated control group for comparison, is critical in science for establishing cause-and-effect relationships. We predicted that exposure to the dance-compound mixture would boost the number of bees arriving at a food source as compared to a control substance (here the mixture’s solvent alone). Results showed that the dance compounds nearly doubled the number of bees arriving at the food source in comparison with the control [Figure 4]. This suggests that the dance compounds, released by waggle-dancing bees, function as a colony foraging stimulant (Gilley et al. 2012).

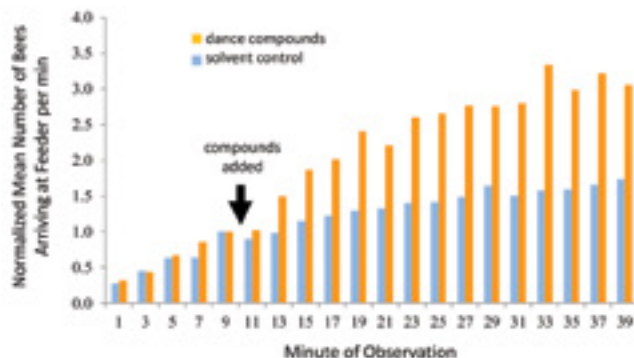


Figure 4. Results of experiment to determine whether dance compounds affect foraging behavior. Bee arrivals at the feeder dish were recorded for 10 minutes before the dance-compound mixture was injected, and for 30 minutes afterward. In half of the trials the pure solvent of the mixture was injected as a control. Each bar represents the mean number of arrivals from 15 trials, normalized among trials to account for daily fluctuations in foraging conditions. Redrawn from Gilley et al. 2012.

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- 1-4:30 p.m. – *Dennis vanEngelsdorp*,
Everything *Varroa*
- 4:30-5 p.m. – Q & A, Wrap-up

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- 8:30-10:00 p.m. – *John Miller*, Honey in CA & ND
- 10-11:30 p.m. – *Andy Card*, Honey NE and South
- 11:30-12:30 p.m. – Lunch, provided
- 12:30-2 p.m. – *Steve Coy*, Honey in SE
- 2:30-4:30 p.m. – *Jim Tew*, Winter Where You Are



Figure 5. Bees marked for individual identification drinking from a feeder dish. Identification of individuals was critical for experiments to understand the behavioral mechanisms by which the dance compounds stimulate colony foraging. Insets: William Paterson University undergraduate Corey Stein marks bees at a feeder; our state-of-the-art bee-marking technology.

From Colony to Individual

How do the waggle-dance compounds affect the behavior of individual bees to produce this colony level stimulatory effect? We thought the dance compounds might attract dance followers (who are potential recruits) and/or increase each dance follower’s willingness to become a recruit (i.e., to pursue the food source being

advertised by the dance). To test this, we marked a pool of forager bees for individual identification [Figure 5] so that we could record the effects of dance-compound exposure on individual behavior.

We predicted that dance-compound exposure would increase both the number of dance followers and the recruitment success of each dance, as measured from video records of the observation-hive dance floor. Data from two field seasons, however, did not support either of these predictions; there were no significant differences in the efficacy of waggle dances when bees were exposed to the dance-compound mixture (Gilley 2014). After a brief mourning period for the death of our beloved idea, we moved to the next most-likely hypothesis.

Considering Alternatives

If the waggle-dance compounds are not stimulating foraging by amplifying the message of the waggle dance to potential recruits, then who is the target recipient of the dance compounds? Well-known by those who have watched foraging bees in detail is that experienced foragers sometimes bypass dance-following altogether, instead using their “private” memory information to pinpoint former food sources (Biesmeijer & Seeley 2005, Gruter & Farina 2009). This phenomenon is known as forager reactivation.

We hypothesized that the dance compounds might reactivate foragers to visit food sources with which they had previous experience. If this hypothesis is true, then exposure to the dance compounds should still stimulate foraging flights even when the feeder is emptied to halt recruitment to the feeder via dancing. The experiment we

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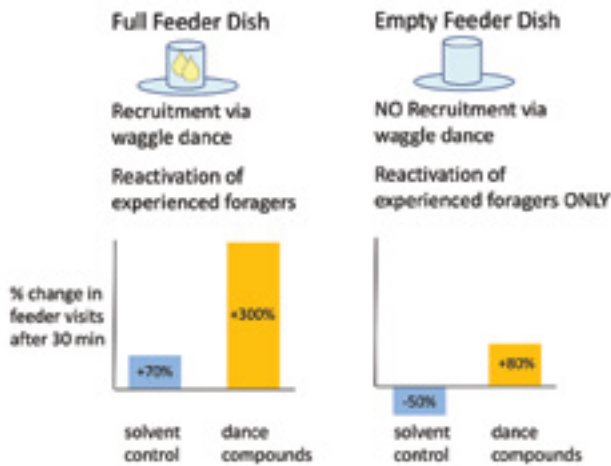


Figure 6. Rationale and results for experiment to test whether the waggle-dance compounds reactivate experienced foragers to visit known food sources. Previous experiments described here had used feeder dishes filled with sugar-water (left panel), thus the observed increases in foraging were a product of both recruitment via waggle-dancing and reactivation of experienced foragers. Emptying the feeder dish eliminated recruitment to the source, yet dance-compound exposure still increased the arrival of experienced foragers at the feeder dish (right panel).

conducted to test this was again similar to the previous experiment in set up, but now the feeder was emptied after the bees had been trained to it, and the behavioral response we measured was the number of experienced (marked) foragers arriving at the empty feeder dish.

After one season of defeat at the hands of unusually wet weather, data from the second season revealed a reliable increase in feeder visits by experienced bees following dance-compound exposure (versus the solvent control; Figure 6; Gilley et al. 2012).

So it seems that these compounds, emitted by waggle-dancing bees, are not so much messages from the waggle dancers to their dance followers, but to other bees in the hive for whom the existence of favorable foraging conditions is relevant. In retrospect, it makes sense that these volatile chemicals, as they diffuse throughout the dance floor area, carry a general broadcast message rather than a specific targeted message.

Speaking Bee

By manipulating levels of a pheromone to provoke a behavioral response, have we communicated with the bees? Honey bees, as you know, are smart little things, but their sensory world is alien to our own prohibiting communication of the kind we share with our domesticated mammalian cousins. If the conclusions of the experiments described above are correct, then we have in these investigations tapped into the scent-dominated sensory world of honey bee society. Improved tools for communicating with our bees could enhance our relationship with them, whether your beekeeping interests are as a hobbyist, honey producer, or agriculturalist. At present, this research suggests that we would do well to consider how our management practices could affect the finely tuned olfactory environment that bees craft within their hives. **BC**

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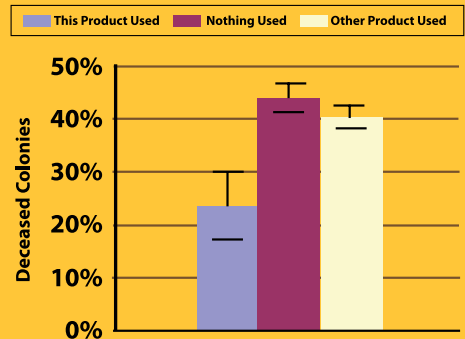





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Remember that old movie, “Mr. Smith Goes to Washington”? Me either, but it had something to do with Jimmy Stewart going to Congress, fighting corruption and striking a blow for the common man.

Well, this year Mr. Makovec went to Jefferson City, and I’d like to think my colleagues and I struck a blow for the state’s beekeepers. Maybe that’s where the similarity ends. I did not encounter any blatant corruption – well, unless you count a committee chairman asking if we’d brought any honey (we had) – and all of the legislators we met seemed genuinely interested in making their state a better place.

But what I did find was a system mired in futility, where a simple bill with virtually unanimous support can barely make it through the process in over three months’ time. Redundant committees, repetitive votes and unrelated amendments all conspire to slow down or even derail legislation. As someone told me at the outset, “There are 19 ways to kill a bill, and only one way to pass it.”

I’m sure the filibuster was one of those 19 ways, but I doubt that “sex scandal” was on his list. Things were already touch-and-go heading into a congested last week of the session, but it was ultimately a combination of those two scenarios that nearly ended our chances.

The Health Department cracks down

First, a little background: Missouri, up until this year, was one of quite a few states that classify honey as a processed food, and regulate it as such. Little known to most of the state’s beekeepers, we had a law on the books requiring all honey for third-party sale to be extracted

and bottled in an “inspected kitchen”. Beekeepers with less than \$30,000 in annual sales were exempt from this requirement IF they sold honey only “to the end consumer”. This meant handing the bottle directly to that consumer – not selling via internet, not handing off to a friend for delivery, not taking orders at a market

for later shipment. In addition, the container had to be labeled, “This product has not been inspected by the Department of Health and Senior Services.” (When selling at a farmers’ market, craft fair or other such venue, a prominent placard with that warning was also required.)

I learned this the hard way last August when I got a call from my county health inspector, who informed me she had just removed my honey from the shelves of a local market, as she had no record of my company, Sweet Harvest Honey, having an “inspected kitchen”.

The call surprised me for a couple of reasons. First, I’d had honey in that store for most of the previous year without incident. Second, Lincoln County, where I have lived now for about three years, is well-known in eastern Missouri for

having few standards for anything. (Your old fridge quit on you? Just drag it to the front lawn until such time as you find another use for it.)

So I told her, “I wasn’t aware that Lincoln County had any rules like that.”

“Oh, it’s not Lincoln County,” she replied, but the state of Missouri. She could not even cite the law in question, but gave me a phone number for the state inspector for the St. Louis region.

I told her that my honey had been in this store for quite some time, and asked if her action was in response to a complaint of some sort. No, she answered, “the state has been training us” on enforcement of their law. She again suggested I call the state inspector.



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It took Virginia Phillips about a week to return my calls, and while she was polite, she showed no sympathy for my situation or my arguments. “What’s the difference,” I asked, “between the honey I sell to you directly and what I sell to a store to sell to you?” When you sell directly, she responded, your customer can ask you questions about the product.

I told her that in almost 20 years I have fielded lots of questions about my honey, both directly and through retailers, but they have NEVER been related to health or safety. Rather, they fall into the categories of:

- Where are your bees located? (How “local” is this honey?)
- Why is this honey a different color than what I bought last Fall?
- Why does your honey taste so much better than what I buy in the supermarket?
- Can I buy it by the gallon?

We also discussed the language of the law in question, which repeatedly referred to the “processing” and “manufacturing” of honey. “I’m not processing anything,” I said, explaining that honey is a finished product once the bees cap it. “And bacteria cannot even live in honey.” There is no reason for it to be covered under processed food regulations, I argued, which are designed to prevent the growth and spread of bacteria.

“My husband and I used to be beekeepers,” she responded. “I know how proud you are of your product.” She added that she would be happy to explain the law to my local beekeeping club.

“As it happens,” I said, “I am currently the president of Three Rivers Beekeepers, which meets in St. Charles County.” I put her in touch with our program director, who set her up for our November meeting.

Some weeks later, in mid-September, I used my bully pulpit at Three Rivers to rant about this law and its repercussions. After the meeting I heard from a couple of other beekeepers, also in adjoining Lincoln County, who had been affected by the recent crackdown. My companion tirade on the Missouri State Beekeepers Association’s Facebook page prompted the MSBA to schedule Ms. Phillips to speak at its Fall Conference in October.

Her message there was not well-received. Most attendees had not been aware of the regulations, but a handful lived in counties that had recently begun enforcement. Some expressed the same incredulity as I had, asking what the difference was between the honey they sold at their doorstep and what they delivered to the corner market. And like me, they weren’t buying her explanation. When someone asked her to cite health concerns from unregulated honey, the best she could come up with was botulism. Even then, she admitted to a questioner that an inspected kitchen would do nothing to prevent it.

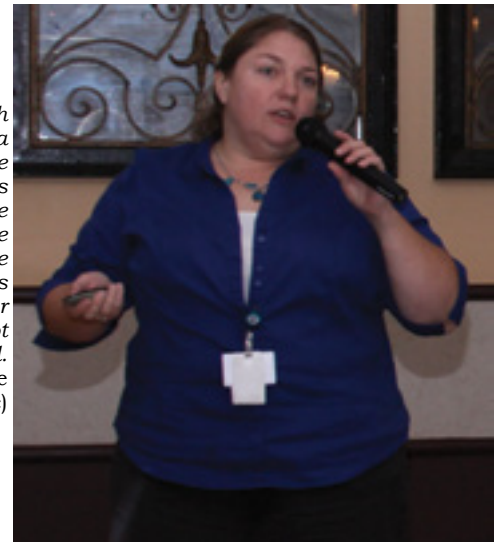
By the way, the Centers for Disease Control and Prevention reports an average of 145 cases of botulism per year in the U.S., two-thirds of which occur in infants. Only about a half-dozen are fatal. Botulism spores are present in dirt and dust, and thus can find their way into any number of natural, uncooked foods. There is no evidence that it is more prevalent in honey than in lettuce or corn syrup. And in virtually everyone over six months of age these natural doses cannot survive our digestive

system and so are harmless. Many beekeepers include a warning on their honey to avoid feeding it to infants under one year of age, though curiously there is no mention of this in Missouri’s (or most states’) honey regulations.

As for the kitchen requirements, Virginia couldn’t really define them for us, but after a running game of “20 Questions” we determined that it included three or four sinks, washable walls, a floor drain, covered lights and an adjoining bathroom – all with a plumbing/septic system separate from that of the primary residence. We later learned that this lack of a clear definition made for different rules from county to county.

Ms. Phillips did not show up for her scheduled appearance at Three Rivers in November, explaining a few days later that she’d forgotten due to an illness in the family. But as luck would have it, her predecessor in that position had come to hear what she had to say, and offered to stand up and speak in her stead. (He’d purchased honey at Isabee’s bee supply store, owned by Three Rivers board member Jane Suerme, and she’d had a discussion with him about the regs.)

MO Health Inspector Virginia Phillips defends the state’s honey sales regulations at the 2014 Fall Conference of the Missouri State Beekeepers Association. Her presentation was not well-received. (photo by Eugene Makovec)



He began by citing two incidents: The 9-11 terror attacks and the Tylenol tampering scare of the 1980s.

I raised my hand. “Would either of those incidents have been prevented by an inspected kitchen?”

“No,” he admitted.

We proceeded to educate him on the nature of honey and how it is extracted. He candidly told us that we would get nowhere with the folks at the health department. If you want to change the enforcement, he advised, you’ll need to go the legislature and change the law.

Gaining access

My incoming state senator, Jeanie Riddle, had just been elected two weeks before, and wasn’t taking office till January. I sent a detailed email to the old state rep office she was vacating, but did not get an answer. In the meantime, we formed a committee at Three Rivers to look into our options. We learned that Illinois’s beekeepers had just gotten their law changed in 2010, classifying honey as an agricultural commodity outside the purview of the state’s health department, and thus exempt from its food processing regulations (except for producers of more than 500 gallons per year). So since our current law applied to

“jams, jellies and honey”, our goal was to remove honey from that statute and write a new one giving Missouri’s beekeepers a broad exemption similar to that enjoyed by our neighbors to the east. We also mailed a letter to the Missouri Department of Health and Senior Services, asking for a list of cases where honey was linked to food-borne illness. We did not expect to hear back from them, and figured on using that non-response against them down the road.

On January 17th, I took our case to the MSBA Executive Board, of which I am a member as Newsletter Editor. The Missouri legislative session ran this year from January 7th to May 15th. But I was told by a couple of people on the board that if my bill had not already been introduced – just 10 days into the session - I might as well wait until next year!

I’d often read about all the bills that didn’t make the cut at the end of a session, but I always figured these

from Health and Senior Services informing me that, under the Sunshine Law, they had the right to charge me \$21.38 per hour for research and ten cents per page for their findings! I called and said we had no intention of paying for such results, but after being transferred a couple of times I was told that I would first receive a bill and have the option of paying for the results. But just two weeks later came their official response, stating, “After review, it has been determined that the Department has no records showing honey as the cause of any food-borne illness.” Even better, this letter showed up on the morning of my meeting with Senator Riddle!

We met in Kevin Flynn’s office, and I was already thinking in terms of 2016, but the Senator said no, we can get something done this year. In fact, she said, Zach already had a plan of attack: Rather than remove honey from the “jams and jellies law”, it would be simpler to remove jams and jellies from the “honey law”. Jams and jellies were already covered under a “cottage foods law” passed the previous year, so there was no need to cover them here, he said, and it would be an easier task to pass a revision to an existing law than to start over.

So we spent an hour hashing out the details, with Jeanie and Zach speaking in terms of what we could get passed, and me stating what I thought beekeepers could live with. For example, I would have liked to remove the \$30,000 threshold altogether, arguing that “it’s the same honey” whether I make 29 grand or 31. Barring that, I suggested changing it to 500 gallons like in Illinois, as that is a constant that will not lose value with inflation.

But Zach asserted, “You’ll never get something passed without a financial cap separating beekeepers like you from the big commercial producers.” The good news, he said, is that the cottage foods law has a threshold of \$50,000, so we can increase it to that without raising eyebrows. I went along, as that would raise it to an equivalent of about 800 gallons and allow for a few years of inflation.

The label change was a thornier issue. Both Jeanie and Zach felt that removal of the “not inspected” disclaimer would unduly complicate things and be more difficult to justify. But I wasn’t budging on this one, arguing that not only would this 14-word statement take up valuable real estate on my label (I handed them a 6oz bottle to illustrate my point), but such a warning goes against our basic premise that honey is inherently safe. Finally the Senator suggested we remove the disclaimer and see what happens; we can always put it back in, she said, if that’s what it takes to get the bill passed. I agreed.

“Other than the health department, who do you think will oppose this bill?” I asked them.

“Urban legislators,” responded Senator Riddle without a second thought. She was very surprised when I told her that the majority of the state’s beekeepers now live in urban and suburban neighborhoods.

By my request, Zach wrote up the bill and sent me a draft on February 16th for comment. I wheedled a promise to change the terms “processing” and “manufacturing” to “harvesting” and “bottling”, and forwarded it to the MSBA board, which voted unanimously via email to approve the language. Senator Riddle introduced it as Senate Bill 500 on February 24th.

Zach suggested that I contact House Ag Chairman Jay Houghton and ask him to sponsor an identical bill in



Label Challenge – find room for the statement, “This product has not been inspected by the Department of Health and Senior Services.” (photo by Eugene Makovec)

were controversial or just introduced late in the game. Who knew that “late in the game” meant mid-January? I learned this year that bills can actually be “pre-filed” as early as December 1, and in fact over 180 Senate bills were filed before the 2015 session even began.

So the MSBA board shelved the issue for the time being, with an eye toward trying to pass something in 2016. I went home discouraged, but two developments quickly got our efforts back on track.

First, I got an email from local beekeeper Kevin Flynn, who informed me that he knew Senator Riddle’s legislative aide, Zach Monroe, and offered to put me in touch. I emailed Zach the particulars, and he responded to say he’d look into the issue. Riddle’s office called in late January and we set up a meeting for February 13th.

The second development was a January 23rd letter

the House. As the Chairman would not return my calls or emails (presumably because I'm not in his district), I contacted my own representative, Randy Pietzman, who had just taken office himself but prevailed upon Mr. Houghton to introduce House Bill 1093 on March 3rd.

The gauntlet

Mark Twain famously said, "No man's life, liberty, and property are safe while the legislature is in session." And frankly, most of the things our legislators pass are bad laws, so we shouldn't make it easy for them. Having said that, some of the issues a bill can encounter are well beyond simple checks and balances.

For example, in the Missouri House we have an Agriculture Policy Committee, consisting of 18 members whose job it is to hold hearings and take public testimony on Ag-related bills before sending them on to the full House for debate. But beginning in 2015, we also have a Select Agriculture Committee, whose purpose is ostensibly to provide another layer of "quality control", thus ensuring that such Ag bills are doubly vetted before taking up valuable time on the House floor. I say "ostensibly" because six of the Select Committee's 11 members are also on the Policy committee – so they are in effect overseeing themselves! Further, as we learned later in the session, this extra committee affords legislators one more chance to tack on amendments before the bill reaches the floor.

Many readers may remember the old Schoolhouse Rock cartoon, "I'm Just a Bill", describing how a law is enacted at the federal level. The process is similar in most states. In Missouri, the following steps are needed:

- First Reading: The bill is introduced on the floor of the Senate. (The process is the same in the House.)
- Second Reading: The bill is assigned to a committee for discussion.
- Committee Hearing: A hearing is held where the sponsoring legislator introduces and argues for the bill, and members of the public are allowed to testify for and against. Committee members then hold an "Executive Session" and recommend the bill "Do Pass" or "Do Not Pass". "Do Pass" sends it to the full Senate for debate.
- Perfection: The bill is brought up for debate, possible amendment and a vote. If it passes it is considered "perfected" and is printed for distribution.
- Third Reading: The bill is brought up once more for an official roll call vote. If passed it is sent to the House, where the whole process is repeated. If that chamber passes the bill, it is pronounced "Truly Agreed To and Finally Passed" and sent to the governor for his signature or veto. A veto can be overridden by two-thirds votes in both chambers.
- If the House amends the bill, the Senate can choose to: Take it back through committee and pass it in its new form; reject the changes and return it to the House; or request a conference committee to hash out the differences. The results of that committee would need to be debated and passed by both chambers.

I'll bet that if you look carefully your state's process is as complicated, and frustrating.

The MSBA gets to work

Once the bills were introduced, we assembled a team of five beekeepers from strategic areas of the state to

testify in upcoming Ag committee hearings, which were held on March 17th and 18th in the House and Senate respectively. We coordinated our statements, each under three minutes, to hit upon various aspects:

I provided the overview, telling the story of my honey being pulled from store shelves due to a processed foods law that I didn't even know existed – a law designed for jams and jellies, which, unlike honey, are in fact processed foods and subject to bacterial growth and spoilage if not properly handled. I closed by quoting from the Health Department letter and concluded, "Enforcement of this law solves a problem that does not exist."

Mike McMillen was next, and talked about the various trials and tribulations that bees and beekeepers face these days, and how difficult it is to keep our heads above water as it is, without the government making things more difficult.

Charlotte Wiggins told them about the enormous contribution that beekeepers make to Missouri's Ag economy.

Bruce Snavely gave a rundown of the regulations for a commercial kitchen and how it cost one beekeeper in his area over forty thousand dollars to comply.

And Cathy Misko detailed the wide-ranging health benefits of honey – especially local honey – and what an important role it plays in our urban and suburban economy.

We were a bit taken aback by the overwhelming support we received from committee members, in both houses and from both parties. "Isn't honey, like, the perfect food?" asked one representative. "It's my understanding that honey never spoils," remarked another.

We did experience one hiccup on the House side, when a woman rose to speak in opposition. She represented a group of health professionals, and took issue with the labeling change. Her contention echoed that of Virginia Phillips last August: It's one thing for someone to buy in person from the beekeeper, who they can ask questions about the product, but people assume that food they buy in stores has been inspected by a government agency, and they need to be informed if that is not the case. And unfortunately, since Chairman Houghton had never spoken to us before introducing the bill, he could not answer the question of why we were making the change!

Luckily, the committee allowed me to speak again "for informational purposes". I argued the same points I'd made to Ms. Phillips, and the committee seemed convinced. In fact, both House and Senate committees voted unanimously "Do Pass" to advance the bills. SB 500 went to the Senate floor calendar, while HB 1093 went to the Select Committee, which also passed it unanimously and sent it to the full House.

Once again, we were amazed by the ease with which both bills sailed through. HB 1093 passed the full House on April 20th by a vote of 150-2. SB 500 passed April 21st by 31-2.

Since the bills were identical, I thought that was the end of it – but discovered to my dismay that, since these were technically separate bills, each was only halfway there; one would need to make it back through the entire process in the opposite house to become law. So with three weeks to go in the session, the calendar became our primary opponent.

Once again each bill passed one committee. But while

HB 1093 was placed on the Senate calendar, SB 500 first had to clear the House's aforementioned oversight committee, and this time its members chose to load it up with a slew of unrelated amendments. With just 10 days to go at that point, it was essentially a death sentence.

I called Jay Houghton's office and asked his assistant: Is there any way the Chairman can bring this to the House floor, strip the amendments and pass it in its original form? Her response: Work with the Senate to pass HB 1093.

But with one week to go, the Senate effectively shut down due to a fight over Right-to-Work legislation. The Republican leadership had made this anti-union bill its highest remaining priority, while the Democrats' primary goal was stopping it. The latter party threatened a filibuster, and the GOP used Senate rules to cut off debate and force a vote. So on Tuesday morning, with the session ending on Friday, Democrats announced a rolling filibuster - an end to legislating for the year. When MSBA President Valerie Duever called me that afternoon for an update, I told her it was over.

But by the time I got home from work that night, I'd decided to keep fighting. I sent email blasts to some 1500 Missouri beekeepers, posted to the MSBA Facebook page, and asked our Regional Directors to contact the local clubs in their areas, all with this final plea: Contact your Democrat senators and ask them to reconsider the filibuster, and contact House members of either party asking that they push to bring SB 500 to the floor, strip the amendments and pass a clean bill.

But the next morning, things took an unbelievable turn for the worse. The Kansas City Star broke a

story about the House Speaker's dalliance with a 19-year-old intern. The House shut down for two days, during which time the Speaker resigned and a new leader was elected. The new boss reconvened Friday afternoon with a vow to get some work done.

Evidently the state's beekeepers had come through with their calls and emails. With hundreds of bills still in the queue, Senate Bill 500 was the 14th of just 32 to be passed during the session's final flurry. Rep. Houghton, who we later learned was himself responsible for one of the committee amendments, argued for their removal, and after a lengthy debate on policy and procedure, the bill was passed 141-5 in its original form. We had won!

Governor Jay Nixon signed the bill on July 10th. The new law took effect August 28th.

Lessons learned

As I researched our options and made inquiries of beekeepers in other states, there were several things that surprised me: For one, Missouri is by no means

alone in its treatment of honey and beekeepers. In fact, the language of the law we were protesting seems to be pretty standard fare: They are almost universally written as *exemptions* to strict commercial kitchen requirements - *provided that beekeepers*:

- Sell only direct to consumer
- Label their honey with some version of "produced in a kitchen not inspected by the health department"
- Remain under some arbitrary annual sales or quantity threshold - commonly 500 gallons or some roughly equivalent dollar amount (\$30,000 in Missouri)

The problem is, this direct-to-consumer requirement prohibits the vast majority of a state's beekeepers from selling their product through their local grocers, health food stores, corner markets, gas stations, feed stores - all the places that consumers go looking for that local, raw honey from local beekeepers. And while the premise for this requirement is to protect the public from "un-inspected" honey, *it does not apply to honey brought in from out of state, or even out of the country.*

So you end up with a curious situation where, for example, Missouri beekeepers can sell their honey across the border in Oklahoma, and Oklahoma beekeepers can do the same in Missouri, but neither can sell to shops in their own neighborhoods. Meanwhile, Chinese honey, with its sordid history of adulteration and chemical residues, can be sold with impunity in both states. If unregulated honey is in fact a threat to the citizenry, we're doing a pretty poor job of protecting them!

A bigger surprise was that most of the beekeepers I talked to in states with similar rules seem to accept them without question. A couple even bristled at the idea of "lowering the standards" by reducing our regulatory burden! A Texas beekeeper decried that state's recent loosening of the law as opening the door for adulteration and other practices that will give the rest of us a bad name. But who is more likely to adulterate honey, I asked him - the local beekeeper who delivers his own product to the corner market, or the guy a thousand miles away who ships it in via distributor and stands no chance of ever meeting the end user?

But what truly amazed me was that, after accounting for the long, drawn-out legislative process and some truly unexpected roadblocks, *changing the law was easy!* We encountered virtually no opposition from legislators of either party, and the Health Department didn't even weigh in.

And no wonder: After close to a decade of wall-to-wall media coverage about CCD and such, honey bees and beekeepers are loved and appreciated like never before. There is no reason that other states' beekeepers should not be able to do what we did in Missouri.

Of course, there's no guarantee you won't hit roadblocks of your own. And state officials may take a more active role in opposition. But consider: On one side we have health department bureaucrats, trotting out the usual, tired arguments about public health and safety, but with nothing to back them up. And on the other are the intrepid beekeepers - stalwart friends of the environment and protectors of the food supply - struggling to survive against ever-increasing odds and now being told that they cannot even sell the fruits of their labor.

We're gonna win that battle every time. **BC**



The author. (photo by Diane Makovec)

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KEEPING BEES

AT SMITH STATE PRISON

— Jennifer Berry

After 17 years of beekeeping experience, it still amazes me to think about how many different ways that honey bees help us humans! First and foremost, they are responsible for pollinating a great deal of the fruit, vegetables and nuts that we eat. They also produce honey (yep, that's right!), which offers a natural alternative to sweeten our lives. There are also the health benefits from pollen, royal jelly, and propolis that may help to alleviate: allergies, wrinkles, stomach ailments and even topical infections. And many swear by apitherapy, a growing medicinal alternative here in the U.S., for relief from arthritis discomfort.

These may be the most obvious ways that honey bees enrich our lives, but there are many others. For example, what about all of the jobs associated with honey bees, beekeeping and pollination. Let's begin with the beekeepers. They raise and manage bees for honey production, and pollination services across the nation. Then, there are those folks who create and sell the equipment associated with keeping bees (woodenware, foundation, tools, protective garments, medications, honey extraction equipment, gadgets, etc.). There are the scientists and academics that research honey bees. There are the authors who write and the employees of the companies that publish those books and articles.

There are the mead makers, candle makers folks who use beeswax, honey, and propolis in the health and beauty industries. And, then, there are those who specialize in making the soaps to cleanse our souls.

What about all the jobs just associated with honey sales: extraction, bottling, labeling, and packing. There are the food companies that use honey as an ingredient in their products. Now all these bees and products need to get around the state, country, and world. How many folks do you think are associated with packaging, handling, delivering and stocking the store shelves? Who else? The list goes on and on . . .

There are more ways (other than consumption and employment) that honey bees enrich our lives, too. Keeping bees helps me to stay healthy, active, and mentally challenged. And, in the Summer months, they keep me sweaty, hot and tired! Think about this: beekeeping may be physically challenging but, when I'm working bees, all my problems (i.e., stress, concerns, worries, angst, etc.) seem to fly away with each forager leaving the hive. Each box is a treasure chest of adventure just waiting to be explored. What will the next colony reveal?

Now, imagine being in a confined place where you would rather not be. A place most of us would fear. Yet, once a week, you are able to escape your trap and be free for an hour. What if this place was a prison, and you were serving one year, two years, 10, 20, life. And, the one-hour a week to take pause from your situation is the opportunity to spend time with honey bees. I imagine that each occasion would be a little taste of heaven. When I asked such an inmate what it was like to be with the bees, he said, "It's a taste of home."

Several months ago, Bear Kelley, President of the Georgia Beekeepers Association, contacted me to inquire how our Master Beekeeper Program certification process could be implemented at a prison. At first, I thought there is no way that it could happen, logistically speaking. I mean, how would we set up a practical exam with live bees, smokers, frames, and hive tools in a prison? And, then, when Bear mentioned it was Smith State Prison, one of two maximum security prisons in Georgia, I concluded to myself there would be no possible way. Among its thousands of inmates, Smith State Prison holds many of Georgia's most violent offenders. The prison administration is not going to let us just waltz in there to certify inmates as beekeepers. Well, much to the contrary, they did exactly that, and here's how it came to be.

It all started within the concrete walls of the prison several years earlier when an inmate, Roy Nichols, started talking with other inmates about the bees he used to keep on the outside. As he kept telling stories, he continued to pique the interest of his peers. Eventually, the discussions turned into the idea of starting a beekeeping program at the prison. And, one day, Roy took it upon himself to approach Warden Stanley Williams about this as he was making his routine rounds through the dormitory.

In minimum and medium security facilities, inmates are allowed to carry out work details outside of the prison. Smith State Prison, however, is rated as a closed (maximum) security prison. Its inmates are not allowed to venture outside the walls because of the types of crimes that they committed. Warden Williams realizes that there has to be something for these folks to do; there needed to be programs to prepare those who make parole or complete their sentences for an eventual life on the outside. The idea is that the better prepared they are with skills and trades, the less likely they will be to end up back in prison.

Unfortunately, Roy's first presentation of his idea, fell on deaf ears. Warden Williams didn't see an opportunity for beekeeping at Smith State Prison. But Roy was persistent. He approached the Warden once more; this time, he was

prepared with evidence in hand. Roy submitted an article about how the Florida Agricultural Department was involved in several state correctional facilities through an inmate re-entry program in beekeeping. It described that not only was the program helping the inmates learn a skill, but it was also generating income for the state! In an interview, Dennis Baxley, honorable member of the Florida House of Representatives, said that through programs like this, it may be possible to cut recidivism (relapse back to criminal behavior) by 33 percent, which could save the state a billion dollars. It was a huge endorsement, not only for the benefit of the state, but equally important for the individuals turning their lives around!

After Warden Williams read the article, he realized that this was exactly the type of program that they should introduce into the Georgia prison system. So, he went back to Roy and gave him a job. He charged Roy with the responsibility to develop a curriculum and a list of required materials. First, Roy put together a list of minimum requirements needed to keep bees. Next, he went to work on putting together a lesson plan, borrowing from several sources including his own experience as well as an old copy of *"Backyard Beekeeping,"* by Kim Flottum.

Once the Warden received and priced the material list, he quickly realized that this wasn't going to be expensive; yet, it offered a high return for the inmates. Not only do vocational programs help keep prisoners active and engaged inside the walls, they also can help them to obtain parole through the

demonstration of their reformed behavior and resolve. They're also actively preparing themselves for when they're released by developing important skills to acquire and maintain a job. As you can imagine, it's challenging to find employment after you've served a sentence. So, learning trades in industries that tend to be more forgiving toward one with a record is exactly what these folks need. Warden Williams not only saw the potential of a beekeeping program for his prison, but he also saw the importance of serving as a role model to other Georgia correctional facilities. As a case in point, the Department of Corrections runs a 10,000 acre vegetable farm responsible for feeding inmates in the system state wide. Well, guess what they have to rent each year in order to pollinate all of the fruit and vegetable blooms? Yep, bees! Hopefully, one day bee programs in the prisons, local to that area, will be able to accommodate the farm's pollination needs.

Another person instrumental in getting the beekeeping program up and running was Wayne Johnson, then Deputy Warden of Care and Treatment. His job was to oversee the daily operation of medical, mental health, education, and counseling services for the Smith State Prison population. Both he and Warden Williams liked the idea of having a "hands-on" program at the prison. And, as a result, they gave Roy Nichols the job of class instructor.

After Warden Williams secured the funds and ordered the equipment and bees needed for the class, Deputy Warden Johnson oversaw their receipt and installation, as well as

Last minute instructions about the practical exam.





Jennifer Berry assisting a student.

supervised the classroom activities. The class began with only one hive, but that's all the students needed to figuratively "fly" over those walls and into a whole new world of adventure and opportunity.

Since then, Angie Henry has been appointed as the new Deputy Warden of Care and Treatment at Smith State. Even though she's only been there for a year, she came to the post with over 30 years of experience in the Department of Corrections. She's also no stranger to agriculture; she and her husband run their own private vegetable farm. Once she got wind of the beekeeping program, she immediately thought to contact Stephan Price, a long time friend of the family and Extension Agent for Bulloch County, for assistance. She not only wanted to continue the program, but also wanted to improve it. The first students who completed the classes only received a prison certificate of participation, but nothing official. So, she decided to pursue a true certification process to give their program legitimacy. Like the Wardens before her, she realized the importance of credentials in the inmates' vocational records. As she told me, "One day these inmates may be your neighbor, and it is important to give them the training necessary to make it on the outside so they will be good neighbors and stay on the outside."

Another person actively involved in this whole process is Mr. Lenwood Roberts. Since his arrival at the prison, he has taken on several teaching programs, which comes easy to him being a retired Superintendent of Public Schools in Georgia. Mr.

Roberts teaches agricultural classes, and now, oversees the beekeeping class.

With a request for a certification process in hand from Deputy Warden Henry, Mr. Price called the Ogeechee Beekeepers Association for some help. Rhett Kelley, then Vice President of the Association, took an immediate interest in the prison program. Rhett is an Emergency Medical Technician (EMT), a beekeeper, a farmer, a husband, and a father of five. He also runs a company that makes and sells handcrafted bull whips. As an EMT, Rhett's already had some experience dealing with the internal workings of a prison. So, he decided to meet with the prison administration and inmates involved. After his first visit to Smith State, Rhett was convinced that this program needed a certification component. So, he contacted Bear Kelley to find out more about possible applicability of the University of Georgia's Master Beekeeper Program to the Smith State Prison situation.

Bear Kelley is a beekeeping mover and shaker here in the state of Georgia. Over the past few years, he has done wonders for the Georgia Beekeepers Association. He was the perfect person for Rhett to involve because he shared an eagerness to work with the prison. After meeting with the group and seeing for himself what they were doing, he was even more excited to help. He agreed with the certification direction for the program, and he contacted me.

The Georgia Master Beekeeper Programs offers four levels of achievement recognition: the Certified, Journeyman, Master

and Master Craftsman Beekeeper designations. The Certified Beekeeper exam consists of two sections, on each of which, a score of 70% or better is required to pass. The first is a challenging written exam covering an introductory level of knowledge of honey bees and beekeeping. The second is a practical exam, which is subdivided into two parts. The first part of the practical section requires a demonstration of beekeeping skills in the apiary; it includes lighting a smoker and properly working a beehive. The candidate is expected to approach, open, manipulate, and close a hive using sound apiary etiquette, as well as identify key constituents and structures within. The second part of the practical section can be held indoors or outside; it is an identification exercise to demonstrate a knowledge of beekeeping tools and equipment, as well as an ability to diagnose important colony disorders.

After talking with Bear and Rhett, I decided to visit the prison to figure out how we can make this work. It's about a three-hour drive south from the bee lab. We coordinated my visit so that I could meet with the Ogeechee Beekeepers Association on the preceding evening. They have a great club, and it always amazes me how there are so many folks from all walks of life interested in beekeeping and involved in their communities.

The next morning, the three of us met in front of Smith State Prison. Did I mention it's a maximum state correctional facility??? Most of us will never set foot inside an area barricaded with razor wire, high concrete walls and bullet-proof glass. At least, we hope not! Obviously, it's not a very welcoming place, and it shouldn't be. Inmates held at maximum security prisons are serving long sentences because of the crimes that they've committed: armed robbery, kidnapping, arson or even murder. It's one thing to watch and laugh at an episode of "Orange is the New Black" on TV, but going there (even just to visit) is another thing. So, I was a little apprehensive, to say the least.

I really didn't know what to expect, but once we were buzzed in, searched, guided through a metal detector, buzzed through several more locked steel doors and gates (topped with even more razor wire),

led through yet another steel door (these folks are serious), we entered a room where 15 students were seated and waiting for us. There was nothing more fancy here than just tables, chairs and concrete walls. We were introduced to each other; the students seemed very attentive and eager to learn.

Bear started off the conversation by telling them that we were there to see if we could extend the Georgia Master Beekeeper Program certification process to them here at the prison. After Bear finished his introduction, I spoke for a few minutes about how the program worked, what we expected from them, and what they could expect from us. After a lengthy Q&A, we were escorted to the bee yard. Again, we followed a maze-like path through numerous locked, steel doors and gates, pausing at each junction to pose for the cameras and wait to be buzzed through. After traversing a long green courtyard with tall gray walls, we finally entered the fenced-off apiary. There were four humble beehives that showed a good bit of wear and tear. Rocks were used as makeshift entrance reducers and plastic bottles as entrance feeders. As the students arrived, they told me how one particular colony had swarmed and another was currently queenless. They proudly indicated their strongest hive, and, by their awareness and enthusiasm, it was obvious they knew a great deal about beekeeping and really cared about the bees and this program. While standing inside the fenced apiary and listening to the students, I was convinced of the importance of this program and committed myself

Philip Quinn delivering the practical exam.



to doing everything that I could to bring our certification process to the prison. We wrapped up the day back in the classroom where I made a list of the things that they needed to grow their program. I recapped what they could expect from me and said that I'd be in touch soon.

Once back at the office, I called upon my good friend, Shane Gebauer, at Brushy Mountain Bee Farm. I told him about the list of needs and my intentions to solicit a donation of one or more items from each of my beekeeping supply contacts until the list was fulfilled. Shane asked that I send him the list and said that he would do what he could. I thanked him profusely before hanging up. A few days later, I received an email from Shane saying that Brushy Mountain will donate EVERYTHING on the list. Wow! I was ecstatic and without words; when I realized that the total value of the contribution was over \$2,000, I was truly taken aback by Shane's generosity and kindness. Once again, thank you,

Brushy Mountain Bee Farm!

Now, all that was left to do was to schedule the exam. While this was not as straight forward as it sounds, Deputy Warden Henry and I worked it out. When I asked the technician crew here at the lab if they would be interested in helping out with the certifications, nobody even hesitated. They all wanted to pitch in. So, several months later, Nicholas Weaver, Philip Quinn, Ben Rouse, Nathaniel Beach, Jack Garrison and I headed south to administer the exams.

We met up with Rhett Kelley in front of the prison, who along with Mr. Roberts, had decided to take the exam with the inmates. When we arrived, I could feel the tension in the classroom; everyone was very quiet and still. Our staff divided up; some stayed to proctor the written exam, and others went to the apiary to set up both parts of the practical exam. I gave a final review of the most important material for about an hour as well as answered any last minute questions. Then, as the exams were

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being handed out, one of the students blurted out loud how nervous he was, and everyone else nodded their heads in solidarity.

As the first exam was turned in, Philip Quinn and I quickly graded it to find that only two questions had been missed; that's a score of 96% (A+). We were still nervous for the rest of them, but what a great start! After 45 minutes, all the students had completed the written portion of the exam and our concern faded quickly as we graded them, they had all passed. Now, it was on to the practical exam.

I noticed that the inmates were much more at ease after having gotten the written exam section behind them. Each of our staff took one candidate after another through the practical. They progressed through

both parts in short order. Once the last candidate had completed the outside portion, we were escorted back inside. Philip and I moved into a private room to tally the grades. It didn't take long since all had passed with flying colors. The lowest grade was 85%. They really blew the top off the exam. It was a 100% pass rate, which was the highest of any test administration to date. Once we had completed recording the scores and organizing the certificates, we joined the group.

While clearly anxious, the candidates calmly awaited the news of whether they passed or not. They were lined up in the main hall outside of the classroom. There were a couple of tables set up with table cloths. One had a beautiful cake decorated with honey bees, and the other had

sandwiches, fruit plates and juice. Warden Douglas Williams (the new Warden at Smith State) and Deputy Warden Henry joined me to award the certificates. I announced that not only did they all pass, but they had rocked the exam with excellent scores across the board! They were rapturous. One at a time, we gave out their certificates and took pictures. Then we ate cake and celebrated the first class of Certified Beekeepers at a correctional facility in Georgia.

Like I said earlier, it's amazing how these little, industrious insects can enter our lives, re-shape our world, and help out in so many different ways. Here's just one more example of how these creatures can lift our spirits and carry us to places we never thought we would go.

See ya! **BC**



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Sainfoin Saga

A New Role For This Ancient Legume

“We are getting near,” said Gandalf. “We are on the edge of his bee-pastures.”

It started in early May. A dot of pink here, a glimpse of pink there. By June the fields were great blankets of pink stretching out over the surrounding northern Utah landscape. Standing on the edge of my bee-pastures, the low hum of millions of bees filled the air as they partook of the bounteous feast. The only thing on their mind right now was sainfoin.

Rewind to 2012. Like many folks, my journey into beekeeping began not only out of genuine interest in honey bees, but also out of concern for their wellbeing. CCD, mites, habitat loss, pesticides – it seemed everywhere I looked there was a new article discussing a new problem with our bees. Understanding that the fate of mankind is intertwined with the fate of our pollinators, I felt a strong urge to do everything in my power to help these magnificent creatures while having some fun at the same time. So with a skeptical nod from my wife, I set out on my adventure.

I spent the next year learning everything I could in beekeeping forums, books, classes, websites, and, for better or worse, YouTube. Luckily I had some unique factors to bring to the beekeeping table that would help shape my vision. For one, I had access to 24 acres of family-owned farmland; property that had sat fallow for years following the death of my grandfather. I also brought to the table an educational background in horticulture coupled with a professional background as an agronomist and seedsman for NaturesFinestSeed.com. Together, these factors helped me form the idea of “honey bee-pastures” – specialized pastures designed specifically for honey bees.

While the idea seemed new, I soon learned from my research that bee-pastures were a common concept, especially throughout the Old World. Today, organizations like the USDA-ARS Pollinating Insects Biology, Management, and Systematics Research Unit help educate the public on the benefits of these floral havens (Wood, 2010). Like pastures for other types of animals, bee-pastures are areas of land planted with the most desirable and beneficial forage for honey bees. But won't bees find enough pollen and nectar on their own without the need of bee-pastures?

Because flight is costly both in terms and energy and



Skylar Christensen

time, a bee will not fly long distances if quality pollen and nectar sources are available close by (Couvillon, 2013). Of course bees will search the surrounding 8,000 acres if they need to, but if forage sources are abundant and appealing close by, large honey crops can be harvested and bee health is optimized.

The question was how to make this idea economically and environmentally sustainable, and what type of forage would I plant for my bee-pastures that would be appealing enough to persuade my girls to stick close to home? The answer to both questions was found in the graceful pink blossoms of the sainfoin plant.

Ask most people about sainfoin and chances are their reply will be “sain-what? Never heard of it.” Native to the Mediterranean regions of the Middle East and Europe, sainfoin (*Onobrychis viciifolia*) was introduced to America as livestock forage, but was rarely planted until improved varieties were developed in the 1960s. As a long-lived perennial legume, sainfoin packs nutrients comparable to the far more famous alfalfa. Sainfoin also requires only half the irrigation water needed by alfalfa,



making it especially alluring throughout the drought-stricken West. While it might not match the yields seen with alfalfa under irrigated conditions, in dryland situations sainfoin has been known to out-yield alfalfa in hay production. What's more, sainfoin can be grazed by ruminant livestock without risking bloat thanks to its high levels of condensed tannins, something livestock producers wouldn't dare do with alfalfa.

But for me, the most intriguing aspect of sainfoin was its potential as a honey plant. During my research I came across phrases like "copious amounts of nectar", "pollen produced in abundance" (USDA-NRCS), "honey made from sainfoin is of the finest quality", and "attracts ten times more honey bees than white clover" (Pellett, 1920). This information was exciting, but in order for my project to be financially justifiable, I would need to be able to eventually harvest my sainfoin and sell the hay. I needed a "dual-purpose" bee-pasture. With alfalfa, nutrient levels determine how much it sells for, and these levels quickly drop the more mature alfalfa becomes. It's for this reason producers typically cut it before the alfalfa is allowed to bloom, making it useless as a reliable honey plant.

This is where sainfoin has another virtue. As it matures sainfoin retains much of its nutrients and palatability, and doesn't drop its leaves the way alfalfa will in later growth stages. This means honey bees and other pollinators can work sainfoin to their heart's content, typically from May to July.

After completing its bloom cycle, sainfoin can then be harvested and sold as good quality legume hay. While regrowth after cutting is slow, there is the possibility of additional cuttings if irrigation or rainfall is adequate, especially with the newest varieties of sainfoin.

With my plan in place and crop selected I began preparing the fields for planting. Because the area had sat fallow for many years, tillage was needed to break up the thick sod that had formed and to remove the well-established weeds. This was accomplished in the fall of 2013. That next spring, the fields were disc harrowed and cultivated to produce a firm, weed-free seedbed.

Because my fields would be non-irrigated, I planted in early April to take advantage of our typically wet May. I also decided to invest a little more money on the newest variety of sainfoin seed on the market – 'Delaney' – which boasts higher yields and the possibility of multiple cuttings. Using a seed drill, the sainfoin was planted at a rate of 34 lbs./acre PLS (pure live seed) immediately after being inoculated with a sainfoin-specific rhizobium. The rhizobium would create a symbiotic relationship within the root nodules of the sainfoin and assist with nitrogen fixation. Essentially, my sainfoin would be creating its own fertilizer, eliminating the need for additional inputs. Then like every dryland farmer before me, I waited and prayed for rain.

The rains did come that Spring and so did the sainfoin. At the same time, my new Carniolan nucs were busy giving me my first hands-on lessons in beekeeping. "Don't expect any honey your first year," I was told repeatedly. I wasn't, but would soon be pleasantly surprised.

The sainfoin seemed to compete with the weeds very well, and I was amazed at its toughness. I dug up a plant one day for further inspection and found a large taproot shooting straight down into the soil, a handy feature to have in the second driest state in the nation.

In one particular field – nicknamed "the white knoll" – decades of erosion had washed away all the dark topsoil leaving behind a white, nutrient-barren hill. But the sainfoin didn't care. It established on this white knoll just as thick as the other fields. My father couldn't remember a time in his life he'd ever seen something thriving in that field until the sainfoin showed up.

While the sainfoin never grew tall enough during its first year to make a harvestable crop, it did flower from mid-June to August of that year. My bees seemed to thrive during that time and by September each colony had fully established their two deep brood chambers, and each had filled a deep super. One colony had even filled two deep supers with the lightest colored honey I'd ever seen. That honey would later go on to tie for first place at my local bee club's annual honey tasting contest. For my first year I was quite pleased. Sainfoin's reputation as a superior honey plant had been proven.

Now in its second year, my bee-pastures have far exceeded my expectations. As of writing this article, the sainfoin is in full-bloom and has grown between three and four feet tall in a nearly weed-free stand. It began flowering the first week of May and should be reaching its peak mid to late June, tapering down until it's harvested in July. The fields have received no irrigation (although the above-average rainfall this Spring helped) and have not been treated with herbicides, pesticides or fertilizer. It seems as far as sustainability and input-reduction are concerned, sainfoin fits the bill quite nicely in these arid Rocky Mountains.

My bee colonies have doubled in number since last year and continue to thrive. Not only do the sainfoin fields attract every honey bee within a two mile radius,

but native bees and other pollinators are commonly seen foraging the pink blossoms. Deer are also frequent visitors; crossing over the neighboring alfalfa fields to help themselves to my sainfoin. Game birds such as turkey and pheasants have become regular residents. I may have found another use for sainfoin – wildlife food plots.

Do you have some acreage to spare? Interested in establishing a sainfoin bee-pasture? There are a few things you need to be aware of. First, sainfoin does best in high pH soils. This has limited its use in areas east of the Mississippi and parts of the Pacific Northwest. For folks wanting to try sainfoin in these areas, I highly recommend planting a small test plot first and testing your soil as amendments may be necessary.

Next, be aware that sainfoin requires good drainage and won't tolerate wet soils, flooding, or high water tables. I also recommend using one of the newer varieties such as 'Shoshone' or 'Delaney' for the best yields possible.

To maximize the lifespan of your sainfoin, avoid excessive irrigation and be sure to let the stand self-seed every two or three years to remain thick and vigorous. When properly managed, sainfoin fields can remain productive for decades. There are even reports of sainfoin stands in Montana surviving for over 60 years (USDA-NRCS).

Legend says it was sainfoin that filled the manger during the first Christmas, providing comfort and shelter to the newborn king. It's been called "holy hay" throughout history, and its name literally means "healthy

hay" in the French language. Jethro Tull, the English agricultural pioneer, referred to it as a "noble plant" (US Patent Office, 1851). Everyone who's worked with sainfoin knows there's something special about it, and it seems this ancient legume may have a very modern role to play in the future of agriculture and our honey bees. **BC**

Skylar Christensen is an agronomist and seedsman for Nature's Seed and founder of Ephraim's Choice Bee Farm. For inquiries and price quotes on sainfoin seed and other bee-pasture seed blends, feel free to contact him at skylar@naturesfinestseed.com.

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DOWNTOWN

Who They Gonna Call?

Who They Gonna Call?

One of my proudest moments in hometown swarm management took place this Summer when I was thousands of miles away. Why so proud? Because we have created and organized a community here that looks after bees, beekeepers, and the people around us, and it is a recipe for success that can work anywhere and for a long, long time. Thankfully, it doesn't depend on any one, worn-out local beekeeper or three to work.

Readers here have been burdened, maybe too often, with tales of swarms and the importance of prompt and effective city beekeeper responses, but being ready for the colonies that throw a swarm can help convert an emergency into an education, and knee-jerk fear into advocacy for bees. But folks need to know that situations are under control, and to understand how they can help.

In Washington DC, we have a general public which is regularly informed of what a swarm is (and isn't), what beekeepers can do if they are quickly and accurately informed, and whom to call to grab and hive the bees. We have a beekeeping community that is urged to prevent but prepare for swarming, with go-kits ready across the city. And we have about 30 beekeepers (organized across every zip code) that have volunteered to collect free bees in response to a text or a call.

Here's my proud moment: On June 19, a good-sized swarm settled on the Senate side of Capitol Hill. Like that swarm near the TV

camera pad on the front lawn of the White House a few years ago, this automatically became national news. The U.S. Capitol Police called the D.C. Government, the latter called our swarm line, and five beekeepers (a senior hill staffer who was assigned the call and four who came to help) snagged the bees. Later, the Capitol Police sent a kind note to the DC Government (trust me, this is a rarity in itself) with real enthusiasm for this opportunity to learn about and save these bees.

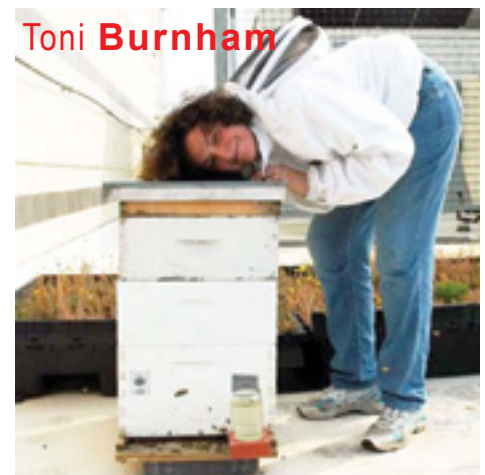
This is how the process worked: ***Setting the stage via public information***

For the past three years—about a month before our local swarm risk peaks – we have posted messages to social media outlets ranging from neighborhood message boards, Reddit discussion threads, prominent blogs, Facebook groups, and others, with substantially the same message: “Swarm time is almost here, swarms are not scary but important, urban beekeepers prize them and want to help, and here is an email and/or phone number you can use to call one in.” We also include a picture of a swarm or a link to such information on forums that allow them. We want this message to go out close enough to swarm time so folks don't forget, but early enough to gather the first ones of the season. Here, that is the end of March or beginning of April, depending on how long winter hung on.

On our website, we also feature (on a prominent tab) all year long, a swarm and structural removal information page like those of many beekeeping clubs. We try to make this page pop up on Google whenever someone enters key words like “dc bee swarm.”

We have learned that our swarm posts get forwarded, tweeted, reposted, and generally shared much more widely than we could ever reach ourselves. Part of it is the novelty (“Can you believe these people?”) and part of it is a genuine desire to be there for the bees. This also means that quite a few non-Apis calls get generated (see the July 2015 issue, “It Pays to Know Your Urban Natives”) and this need to be handled well, too.

Certain locations, such as local Reddit, are almost guaranteed to generate interest from a reporter or two, and often a request to ride along. The latter are hard to accommodate: journalists are often only able to participate in certain areas at specific times, and with hours of notice. It is, however, often worth explaining to them that this is nature and agriculture, that you are not giving orders to the bees, and that you can send multiple texts over multiple occasions until one of them works. We have never had a reporter who rode along choose to give the bees a hard time, though we have run into crews responding independently to swarms at very public locations



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Recipe for a Swarm Squad

1. Tell the Public About Swarming (stir gently)
2. Tell Your Beekeepers How to Handle Swarms (whip into peaks)
3. Sign up Volunteers by Zone (divide into equal portions)
4. Take and Route the Calls (serve the community)



Swarm Kit

who remained intent on the fear and dread side of the story despite better information. Be careful what you say and to whom you choose to speak.

Prepping the downtown beekeeping community

So many urban beekeepers are relatively new to the practice of bringing strong, likely-to-swarm hives through the winter that it helps both to speak to swarming (in relatively emphatic terms) frequently, year after year. This is helpful both in beginner courses and in club meetings in the two to three months ahead of swarm time. In this city, the first swarm risk comes more than a year after our introductory class concludes, and we can't count on the message staying clear.

Like most beekeepers, we emphasize prevention and that any swarm settling in a vulnerable location could be damaging to legal city beekeeping. But there are bees in trees and out-of-the-way structures, and even careful beekeepers get surprised from time to time. We therefore suggest that as many people as possible prepare a go-kit as well as completing spring management tasks. We developed a relatively minimal and compact set of tools (we even ran it past the editor here, to see if we forgot anything) and emailed it to all participants while placing a link on our website for easy, consistent access. (<http://www.dcbeekeepers.org/easy-swarm-go-kit>). With a copy-paper box packed with easy-to-carry stuff in the trunk of the car or a corner of an office, dozens of beekeepers can get to swarm locations across town in less than 20 minutes (or can lend to another who will).

And this bears reminding: once you grab those bees, you will need a place to put them. Some

empty, prepared woodenware (or access to a community that can lend some) is your closing concern.

Organizing the responders

Because the majority of our club communications happen online and by cell phone, it made sense to us to create a page on our web site where volunteer swarm retrievers could sign up and provide geographical and contact information (preferably a mobile phone capable of receiving text messages).

We ask our swarm catchers to specify, by zip code, which areas are within their response zone, and we provide a little map to show which are which. We are using a Content Management System that stores this information in a database and allows authorized ringleaders to download, in a few seconds and in spreadsheet form, a list of current responders to carry around on a personal phone. This can also be done using a typical web form that generates an email, but it is a bit wonkier. By June 19, when the Capitol Hill swarm came in, we could get a call from DC's Department of the Environment at 6:30 PM Istanbul time, text a dozen candidates, and have five willing responders at the Senate gate by 7:00.

We usually send a text to all responders in an area, and the first one to call it, keeps it. (There are exceptions for secure and controlled-

access areas.) Every zip code in DC has at least seven volunteers, though we do benefit from two or three enthusiastic folks who are willing to go anywhere! We also have volunteers each year who have never fetched a swarm and would like to accompany someone with experience the first time, so we need two responders in those cases. Going forward, we are going to have to figure out whether we need a protocol to manage the hail of messages that can occur when a swarm lands in a really desirable location, or to encourage the most energetic participants to share the wealth – maybe taking no more than two in a row? We have to talk about this.

Directing the Calls

Once the community knows that swarms are out there and whom to call, and the beekeepers know when swarms are likely to issue and how to retrieve them, someone needs to direct the traffic between the two. The public needs one number and one email to use, and there must be someone on your end to answer. That person or persons must have the responder list and easy, consistent access to emails, texts, and phone calls. When the calls come, they should be prepared with basic information about local bees and be ready to ask the questions necessary to determine whether it really is a swarm of honey bees,

whether it is in an accessible location, and where to send folks for information when it's not a match. We will be adding an "Is It Really a Swarm?" Q&A page for use by potential swarm catchers and organizers to our website next year based on our experiences with typical questions and problems.



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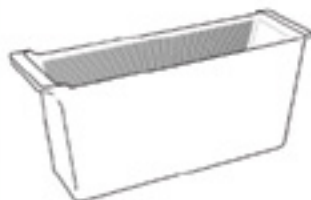
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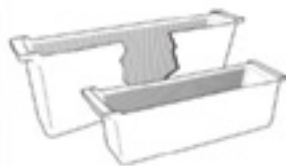
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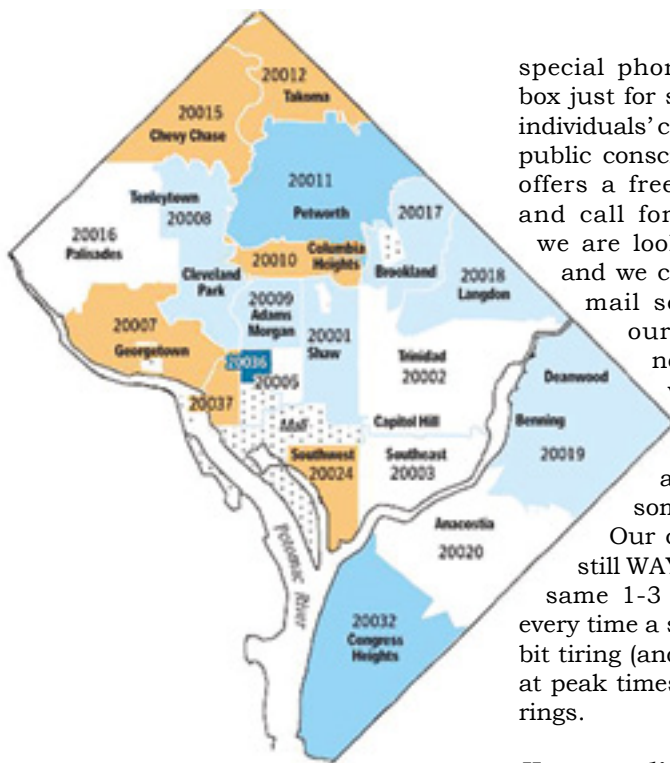
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special phone number and email box just for swarms, and to remove individuals' cell phone numbers from public consciousness! Google Voice offers a free U.S. phone number and call forwarding service that we are looking at for next year, and we can easily configure the mail server that came with our website to handle a new swarm mailbox. We would like it to be easier for folks to take turns answering these calls, and to have cover when someone goes on vacation. Our current arrangement is still WAY easier than having the same 1-3 people jump and run every time a swarm issues, but it's a bit tiring (and potentially expensive) at peak times when only one phone rings.

Happy endings

A well-collected swarm is a wonderful thing: the bees are safe, the beekeeper is richer by one colony, the public is reassured, the community (beekeeper and non-) comes together, and beekeeping gets woven a little deeper into the DNA of another city. I think I love my urban swarm girls in a special way: it's a little bit like a holiday gift, wondering what's inside (A good layer? Disease resistance? Bees from a particular beekeeper?) and watching them launch their new life. The idea that this town could come to instinctually and effectively know what to do when these lovely girls jump ship is like one part of sustainability, and if communication is what it takes to do that, I hope this recipe works where you live, too. **BC**

Toni Burnham keeps bees and catches swarms around her home in DC.

This is really important: in some years, less than 5% of the calls we get deal with either honey bees or swarms. It is a BIG mistake to send your volunteers on bogus calls, or to promise a solution to a problem you cannot handle: for instance, most folks don't know the difference between a swarm and a structural removal, and most beekeepers cannot possibly deal with the latter off-the-cuff. Your phone team might also get pretty impatient with call after call about hornets, and it might help to have a FAQ that they can just send out to these callers (we give them the DC number for responses to public spaces, and advise for-pay pest control if they can't cohabitate with wasps/hornets on their own property).

If there is one mistake we hope to fix next year, it is to set up a

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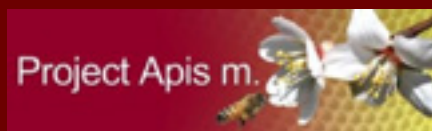
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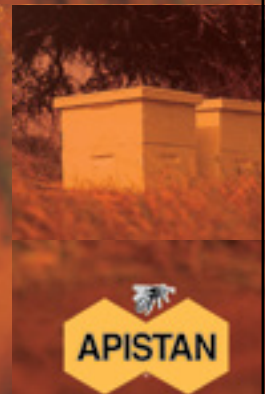


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Some Beeyard Thoughts, Observations and Updates

*Queen Excluder Mysteries • Smelly Winterkilled Equipment
Making A Grafting Tool • Dipping Queen Cups
For The Brand New Beekeeper • Odds and Ends*



A hive surprise

Well, I did not see this beehive event coming. More than a week ago, on the day before I was to depart Ohio for the 2015 North Carolina State Beekeepers' Association Summer meeting, I went to tell my bees, "goodbye" and give them one last look before I left for about 10 days. All looked good until I came to the very last colony (*no exaggeration – it really was the last colony*).

Just in case the nectar flow of a lifetime came my way this season, several weeks earlier I put on extra equipment. At that time, on top of two brood deeps, I installed a queen excluder, added an empty deep that was filled with drawn combs, and then put an empty Illinois-depth super on top. As has become my unintentional beekeeping style, all this equipment produced a tall colony.

So here we are . . . as I made my final departure inspection, I found all stages of brood in the top deep that I had put on just a few weeks before. Excluders are notorious for having ever-so-slight distortions – just enough for a queen to squeeze through.¹ I admit it was puzzling. As beekeepers, you would expect me to immediately wonder what was in the bottom equipment. In theory, it should be broodless. After finally breaking all the propolis and the burr and brace combs, I could begin to pull out frames from the bottom deeps. After removing an outside frame, I finally removed a center frame. You know what was there or I would not be writing about it – brood in all stages. The car was essentially loaded and my wife and I were already beyond our departure time. I had no time to make hive changes and did not want to ride for the next eight hours smelling of cedar smoke. What would you have done?

I brought out of retirement an old bottom board and outer cover. I set the equipment that had been above the excluder on a new stand and left the remaining equipment in place. At the end of my trip, my plan was to return to the scene of the mystery and simply use newspaper to recombine the two parts.

In fact, that glorious nectar flow did not occur. It rained very heavily while I was gone and was still raining upon my return. Since I was traveling, this article was already overdue – as editors Kim and Kathy were aware. I needed to write and quickly determine what happened in the apiary.

When I returned to my apiary, it was a bright still day. I gently opened the smaller part of this divided hive without smoke. After removing outside frames, I got to the center frame, and it was still there – brood of all stages.

I immediately closed it and moved to the larger part that was on the original stand. As I cracked the outer and inner covers, they came after me. Though I was lightly dressed and without smoke, I was prepared for this response but was surprised at the vigor of the defense. This unit did not act like a queenless colony. You know the drill. I had to stop everything and fire up a smoker². With smoke, all went well. Upon finally getting to the center frames, there was brood of all stages.

I know what happened. Even into early July, I was trying to get last Winter's dead equipment refurbished and into service before wax moths got to it. Putting the winterkilled deep just above the original brood nest and using an excluder to ostensibly keep the queen from the upper equipment (all without realizing that there was brood in the top equipment), I essentially isolated a queenless nuc above the empty equipment and excluder. These isolated bees produced a queen and made colony plans to live life their way. Without meaning to have my colony numbers increase, I now have two strong splits that I unintentionally made. Both are queenright without any help from me. Well, that worked well.³

Stinking, disgusting winterkilled equipment

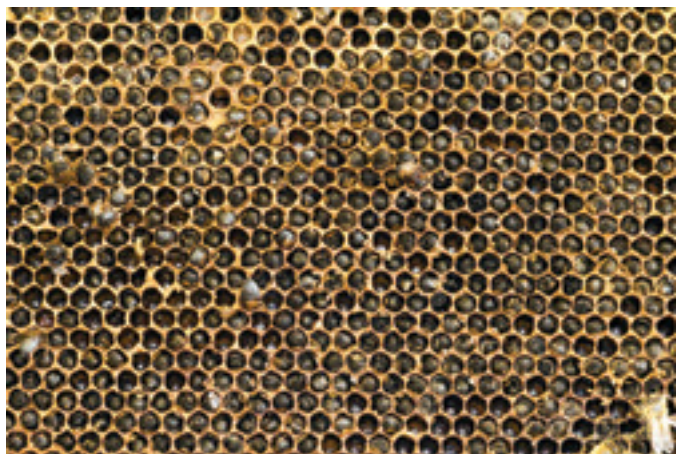
Many, many times I have admonished both new and old beekeepers to "enjoy" beekeeping. Don't fret if you can't get all the assigned beekeeping tasks done; swarms leave; nectar flows are light; and winterkilled colonies are abundant. In beekeeping, we are all supposed to ultimately love what we do. When I give beekeepers that advice, I am talking to myself more than you. But there is a dark side to the craft you and I love.

I don't like swarms getting away from me, and I don't like smelling of smoke, but I really don't like cleaning winterkilled equipment. It's a stinking, disgusting task. I recently told the North Carolina beekeepers that *enjoying* beekeeping is the "average state" of beekeeping mind. I love beautiful, healthy, productive colonies. I don't like – at all – having to clean and refurbish Winter dead-outs. I am forced to look at both my failures and the failure of my bees. Loving and hating are the extremes in beekeeping – *enjoying* is the desired average state.

¹Many years ago, a queen excluder gauge was available for purchase. Beekeepers could use this gauge to check the dependability of the excluding device. It was only a metal pin that was exactly the width of the excluder openings. It was the kind of device that one immediately loses. I lost mine.

²Beginners, for smoker management procedures, see section that follows.

³I am implementing a system for storing additional photos that support and clarify my articles. Occasionally check my blog at: www.onetewbee.com for the location of this service.



Putrefying dead bees in a winterkilled colony.

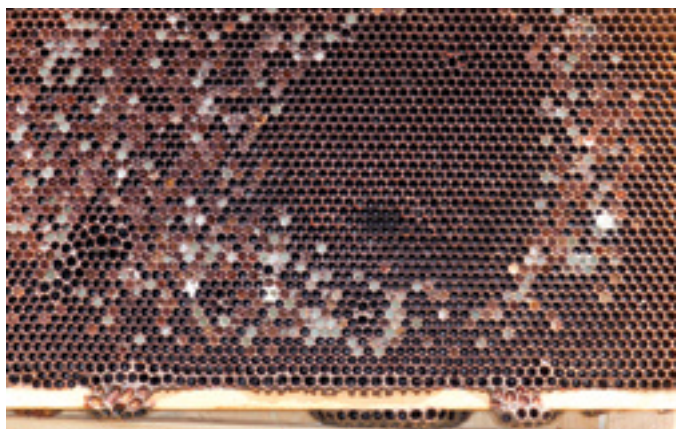
At first, winterkilled equipment may not look that bad. New beekeepers must remember that in many cases, the dead bee carcasses are frozen. *“This is a mess, but I will get to it later when it is not so cold.”* And then the hive corpses thaw out. Flies and degrading insects come, and bacteria begin to do things. It is now warm, so I must deal with this stuff. Wear gloves, wear an apron, and just get it done. It is a reeking, slimy mess – but at least it is now warm weather.

Bounce out as many of the bees as possible. In some frames, many putrefying bees will remain stuck – headfirst – in the combs. Just leave them.

There may be mold growth on some combs, but little can be done about that. I use a commercial heat gun to soften old propolis and to soften hard, dark combs. I clean the frames and scrape out the hive boxes so that all again fits neatly.

But then there is the leftover fecal-soiled fermenting honey that is still in the combs. What in the world should be done with that? Depending on the quantity, extract it and dump it. But that’s simply more work with extractors, uncapping knives, and the subsequent clean up – just to dump the extracted honey. I certainly would not eat it, but the bees always seem appreciative when given this bounty. Inside the hive, if it were terrible, why would they not remove it themselves rather than reconstituting it?

The following thought string is **not analytical science**, and to my knowledge has not been academically reviewed by any scientific technicians. Read at your own risk. Could it be that the slightly fermented (even



A winterkilled brood frame with pollen mold.

heavily fermented) honey might have beneficial effects on the housecleaning bee? I ask you to consider all the fermented foods we eat and how healthy those foods are thought to be. Entire diets are built on this premise, and some diets include consuming vinegar food products. In the wild, bees are notorious for robbing honey from dead colonies and pilfering residual honey from winterkilled colonies in bee trees. Robber bees readily steal such questionable honey. So, help me here. Is it possible that such questionable honey is not just okay, but actually good for them?

But wait. If it were good for them, then why would bees make honey in the first place – but rather just make honey vinegar. I would guess that it would be because of the carbohydrate conversion. So yes, it is okay for bees to consume some fermenting honey, but they could not survive only on vinegar.

Having said all of that, I do fret about the fecal staining that is on some winterkilled honey. But I justify that issue by the fact that there are droppings everywhere in the killed colony, not just on the honey. Bees would come in contact with diarrhea feces anyway. As a medical aid, bees have propolis to deal with that contamination, but that is a topic for another day.

I use all of these concepts to help assuage my anxiety when I re-feed Spring colonies with winterkilled honey stores. I don’t really know what else to do with it. Again, my thoughts are not the product of scientific evaluation. They are **ONLY** my musings in the beeyard while performing a nasty task and refurbishing equipment.

Robber bees as a measuring device for a nectar flow

After I clean winterkilled equipment, I stack it outside on a floored pallet so it can air out. The plywood floor keeps out most mice, but invariably, curious bees find the inevitable crack or crevice. Honestly, I don’t fight it very much. I have already explained why above. But I have noticed that robber bee activity waxes and wanes. I can only guess that is due to the productiveness of the nectar flow. A heavy Spring flow is heaven in the apiary. The bees are at full power to get the natural bounty. They take little notice of you as you paw through the colony, have no interest in robbing from their neighbors, and at that moment, have little interest in swarming – but that behavior will really change in a few weeks.

Robbing activity is only an arbitrary measuring device. Obviously, if all the honey is looted, robbing activity will decline. In my case, all too often there is a respectable amount of honey in the stacked and stored equipment. It is in that equipment the eagerness for robbing – or lack of it – can be used as a quick look for how productive the present nectar flow is.

Queen tinkering in my apiary

Last month, I boldly told you that the current price of queens had motivated me to explore the old, simple (but somewhat demanding) procedures of queen production that I was taught in the early 70s. I told you then and now, that I respect commercial queen producers, but there is adventure in producing your own queens. Then it rained a measurable amount every day during Ohio’s June except for one. Since the last article, I have been forced to tinker with queens inside. All this rain dampened my queen tinkering interest, but it is back now.

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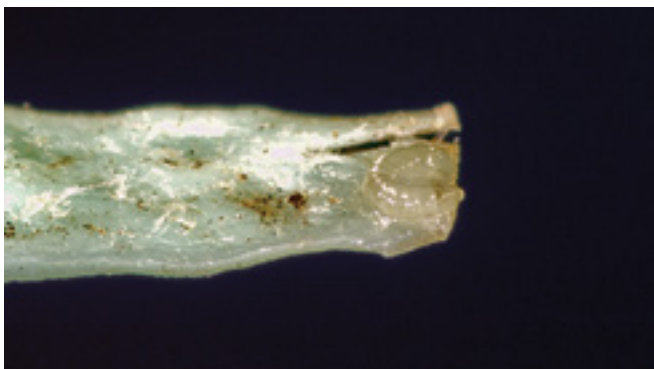
A modified plastic toothpick in an X-Acto handle.

A plastic toothpick queen-grafting tool

Hive stands, feeding devices, and queen grafting tools continue to be without an industry standard. Transferring nearly invisible larvae is arduous and visually demanding. We are always looking for the perfect grafting tool. I don't know that anyone has ever found it. I do know from experience, that when the perfect tool is found, it will soon be lost, broken, or stolen. Suddenly your grafting life is turned bottom side up.

In my grafting years, I decided never to use anything but a simple stick – actually a flat toothpick. Yeah, try to find anything but round tooth picks now. But plastic toothpicks are everywhere. I did the following, and it worked reasonably well.

I took a plastic toothpick, and beat one end flat with a ballpeen hammer on an anvil. I happen to have both. You can readily use a common hammer and any flat metal surface. After flattening (it only takes a few whacks), I gently shaped the edge with nail clips. I put the modified toothpick in an X-Acto knife handle. I then grafted reasonably well for a guy with 67-year-old vision. I readily admit that I do not have 1000's of hours using it, but I sense that it could become a comfortable device for me. More on this increasing visual challenge in future articles.



A larva only a few hours old on a flattened toothpick grafting tool.

Making beeswax queen cups with your outdoor grill⁴

Making individual beeswax cups is no longer done by most queen-producing beekeepers, but the backyard person could still produce a few cups rather than having to buy the modern plastic ones.



⁴A 4-minute video of this presentation is at: <https://youtu.be/atBZvpYoiB8>

A shortened URL for the video is at: <http://tinyurl.com/Wax-cups>

My impulse was to come up with novel components, but I fought off that urge. I tried to stay dead simple – even primitive. I used a cut soda can, a boiler from the thrift shop, and a common 3/8" dowel rod about five inches long. I took combs with natural queen cups and stood by a belt sander and shaped the short rod until the rod point would neatly fit in the natural cups. You cannot finish sand and burnish the rod tip too much. It needs to be smooth.

I used the side burner on my outdoor grill to provide heat. I melted a few ounces of virgin beeswax (older wax could be contaminated) in the double boiler contraption. To prevent the wax from sticking, I dipped the pointed rod into soapy water; then, I dipped the rod about 3/8" deep into the melted wax. I immediately dipped the wax-coated rod into a cup of ice water. I did this cycle three to four times, and then gently twisted the cup off. Until the stick is smooth and wax coated, expect the first few cups to be disasters.



Preparing for the last dip. Notice the ice water remaining from the last water dip.



Finished wax cup ready for twisting off the dipping rod.

I have not made cups in many years, but as time passed, I got better at it. Ironically, now only one company still makes the wood cell bases. If these bases go away, we will simply find something else. Keep in mind that I am only tinkering with queens for my own use.



My smoker management system.

For the Brand New beekeeper

For lighting and managing my smoker, the following technique works well for me. I have three heavy-duty galvanized cans in my apiary. One is for trash and spent *Varroa* control products. In another, I have cedar animal bed shavings. In third one, I have all my smoker paraphernalia. I have a newspaper and a roll of paper towel, several lighters and an extra hive tool.

When I fire my smoker, I dump the previous charcoal and ashes in the lid of the galvanized can. A small wad of newspaper gives me the starter fire, and I gently drop some of the partially burned shavings from the lid into

the burning paper flame, I keep doing this until the flame is consuming all of the previous burned shavings. Then I begin to add new shavings. Pump the bellows profusely. Smoke the neighborhood. Pack the load tight with more shavings, and put a sheet of paper towel over the load so the shavings will not blow out. At first, give frequent bellows pumps, but after 15 minutes or so, the coal bed of shavings will maintain itself. Without recharging, the smoker can be used for an hour or so.

The smoker gets blazing hot. After one burn experience you will no longer forget that reality. After finishing my bee work, I stuff another piece of paper towel into the smoker top hole and allow the smoker fire to suffocate. After cooling, I put the smoker in with the shavings. This ending allows me to reuse the charcoal and partially burned hand towel for starting the next smoker fire.

Odds and ends Hive stands

Wow. You folks had a lot to say about hive stands. If you have one you like, keep sending photos and explanations. I will put a listing on my blog. Seeing your ideas has really been enjoyable. One major point has shown through – the stand needs to sit dead level. Otherwise, tall heavy hives can topple.

Wi-Fi in my beeyard

I admit that I am excited. I am taking on a few projects that require Wi-Fi in my apiary. Is that electronically cool or what?

I hope you find this funny. I didn't

Remember how I just told you above not to get attached to your grafting stick and how many of us old guys lost our excluder measuring gauge? As I wrote this for you, it came time to photograph the grafting cup stick that I made for this article. It was *nowhere* to be found. Exasperation ran rampant. Two hours later, I abruptly found it in my camera bag. Agrraaa. In all things beekeeping, *Do as I say, not as I do.* **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

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A beekeeper in Nevada writes:

I really appreciate your column in *Bee Culture* magazine. I have learned a lot from it.

Now I would like to learn a little more:) I was going through one of my hives just a little while ago and I saw my store bought marked queen and then I saw an unmarked queen on the same frame.

Should I just leave her in the hive or should I get rid of her? I did mark her with my yellow marker so she would be easy to find the next time.

Phil replies:

It definitely sounds as though what you're seeing is queen supersedure. My suggestion is to leave both of them "bee." As I discussed in my September 2013 column, honey bees typically produce new queens under three circumstances, but supersedure is the only one in which you will see queens peacefully co-existing side by side.

One of these scenarios is when a colony is making preparations to swarm. Queen cells and new queens are produced to replace the old queen who will leave with the swarm, typically prior to the emergence of the new queens. A second case is when a queen is accidentally killed or badly

injured. The most likely cause of this occurring is some action by the beekeeper, but I suppose it possibly could occur during robbing of a hive by another colony. In this circumstance, a productive new queen or queens will be produced if there are appropriately aged larvae available – that is larvae one to two days old. Beekeepers refer to these as emergency cells and queens. In the case of both swarming and emergency replacement, the emergence of more than one virgin queen at about the same time usually results in combat between them and the death of one. Sometimes surplus queens are eliminated by the colony's workers. Since, in both of these situations, the old queen is no longer around, there is little likelihood of two queens being seen together. However, things work a little differently when a colony supersedes an old queen with a new one.

Supersedure occurs when the bees sense something is wrong with the old queen and feel compelled to replace her. The wrongness may be an injury, such as a broken leg, which could possibly interfere with egg laying – the sort of injury which could result from a successful battle with a sister queen. However, it is more likely to be a shortage of stored sperm in the queen's spermatheca, resulting in unfertilized eggs in worker cells, or perhaps a reduced level of queen pheromone indicating an aging queen. Though a shortage of sperm is usually associated with older queens, it can also occur in young ones as a result of insufficient mating. I hear more reports of young, drone laying queens in colonies started from package bees in years when southern states (where most package bees purchased in Kentucky originate) have experienced unusually rainy weather in early spring. Persistent rain can interfere with mating flights.

During supercedure, the new queen, or queens, emerge and make mating flights as usual. What distinguishes this situation from swarm or emergency creation of queens is that the old queen is still around, and will coexist with the daughter queen for a period of time, often while both lay eggs. At some point, a sense that a healthy, viable queen, who is a successful egg layer, permeates the hive and the old queen will disappear, most likely balled by the workers rather than killed by the new queen.

Most honey bee behaviors, mysterious or inexplicable as they may seem at first observation, exist because they confer some reproductive advantage on the colony. In the case of supercedure, the lack of hostility between the new queen and her mother is not due to family fondness,



Swarm cells are 'usually' on the bottoms of frames.



A supercedure or swarm queen will not be marked.

but is a behavior selected through evolution to improve the colony's chances of survival. The brief coexistence of the two queens allows the bees to ascertain that the new queen is viable or to try again if she is not, insuring a smooth succession. This situation is much more common than most beekeepers realize, because it often goes undetected by them. There is no gap in egg laying, eggs and brood are continually present, and the second queen usually escapes observation because we don't look for queens after we have found one. If the unmarked queen had been on a different frame from the marked one you saw first, you might never have noticed her.

Like most beekeepers, I have rarely seen more than one queen in a hive at a time, though I am certain they are sometimes there. What I do notice are queen cells: both swarm cells, and supercedure cells. Though the books tell us swarm cells are found on the bottoms of frames, and supercedure cells in the middle, I distinguish them by their number. A dozen or more are most likely swarm cells, a half dozen or less, and I assume that they are supercedure cells. Whichever type they are, I leave them alone. If they are swarm cells, I take note and keep an eye out for departing swarms. I do not practice labor intensive swarm control measures; I am content to try to catch the swarms. With supercedure cells, though it frustrates me if the queen is a recent purchase, I allow the colony to do what it is compelled to do. I feel that the bees most likely know something that I do not, and are able to detect a flaw in the old queen that I am not aware of. Moreover, if I destroy the cells, they will just make new ones and replace her anyway when I am out of town and not around to interfere, just as a hive intent on swarming is likely to swarm at some point despite my efforts.

My advice is to leave both queens alone and let the bees work it out. One possible alternative would be to take the old queen and use her to make a nuc. However, if you do, monitor it carefully. If the flaw is not serious, she may perform adequately for a while, but be aware that she may very well be replaced eventually. Life goes on, and the bees find a way.

A beekeeper in Kentucky writes,

Myself and others have been referred to Amazon.com to purchase oxalic acid, since the bee supply companies can't sell it in most states yet. The problem is, CAS# 144-62-7, or Oxalic acid dihydrate (the crystalline form), not wood bleach, is marketed online as being 99% pure. So I was very

surprised to hear from you that the approved solution for bees is 3%. I don't think very many people are aware of that. Any suggestions?

Phil replies:

As you have obviously heard, oxalic acid has been approved by the EPA for *Varroa* mite control on honey bees. In the June issue of *Bee Culture* magazine, Jennifer Berry wrote an excellent article on the subject, which I suggest you read. (*Bee Culture* readers: If you missed Jennifer's article, dig out the old issue or read the online version.)

Oxalic acid is an organic acid, a naturally occurring chemical found in plants and insects. It has been used for some time in both Europe and Canada as a *Varroa* mite control. Since traces of oxalic acid are found naturally in honey, residues are not a concern. A form of it is commonly sold for use as a bleach in woodworking, so is easily obtainable. The registration process for a pesticide, which is what oxalic acid is when used to control mites, is complicated. EPA approval has been granted, and oxalic acid should be legally available for use by all beekeepers by late fall, but the paperwork is not yet complete. When finished, it will include registration in every state.

The registration for oxalic acid is for a liquid which can be used either in that form or as a gas. In liquid form, it is mixed with sugar syrup and applied by "trickling" a stream of the mixture between the frames of the hive, directly onto the bees. Package bees can be treated in a similar way. Alternatively, it can be vaporized by the application of heat.

One very important caveat concerning oxalic acid as a miticide is that it only kills mites on bees, not those in the cells, and is most effective when used during periods with little or no brood in the hive. This is a serious limiting factor in its use.

Another note of caution is that the oxalic acid sold as wood bleach is close to 100% pure. For the safety of beekeepers as well as bees, the registered product is designed to be used as a 3% solution. Don't be misled. Oxalic and formic acids, both "natural" products, are never-the-less both quite toxic in the wrong concentration.

I am sure that a number of U.S. beekeepers have been using oxalic acid for years, just as many have been using (and I'm certain some still do) homemade formulations of formic acid. Though purchasing and using non-labeled forms of either chemical for *Varroa* mite control is illegal,



Oxalic acid only affects mites not in cells.



Mites on larvae in sealed cells are not affected by oxalic acid applications.

the employees of state pesticide departments are very busy monitoring the application of legal pesticides, and it is rare for a beekeeper, especially a small scale beekeeper, to be cited for what we call off-label pesticide use. However, the odds of getting caught are not the only consideration.

The issue you inquire about, of getting chemicals in a proper, safe, and effective concentration, is one of the major reasons for pesticide labeling regulation. Before a product can be registered, a great deal of research goes into determining the optimum concentration and method of application for both safety and effectiveness. I have heard horror stories of beekeepers burning off the tips of their fingers or damaging their lungs while handling full strength formic acid. If pesticides in too strong a concentration can be that dangerous for beekeepers, imagine what they could do to your bees. On the other hand, too low a concentration will be ineffective at killing mites. While some beekeepers may dilute formic acid properly, I'm certain some do not. I wasn't sure how hazardous oxalic acid is compared to formic acid, so I consulted with a friend who is both a university chemistry professor and a beekeeper. Here is his response:

I have worked with both formic and oxalic acid in the past. Oxalic acid is somewhat safer than formic acid, but both are dangerous. In the solid, crystalline form, oxalic acid would not be a problem, but in either concentrated form and in powder form, it can be nasty. It is pretty reactive with proteins and any nitrogen-containing compounds. It can be used to cross-link proteins, for example. On the other hand, there are many enzymes that readily inactivate

it. When working around it, in either concentrated form or in powder applications, I would wear face-mask and gloves, and not just safety glasses.

As you can see, it's important to know what form of the chemical you're dealing with. In your question, you refer to crystalline oxalic acid. Though it poses less risk to the user, it still must be diluted precisely to ensure the demise of the tiny mites without harming their only slightly less tiny hosts. I also did an internet search for "buying oxalic acid", and found it for sale in a number of formulations, some of which are much more dangerous to work with.

You asked for my suggestion. Though oxalic acid, like formic acid, is easy to find for other applications, there is a registered product commercially available, and beekeepers should use it. Brushy Mountain Bee Farm will be the primary distributor. (See: www.brushymountainbeefarm.com/). The registration process is only complete in a few states at this time, but by fall all U.S. beekeepers should be able to purchase the legal formulation. It is being sold in two ways: as a kit or as the chemical alone. The kit includes directions, safety goggles and gloves, 35 grams of oxalic acid, and an application syringe for the trickle method. Thirty-five grams is enough to treat 12 colonies using the direct trickle method or 35 colonies by vaporization. Using the trickle method, the cost to the beekeeper is about \$1 per hive. The 35gram package of oxalic acid sells separately for \$5.95 which works out to a cost of 50 cents per hive by trickling or 17 cents by vaporization.

I strongly urge you to wait for registration process in Kentucky to be completed and to use the labeled product. I am sure it will come soon. Certainly beekeepers can save a little money by off label use, but the cost is minimal and, aside from the safety concerns I mentioned, there is the issue of fairness to the distributor. As Jennifer Berry mentioned in her article, Brushy Mountain has spent a significant amount of money to give beekeepers the legal option of using oxalic acid for Varroa control. They can only recoup this investment by the sale of their oxalic acid product. I feel that using oxalic acid off label is tantamount to violating copyright laws on written or recorded materials - depriving those who make the products available of a return on their investment. **BC**

Photos by Mary K. Parnell.

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UNHEATED & UNFILTERED

Consider Giving Raw Honey A Try This Season

Ross Conrad

Those who have never tasted unheated, unfiltered honey are missing out on a unique gourmet taste experience. First of all let's be clear about what we are talking about here. Raw honey is produced by honey bees from the nectar of flower blossoms, not from feeding bees sugar syrup, corn syrup or any other artificial diet. The nectar gathered by bees is primarily water with some sugars in it, and is dehydrated by the colony through a process that concentrates the sugars in the nectar. Honey is generally considered to be fully processed and ripe when the moisture level is below 18 percent.

Once a cell is filled with ripe nectar, it will be capped with a thin layer of wax by the bees in order to store the honey away for later use. A general rule of thumb used by many beekeepers is that at least 75 percent of all the honey comb harvested and extracted should be capped in order to ensure that the final product will have a moisture content below 18 percent.

Small amounts of enzymes are added to the nectar during various phases of the process that the bees use to turn the nectar into honey. These enzymes break down most of the disaccharide sucrose found in the nectar into primarily the two monosaccharides (simple sugars) glucose and fructose. The third most common ingredient in honey is water. Other minor or trace ingredients found in raw honey besides enzymes include numerous other types of sugars, as well as acids, proteins, minerals, vitamins, aroma compounds and polyphenols.

Most honey in its raw form will eventually take on a crystalline or semi-solid state of granulation. Honey crystallizes because it is a supersaturated sugar solution. In an effort to become more stable, the glucose will spontaneously precipitate out of the supersaturated solution changing the solution to a saturated crystallized state. Many honey processors and packers will heat honey in order to melt the crystals. They then filter the honey in order to remove any bits of pollen, propolis, etc., that could act as a nucleus around which additional crystals may form. This is done to extend the liquid shelf life of honey.

Honey packers in the United States tend to prefer

to keep their honey liquid since, unlike most of the rest of the world, most honey consumers in the U.S. are used to and seem to prefer liquid honey. In fact many non-beekeepers think that crystallized honey has "gone bad" and have been known to throw away perfectly good jars of honey just because it has undergone the natural crystallization process.

When honey is heated, the color of the honey may darken. Unfortunately, the flavor of honey is also affected when honey is heated. In many ways when it comes to honey, the flower's fragrance is its flavor. The volatile aromatic compounds in honey that provide the subtle flavors of the flower blossoms from which the honey was gathered are driven off when heat is applied. In addition, temperatures of 104°F (40°C) will begin to break down the enzymes in honey and temperatures of 120°F (48.8°C) and above will destroy the enzymes in honey all together.

The challenge for consumers looking to purchase raw honey is that there is no official definition for honey that is unheated and unfiltered, and so beekeepers can make up their own definition for what constitutes raw honey and as a result, each definition is just as valid as another. Honey must be heated to between 140°F (60°C) and 160°F (71°C) in order to easily pass through a filter. The higher the

temperature, the greater the impact of heating has on the honey. Thus, we have beekeepers who heat their honey to 160°F (71°C) but only for a short period of time and then label the honey raw. Other beekeepers may only heat their honey to 140°F (60°C) and call it unheated or raw, while still others may not add any heat whatsoever . . . and all these variations may end up being labeled as unheated or raw honey. I don't expect to see a nationally accepted definition of honey in its raw state anytime soon, given the difficulty we are having just agreeing on a definition of honey in general (only five states and the FDA have developed definitions of honey, but none of them agree).

My definition of raw refers to honey that has not been exposed to any heat other than room temperature. Call me a purist, but when an egg has been heated a little, I call it soft boiled, not raw...so why would I treat honey any differently? Mind you, this strict definition of honey



The Ultimate Raw Honey.

does require a few considerations. My customers and I have to learn to appreciate and consume honey primarily in its crystallized form.

I don't have the option of using a heated uncapping knife, or sump pump and filter when processing and bottling my honey. Instead, unheated honey must be strained through a sieve, or allowed to settle before drawing the relatively clean honey off from the bottom of the honey tank.

Nor do I have the option of storing my honey in drums or pails and then bottling it at a later date. All my honey must be bottled at the time it is harvested, while it is still naturally liquid, and it is still easy to pour it into jars. Unheated, crystallized honey must be scooped into a container; a slow and messy process. And forget about entering raw honey into an official honey contest with any hope of winning with all the bits of pollen and propolis floating around in it. The only honey contest category that is open to "raw" honey is the "black jar" category where honey is judged on its taste and nothing else.

Aside from preserving the delicate floral flavor of honey, maintaining its natural color and preventing the enzymes in honey from decay, why would we want to keep honey in its "raw" state? One good reason can be found in the concept of *terroir*, the idea that a specific place on the earth (its geography, geology and climate) interacts with the plants growing in that area to create a unique "taste of place," a taste which embodies certain characteristics and qualities, the sum of which reflect the effect that the local environment has had on the production of the product. While the French first developed the idea of *terroir* and have used it very successfully to guarantee the quality of many agricultural products such as wine, cheese, and butter, few agricultural products lend themselves so perfectly to the idea of *terroir* as does honey.

Just think about it. Depending on forage availability, honey bees will travel about three and a half miles in every direction from the hive foraging for nectar and in the process must visit approximately two million blossoms in order to gather enough nectar to make one pound of honey.

A colony of bees covers many thousands of acres in the process of making a single pound of honey and the taste, color and scent of that honey is impacted not only by the flowers the bees visit, but by the weather in the region and the qualities of the soil that the plants are growing in. The large sampling of blossoms allows the honey bee to create a final product that is a perfect example of *terroir*. And yet so few beekeepers fully capitalize on this unique characteristic of their honey. Oh sure, many beekeepers are promoting the local nature of their finished product, but the heating and filtering process the honey is put through seriously erodes the quality of the *terroir* experience for the consumer.

Raw honey also provides superior medicinal benefits over heated and filtered honey, particularly when it comes to dealing with burns, cuts, and infections. This is because one of the enzymes the bees add to the nectar that they process into honey is glucose oxidase, and as this enzyme breaks down on the skin it creates gluconic acid and hydrogen peroxide. This sterilizing action of honey when used as a topical wound dressing tends to be lost when the honey is heated.

When honey is not heated or filtered, less equipment

is required for its production and this can save a honey producer/packer money, energy and space in their honey house. Indeed, one of the great benefits of producing the ultimate raw honey product, comb honey, is that no extractors, bottling tanks, storage tanks, pumps or filters are required to manufacture a premium product that is in high demand in many parts of the country.

This harvest season, consider the many benefits of producing honey that is unheated and not filtered. The honey bee does such a great job creating the only sweetener available to us that requires no processing on our part in order for us to enjoy it. We really can't improve on the bee's effort, the best we can hope to do is that we don't degrade or ruin the good work that the bees do. **BC**

Ross Conrad is author of *Natural Beekeeping: Organic Approaches to Modern Apiculture Revised and Expanded Edition* (2013)

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The National Honey Board

Check out this incredible resource for beekeepers.

Do you know about the National Honey Board? If you are a beekeeper, large or small, you should be taking advantage of the information and items that are offered not only to help you market your honey but also to give you very useful honey information. Since this is National Honey Month let me introduce you to a valuable resource.

First a bit of history. The United States Department of Agriculture (USDA), through the Agricultural Marketing Service (AMS), administers a number of marketing boards. The purposes of these boards, made of members of an agricultural commodity, are to conduct market research for their particular product and promote the product. These marketing boards are established under Federal law at the request of producers. The first board, for cotton, was established in 1966.

You may be familiar with the results of such promotion. Remember 'Pork, The Other White Meat?' That slogan was developed by the Pork Marketing Board and was used for 25 years until 2011 when the slogan was changed to 'Pork: Be Inspired.' Today 22 USDA marketing boards exist, from Beef to Watermelons. These commodity and research programs, also known as checkoff programs, receive their funding from assessments, called checkoff funds, paid by the producers. Therefore, the yearly budget for board operation depends on the production of the product.

Around 1985 a group of the nation's honey producers decided that honey needed a marketing board to encourage sales and consumption of honey. None of the producers had any idea of who used honey, how much people used, and even what the users did with purchased honey. At that time a market for honey had to be created by each producer, large or small.

In order for a marketing board to be established certain guidelines must be followed. The proposal, submitted to USDA, has specific requirements: information about domestic production, imports and number of large and small businesses. Support throughout the industry is essential, as well as impact on and benefit to small businesses.

The honey producers submitted their proposal. The National Honey Board (NHB) was approved in May 1986 and became operational in early 1987. A commodity board has an office staff headed by a CEO. The board members are nominated by those involved in the industry and must be approved by the Secretary of Agriculture. A

board member, as well as an alternate, is approved and appointed. The alternates can attend board meetings so that they will be an informed substitute should the occasion arise.

At inception of the National Honey Board the United States was divided into regions depending on honey production. The initial board was made of honey producers, large and small, chosen from each region, plus an importer and a packer. In 2008 a referendum was taken and the original makeup of the board was changed. Today it is composed of producers, packers, importers and one representative of a cooperative. To be a board member the producer is required to produce at least 150,000 pounds of honey a year, based on best three-year out of five-year average. The board members receive no compensation except for travel expenses to board meetings or conducting board business. In addition assessments of 1.25 cents per pound are imposed on first handlers (those who buy honey in quantity from producers and market it), and importers or importer-handlers. (The assessment is scheduled to increase to 1.5 cents/pound in 2016. Those in any category who produce or handle or import less than 250,000 pounds per year can apply for an exemption from the assessment.

Briefly, the board prepares budgets and plans development of research, promotion, advertising, and information programs for honey and honey products, all with the approval of the Secretary of Agriculture. The office staff is based in Firestone, CO. Here is where the day-to-day business is conducted.

The activities of the National Honey Board are amazing. Pay a visit to the website, honey.com, not just now but throughout the year. After all, the information, as well as many other things having to do with honey and marketing honey, is free.

Sign up for the Honey Feast newsletter. Periodically you will automatically get an email with new seasonal recipes. Use them yourself. In addition, put them in your club's newsletter and encourage club members to distribute the recipes to their honey customers. After all if the customers are encouraged to use honey in a recipe, they will buy more honey. Recipes are available in sixteen different categories, such as main dishes and baked goods, including one for holidays and one for kids.

Recipes are also available in twelve different categories for the food service industry. If you know a chef

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Natural, Affordable Way to Soothe a Cough

Did you know that emerging research supports honey as a natural cough suppressant?¹ Just a small dose of honey given before bedtime provided the greatest improvement of nighttime cough and sleep difficulty in children over one year of age compared to dextromethorphan and no treatment. Try this [Honey Soother recipe](#).*

*Honey is recommended for children over the age of one.



Beauty and the Bees

Honey has always been touted by beauty experts as “liquid gold” in the industry. Now, research supports that it's an effective moisturizer.² As a natural humectant, honey attracts and retains moisture, helping keep skin soft and supple. Honey also helps fight bacteria: its antimicrobial properties work to keep skin clear and breakout-free. Pamper yourself with this do-it-yourself [Cucumber Honey Eye Nourisher](#).



The Natural Energizer

Honey has long been used by athletes as a quick pick-me-up because of its carbohydrate count. With about 17 grams of carbohydrates and 64 calories per tablespoon, honey is an ideal natural energy booster for athletes, fitness lovers and busy moms alike. Sports Dietitian Mitzi Dulan, RD, CSSD, suggests adding one tablespoon of honey to water for a budget-friendly sports drink. Find other honey tips and recipes [here](#).



¹Paul IM, et al. Effect of honey, dextromethorphan, and no treatment on nocturnal cough and sleep quality for coughing children and their parents. Arch Pediatr Adol Med 2007; 161(12): 1140-1146.

²Honey has been scientifically proven to be a natural skin moisturizer according to a double-blind clinical study conducted by cyberDERM Clinical Studies. The study involved 53 panelists and was conducted in Broomall, Pa., during the weeks of January 18 and January 25, 2010. The testing followed current cGCP, cGLP, as well as COLPIA Efficiency Testing Guidelines.



www.honey.com

or someone with a restaurant or a school that prepares food let them know about these recipes. The quantities are large. In addition to recipes the Food Service tab offers other valuable information about using honey. A newsletter is also available plus a complementary resources kit. Since these Food Service recipes make a larger quantity of a dish than normal recipes you might find a recipe suitable for taking to a potluck supper at your bee club.

Since you are a beekeeper you probably have been asked endless questions about honey or have been asked to give a talk about honey. A visit to the Honey at Home tab, then to Learn About Honey will give you a download for a brochure entitled 'Honey. A Reference Guide to Nature's Sweetener.' Here you can find the answer to all the questions you have been asked including an excellent explanation about why infants should not be fed honey. Some honey customers do not know the reason for that. A good answer is reassuring and encourages honey purchase.

Are you selling your honey for a good price? If you visit the Honey Industry tab, Honey Industry Statistics, you can find a table of retail price per pound of honey over several years. You can then compare your current price to that across the nation. It is interesting to see that honey has increased in price, indicating that consumers value honey as a sweetener. (The data the National Honey Board uses on their price list is from *Bee Culture's* Monthly Honey Report, just so you know.)

Honey needs a legal label if it is going to be sold, even at a farmers' market. The basic legal label information can be found on the website. However it would be important to check with your own state's labeling requirements in case you need to have additional information.

Puzzled about 'raw' honey and 'filtered' honey? Customers frequently have definite opinions about various honey processing terms. 'Heating,' 'filtering' (often confused with straining), all seem to ruin honey's benefits. A visit to the NHB site for Honey Nutrition Information may surprise you. This section has the results from scientific studies on the effects of processing honey. Take a few minutes to read the two papers giving the findings on processing. You will then be able to discuss honey, its processing and benefits, with your customers. You will also find abstracts of other research on honey. Such research is expensive but that is part of the work of the National Honey Board.

Now let's have some fun. If you visit Tools, Tips and Resources you will find Digital Art. You can download Brochures, Wallpaper, E-Cards and Clip Art. These are available to help you construct your own promotional material, use in newsletters, handouts to accompany your jars of honey, make hang tags, decorate information for customers, and whatever else you think of. The Clip Art file has four sheets you can download. The E-Cards have a recipe on them – a great way to give a gift of honey. And all these are free!

Now go to Honey and Bee Research under the tab for Honey Industry. Here you will find information about a small but very important part of the National Honey Board – funding research. The NHB has allocated funds for research since 2004. Scientists can find information about submitting a Pre-Proposal at this site.

The most famous honey scientist, Dr. Jonathan W.

White, Jr., spent his life discovering honey. His scientific papers, all 250 of them, were digitized by Pennsylvania State University and shared with the National Honey Board. Although honey research is still conducted, his papers are still a valuable resource.

Would you like to know what people are doing with honey that they buy? Who buys honey? Why do they buy it? The National Honey Board conducts frequent surveys to find out the answers to these and other questions about honey and its consumption. The most recent survey was done in 2013. You will find the results of that and other surveys under Market Research. Making surveys is an important part of marketing boards. The answers give the boards guidance in preparing advertising and also making appropriate marketing tools available to producers.

If you are selling honey directly to consumers it would be a good idea to look at the results of this survey. Consumers are still using honey in tea and on biscuits and for a cough. You may need to give your customers more recipes. If your new customers are confused about what 'pure' honey is, perhaps you can make a handout explaining 'pure honey.' If you think you have too many of 'just put it in my tea' customers, perhaps some simple and quick recipes would encourage them to use more of your honey. Survey results can help you decide appropriate promotion of your honey.

Are you a fan of Minor League Baseball and attend games? For eight years the National Honey Board has been a sponsor. This year 14 teams are sponsored. Brochures and recipes are available at games. Honey is promoted at the games as an all-natural energy booster, perfect for all who play sports. The NHB honey bear mascot is present at the ball games to entertain the fans. To find out more about the teams and the NHB activities there you can put Minor League Baseball into the Search box.

There's so much more! Click on BLOG to find more activities. Go to the Honey Locator to find out where to buy honeys different from yours. Your customers might like to buy some special honey – one from another part of the United States. It makes no difference if you are a new beekeeper with two hives or a seasoned beekeeper with hundreds of hives – use honey.com! It's there for you to use and it's free! **BC**

Ann Harman was there at the beginning of the National Honey Board. She served on the NHB Board representing hobby beekeepers.



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BIGGER PICTURE

Jessica Louque

Touring Dakota Honey

This year is the first time our work has taken us to North Dakota. It wasn't a long trip for the first round (of at least three this year) but it was definitely a learning experience. Bobby scratched his cornea (again, always in the Summer) and we had to go to the ER within 24 hours of arrival. By the time we were out to get the prescription for eye drops, our crew had contacted us from a room with 8" reinforced concrete walls saying that tornadoes had been spotted and they were under warning. We were a little bit away from them since the ER is in Grand Forks,

and casually mentioned this piece of news to the pharmacist. He told us to not say it too loud because it would upset the other pharmacy techs. We dropped off the prescription and went to the front to pick up a couple of tents, and when we took them to the car, sirens started going off. We realized they were the tornado warnings, and ran back in to

try to get the prescription. The pharmacy was blockaded like a bank in a robbery with the chain cover over the desk area. We decided to wait it out in the parking lot instead of the hallway in the back of the store with the others. Sitting outside in the truck, watching the dime-sized hail bounce off the hood, we saw a fairly large tornado. Fortunately the storm ended up sort of splitting around us, while Bobby posted on Facebook that the tornado was coming for us to scare my mom. She did not think it was funny. We had another tornado the next day and rain sheeting so much that you couldn't see anything ten feet off the highway. This is not what I would call a fun experience, but I will say that the people we met were all really interesting and entertaining.

The people in the town know us as the "bee people" because we had a team there last year, and they are

some of the most accommodating people I've ever met. We basically rent out the entire inn, and try not to get stuck too much in the canola fields. Since we're putting hives out in the field, it does get a little difficult to drive around when you get an inch of rain a day. In between our rain storms, we finally were able to go out and meet our beekeeper there who is working with us on our bee studies for his second year. I've learned some slightly odd things about large beekeeping operations in different places this year, so I thought having an informal interview with

the Larimore guys of Dakota Honey would be a neat thing for everyone.

We work with Nate Larimore to rent his bees for colony studies. Our only problem with Nate is that sometimes his hives are a little too good. If the hives are too big, we can't really work with them very well and move them around. Nobody wants to shift hives that have six full honey

supers. I personally didn't expect to see towering hives full of honey everywhere, what with North Carolina basically having a dearth for about nine months out of the year. With the abundance of clover and canola, these guys had rockin' hives.

Nate and his dad, Bob, gave us a tour of their honey house, if you could call a giant warehouse by the same name as the little Amish storage shed in our front yard. We had six of our techs with us, who are either college students or recently graduated, and I think it was a good experience for them to see how a commercial operation works. I spoke more to Bob than Nate, who told us more of the history of their company.

We were first introduced to their candle making room. The walls were covered with hand-painted Dakota Honey signs. The signs were one for each year of their local booth



Our work group: Jessie, Bobby, Bob Larimore, Brooke, Connor, Bryce, Elizabeth, Lindsey, Nate Larimore, Joe



An assortment of Dakota Honey candles.

sales of their candles, which would be 17 of them. All of our techs were rummaging through the cabinets, not for what they could see, but for the smell. The lilac was personally my favorite. Bobby preferred the pinecone candles regardless of scent.

We went into the main part of the warehouse next, which was stacked to the ceiling with hive bodies and supers. A Hummerbee forklift sat in front of one of the stacks. Bob said that they have about four thousand honey supers out in the field right now, and also have hives out to collect pollen. Pollen traps were hand-made and painted, with only about 10 left in the warehouse. The

pollen room was elsewhere, but we would get there soon.

We wandered to a different part of the building, and it smelled like beeswax. This was where old frames were being stripped for melting and straining for the wax blocks to be shipped out. A large melter sitting at 170°F poured out liquid wax like water. None of our bee team thought it was a good idea to stick their hand in it, although I could see the thought crossing a few minds.

Crossing from here into the pollen room, we saw more wax than anything, since the pollen traps were being collected at the very moment we were visiting. The boxes of pollen in

the cooler were not interesting, since they were closed boxes and were not Christmas presents with my name on them.

We started for the honey processing room, which had a large honey extractor sitting at the front of the room, and a commercial sized extractor in the back. This is where more of the daily operation conversation happened. We learned that Bob had really gotten into the bee business around 30 years old, and slowly expanded from his original 64 hives for the past forty years. The newest extractors had replaced their two 90-frame radials. They can now process around 250-300 supers a day with eight or nine frames per super. In the past, the honey production has varied, with only around 60 barrels in 2013, 100 barrels last year, but having 300 barrels at other times in the company's history. The shot in the dark for 2015 is 200 barrels. No word yet on how likely this is to happen, but Bob is hopeful. He did have a hive that had eleven supers on it.

We also had a little bit of history about the area. We saw random rows of trees in the countryside, which looked like they might be windbreaks, water lines, or property fences. It turns out they are called "shelter belts" and were planted in the 1930s. The trees (or shrubs, in some cases) were lilacs, caragana, pine, spruce, cottonwood, or a few other species. The original intent for these shelter belts was not only for windbreaks, but also for erosion control and wildlife habitat. I'm sure there were also more than a few neighbors who appreciated their living fence between them and the next property.

I also asked about the colony losses they had faced in recent years. The rounded number was about a thousand hives in 2013, and about 500 last year. The losses were almost exclusively due to mites. Bob said he thought one of the bigger problems with mites was overuse of some of the miticides, which caused resistance in the *Varroa* populations. The guys had a fairly robust IPM practice down to control various hive problems, and will hopefully have even less losses this year.

The next stop on the tour was the hive repair room, stacked with boxes that had been repaired and were waiting for new paint. The



Bobby wrestling a very big hive . . .



. . . that's full of honey from these canola blossoms.

average count was around 150 boxes each year to repair. Bob also has a hobby of making birdhouses out of the scraps left over from his work, which he freely gives to his friends and family. A couple stacks of supers in the back were emblazoned with the initials "RCL" but branding is no longer a part of the Dakota Honey process. I wouldn't want to brand that many boxes either.

On the way back out, we stopped by the pollen room again, where two guys were pouring buckets of pollen baskets through a sifter. We all stopped to stare at the guys, who may or may not have liked the immediate attention of an audience of strangers. From the hives with pollen traps, which I believe was around 200 (I could be wrong; I forgot to write down the number), a total of around 2900 pounds of pollen baskets were expected to be collected for this year.

During our tour, one of our techs spent most of his time talking to Nate. By the time we left, Joe, the tech, was asking for contact information so he could come help out on the weekends to learn more about their business. We will have Joe stationed up there for a while, so I think these guys can keep him plenty busy. In the meantime, our job was to find some Schwan's ice cream, as it was the best ice cream in the area. Bob couldn't spell it for us because his wife was the one for that job. I did have to look it up to see what it was. Schwan's seems to be home grocery delivery company that delivers out of Minnesota. They do sell other things besides ice cream - but why would you care? I don't know that it would beat my own favorite Howling Cow ice cream from NC State, but I'm never one to turn down an ice cream invitation. Hopefully there will be an update on that sometime later and I'm sure it will be delicious. **BC**

Jessica Louque and her family are living off the land in North Carolina.

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Learning To Be An Expert In *The Sensory Analysis of Honey*

Marina Marchese

Catching an international flight out of JFK is the last thing I wanted to do during an Ebola panic, it was mid-March 2015 and the deadly virus was on U.S. soil. Missionaries were being flown home for treatment while international travelers were held in quarantine at airports, so naturally it was my karma to have a non-refundable ticket to Italy. When the Italian Institute of Apiculture Research (CRA-API) contacted me to confirm the final training course in the sensory analysis of honey had the required 15 students, I had no choice but to hustle and schedule my travel plans. This trip would mark the final class of a three-part program navigating the road to becoming an expert in the sensory analysis of honey. Without hesitation, I packed up two years worth of tasting notes, my laptop and required textbook to brave three days of scrutiny by master honey tasters. Knowing very well, that the final exam could make or break my knowledge of everything I knew about honey, but if I passed, it could land me a coveted place on the Italian board of honey tasting experts.

Bologna is a lively culinary destination and the home of the Italian Apicultural Research Center (CRA-API). They offer educational courses in beekeeping,

melissopalynology, bee pathology and the only organization in the E. U. to have a dedicated educational program for the sensory analysis of honey and a national registry of tasting experts. This is where I persevered the intense training in order to sharpen my skills for honey tasting with the most passionate and experienced tasters in the world. It was only last October that I completed the second required course and since then, I have been immersed in studying for more of this sweet insanity.

Sensory analysis is tool to evaluate color, aroma and flavors of honey and compliments the chemical and pollen analysis work performed in the laboratory, also it is used to understand consumer preferences. So how does one begin to study for a honey exam? I fashioned a worktable in my studio that serves as a designated honey tasting study station where all of my unmarked samples are laid out in transparent glass goblets with lids. Additionally, endless piles of tasting spoons, a few green apples and a pitcher of water are all within reach as palate cleansers and my essential tasting notes. In order to learn about honey you have to taste a great deal of it, side by side, consciously and methodically. You must also be obsessed and razor focused to memorize all the sensory qualities



My honey study table.



Some of the honey samples.



In class.

of a diverse selection of honeys including details about their floral sources and regions.

This may all sound impressive, however experienced tasters are also able to make assessments, one subjective and the other objective, that is separating your personal opinion of liking a honey from its quality. A skill earned through tasting a wide variety of honeys and understanding their sensory qualities without injecting your own ideas. For example, you may not like buckwheat honey but you have learned to appreciate its woody, musty and chocolate malty flavor notes.

During my training, I learned the value of writing detailed tasting notes for every honey I tasted in order to describe its sensory qualities. It has been proven that aromas and flavors are directly linked to memories so it makes perfect sense to consistently apply descriptive words to the sensory qualities of honey in order to reinforce your impressions. In fact, a good memory is one quality that expert tasters have in common and it is possible to become an accomplished taster through identifying and memorizing flavors. In the first course, we were taught the fundamentals of tasting beginning with the somewhat confusing fact that our tongue (gustatory system) can only recognize five tastes: sweet, sour, salty, bitter and umami (savory). Yet our olfactory system is much more complex in that we can recognize a diverse range of over thousands of flavors from citrus, butter, pepper, dry hay or mushrooms. In fact, this is why wine drinkers always sniff before they sip. So in order to truly experience the flavor of honey, you must smell it, let it melt on your tongue with a generous amount of saliva, then inhale to force the aromas up through your retro-

nasal passage airways that connects our nose and mouth. Our olfactory bulb transmits these odors to the brain where we can distinguish thousands of aromas even at low concentrations. Flavor is actually the combination of aroma, taste and texture.

We followed the standardized tasting method then performed the most intense exercises each morning and again two hours after a typical leisurely Italian lunch this is when our senses were the sharpest. By this point, we were expected to be comfortable with the sensory profile of 20 honeys we learned during the first two training courses. In each exercise we were challenged to identify 12 anonymous varietal honeys presented in amber tumblers to disguise the color by aroma alone. In another exercise, we were asked to identify 12 different samples only by tasting them. Sometimes this was only possible by the process of elimination. Occasionally, one varietal honey appeared twice in an exercise to catch us off guard. We were also asked to write tasting notes and sensory profiles for unidentified liquid and crystallized honey samples, rate other samples on pre-established perimeters and even identify floral sources of blended samples. In order to identify positive attributes in honey you must also experience the bad and the ugly, so we were exposed to defects such as fermentation; impurities, smoke and metallic flavors. Samples were prepared in various stages of each defect then we were tested on the ability to identify each and at all levels. Three eight hour days of tasting and talking about honey was demanding and no matter how much experience one has, there is always something new to be learned. I have to admit that when the course was up, I felt a great deal of relief and was glad to be on my way home, too exhausted to worry about Ebola.

A few weeks after my return home, I received a letter congratulating me on passing the course and my ID card for the Italian National Registry of Experts in the Sensory Analysis of Honey. In order to maintain any skill, you must practice and this is also true for tasting honey. I continue to taste honey almost every day and learn as much about each sample along with its sensory qualities, floral source, season and the region it was produced. These stories paint a portrait of each honey sample that make every honey unforgettable. **BC**

If you are interested in learning more about tasting honey, the methods and writing tasting notes, I will be offering educational courses through the American Honey Tasting Society. Check the course schedule at www.americanhoneytastingsociety.com

Marina is the author, with Kim Flottum of The Honey Connoisseur, A Guide To Selecting, Tasting and Pairing more than 30 varietals of honey.

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Beggar Ticks & Related Bee Plants

Connie Krochmal

At one time or another nearly everyone has brushed against the seed heads of beggar ticks or Spanish needles. The annoying flat seeds with toothed or barbed ends must be removed one by one from clothing and pet fur. They're eaten by some bird species.

The Latin name for the genus means two-toothed. Members of the daisy family, these plants are also called tickseeds, stick tights, harvest lice, and bur-marigold. Over 200 species are found worldwide with at least 20 occurring in North America.

Typically annuals or perennials, the fast growing plants are sometimes biennials or shrubs. Often, they're considered weedy, particularly those that self sow. Usually found in most regions, beggar ticks are pretty much cosmopolitan.

Generally, most species are considered excellent bee plants. They're important nectar and pollen plants in the Southeast, the Plains, and the North Central states. The very pleasant tasting honey is typically golden. When enough flowers are available, these can bring a good honey crop.

Habitats

Beggar ticks frequent assorted habitats. These include coastal regions, low lying areas, low fields, meadows, waste places, rocky woods, ditches, wet shores, bogs, swamps, roadsides, woodland borders, bottomlands, and thickets.

General Description

Because the plants readily hybridize naturally, identification for some beggar ticks can be difficult. Usually hairless, the stems can be erect or trailing. Typically, they're freely branching. The height varies according to the species or variety. Some are quite tall – up to five or six feet.

The opposite leaves can be divided or entire, depending on the species. They're mostly toothed and divided. The leaflets are often lanceolate or linear.

The flowers usually open from August through October, according to the species. Generally, the daisy-shaped blossoms, sometimes scented, aren't terribly showy, particularly if they lack rays. However, certain species feature beautiful blossoms that resemble those of coreopsis.

The blooms are generally yellow, which explains why they're sometimes called tickseed-sunflower. These typically feature clustered, many flowered heads. If present, the petal-like rays, usually three to eight in

number, can be white, yellow, or neutral.

The disk flowers are yellow and perfect. The outer bracts are usually green and leathery, while the inner ones are brown or yellow.

Growing Beggar ticks

Only a few species are cultivated, mainly the ones with attractive appealing blossoms or dainty lacy foliage. Most prefer full sun. Beggar ticks are suitable for rich to average, well drained, evenly moist soils. Although the plants usually favor rich, fairly moist, peaty or sandy soils, some are adapted to drier conditions. Treated as perennials in warm climates, they're grown elsewhere as annuals.

Germinating quickly, the seeds can be started indoors about six to eight weeks before the date of the last expected frost. These can also be direct sown after the danger of frost has past. In warm climates, the plants can be divided or grown from cuttings.

Cultivated Species

Several native species are grown in gardens, including bearded beggar ticks and northern tickseed-sunflower. In addition, a number of other species are sometimes cultivated.

One of those (*Bidens humilis*) is known simply as beggar ticks. Reaching a foot in height, this free flowering, deer resistant species with trailing, vigorous stems does well in pots and hanging baskets. It blooms throughout



Beggar Ticks

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the Summer. Seeds of the species and some award winning varieties are available.

Fern-leaved beggar ticks, also known as Apache beggar ticks (*Bidens ferulifolia*), is also cultivated. Native to Arizona, the southern U.S., Mexico, and Guatemala, it can reach one to three feet in height. Most varieties are only a foot or so tall.

It features attractive, fern-like, deeply divided leaves. The species bears slightly scented blossoms, 1½ inches across. They're mostly golden yellow with somewhat deeper colored centers. In recent years, a number of varieties with blooms in others colors, such as orange and red, have been developed. These can bloom year-round in warm climates.

This short lived, easy to grow species is drought and heat tolerant. Treated as an annual in cold climates, it can be grown as a perennial in Texas and along the Gulf. Fern-leaved beggar tick is very easy to grow from seed.

Peters Gold Carpet, a Proven Winners variety that reaches ten to 15 inches in height, is a shapely, rounded plant. This bears gorgeous showy, fragrant golden blossoms all season. The plant is suitable for hanging baskets and other containers.

Namid Golden Eye Bidens is a new annual variety with striking, large, star-like blooms that contain apricot petals and golden disks. The upright to mounding, branching plants with short stems are suitable for containers.

Various other varieties of beggar ticks are available. The Bidens BeeDance series, which includes BeeDance Painted Red and BeeDance Red Stripe, features striking plants with stunning, bicolored blossoms. These well branched, floriferous varieties bloom continuously all season until frost.

Varieties with yellow blossoms include Popstar, Namid Early Yellow, and 2 Teeth Big Oly Star. All of the varieties mentioned here can be treated as annuals.

Recommended Beggar Ticks for Bees

The following species are known to be excellent bee plants although the amount of honey can sometimes vary by region.

Bearded beggar ticks or tickseed-sunflower (*Bidens aristosa*)

Also called Ozark or Midwestern tickseed sunflower, this is adapted to open shade and full sun. Different varieties of this plant are found. Hardy to zone four, this occurs in Texas, Colorado, Oklahoma, Kansas, Missouri, Indiana, Illinois, Iowa, Minnesota, Kentucky, and the Gulf States to the Lower South into the Carolinas, Virginia, and the Northeast. It frequents bottomlands, riverbanks, swamps, and marshes.

This much branched, leafy, erect, tap-rooted species can be two to six feet tall and equally wide. Mostly an annual, it is sometimes biennial. Bearded beggar ticks can have multiple stems, which are sometimes hairy.

The lobed or toothed, opposite leaves, sometimes hairy, are compound. These can be large – up to six inches in length.

The numerous, scented, showy blooms, resembling those of coreopsis, open from August to frost. They feature

yellow rays, blackish-purple anthers, green outer bracts, and pale yellow inner bracts.

Some sources classify the long bracted tickseed-sunflower (*Bidens polylepis*) as a variety of bearded beggar ticks. Its flowers are somewhat smaller than those of bearded beggar ticks. Bearing seeds with round margins, this abundant variety occurs in wet places, low prairies, and along roadsides in Texas, Colorado, Kansas, Oklahoma, Missouri, Iowa, Illinois, and Tennessee along the Atlantic Coast to New York.

Bearded beggar ticks is a particularly good honey plant in some areas. It can yield nearly 50 pounds per colony in a fairly short time.

Common or devil's beggar ticks (*Bidens frondosa*)

This species is found pretty much throughout the country, especially in the Northeast. The habitats include moist sites, cultivated ground, waste places, fields, roadsides, and wet thickets. Although it largely favors wet or damp sites, this also grows in dry places. Common beggar ticks adapts to partial shade and full sun. It is one of the most abundant species.

This much branched, leafy annual emerges from a taproot. It reaches from one to slightly over four feet in height. Almost four sided, the erect stems branch towards the top. These are mostly smooth, but sometimes hairy.

The opposite, compound, divided, toothed leaves contain up to five leaflets that are sometimes slightly hairy underneath. The leaflets are either lanceolate or narrowly oval.

Common beggar ticks typically blooms from August through October. The erect heads are almost globose to hemispherical. The flowers are less conspicuous than those of some other species because they're typically rayless. If present, the rays will be yellow-orange.

The orange-yellow to orange disk flowers with gorgeous blackish-purple stamens are surrounded by eight, leathery, fringed, green outer bracts. The barbed seeds are sometimes found in wildflower seed mixes.

This is a better honey plant than some related species, particularly in the Northeast and in Nebraska.

Northern tickseed-sunflower (*Bidens coronata*)

Also called tall swamp marigold, this is found in wet places in the Northeast. A branched annual that can reach



Spanish needles (*Bidens pilosa* or *B. leucantha*)



Purple stem tickseed seeds.

one to five feet in height, it features toothed, opposite, pinnately compound, pointed leaflets, which can be linear or narrowly oval. The plant is similar to bearded beggar ticks except for the bristled or slightly fringed curly bracts and narrow seeds with straight sides.

Opening August to October, the flower heads with eight rays are two inches wide. The Latin species name refers to the crown-like flower.

One particular variety known as purple stemmed beggar ticks (*Bidens coronata* var. *trichosperma*) can be recognized by its hairy seeds, which have barbed awns that don't readily cling to clothing or fur. This variety occurs in the Northeast along the Delaware River and the Atlantic Coast to much of the Southeast and from Pennsylvania to Ohio, Indiana, Illinois, Iowa, Nebraska, and Minnesota.

Purple stem tickseed (*Bidens connata*)

Growing in full sun and partial shade, this prefers moist or wet places mostly. It occurs in Nebraska, Kansas, Missouri, Minnesota, Wisconsin, Indiana, Ohio, Tennessee, Georgia, North Carolina, and West Virginia along the mid-Atlantic to New England. Different varieties of this plant grow in some locations.

This annual features an erect, smooth, branched stem that grows from a taproot. Purple stem tickseed can reach three to five feet in height. The pointed, toothed, deeply divided leaves are up to eight inches long.

This bee plant blooms from August through October. It bears erect, orange flower heads, $\frac{3}{4}$ inch wide. Rays are often absent or few in number. When present, they're golden yellow. The blossoms feature black anthers, orange corollas, and leathery bracts. The chaff is yellow with red streaks. The awns are extremely barbed.

Showy bur-marigold or smooth beggar tick (*Bidens laevis*)

This species, which can be annual or perennial, grows in moist places, disturbed ground, swamps, and along roadsides. It adapts to both brackish and fresh water. Showy bur-marigold is found from California along the Gulf to Georgia, Florida, and North Carolina northward to Indiana, West Virginia, Massachusetts, and New Hampshire.

Showy bur-marigold can be slightly over three feet in height. Arising from long rhizomes, the firm, smooth stems root at the nodes.

The opposite, toothed leaves vary slightly in shape from elliptic to narrowly oval. They're up to eight inches long.

The branched, mostly hemispherical, erect flower heads, up to $2\frac{1}{2}$ inches wide, nod slightly. The orange-yellow or yellow blossoms appear from August through November, generally on the upper and middle part of the plant. These feature up to eight golden yellow rays. The disk corollas are dark yellow. The bracts sport reddish tips.

This is considered a good honey plant. The pale yellow honey has a lightly spicy aroma.

Spanish needles (*Bidens pilosa* or *B. leucantha*)

This species favors sites that aren't constantly wet, such as gardens, fields, disturbed ground, lawns, waste places, and along roadsides. After being introduced from the subtropics and tropics, it naturalized and now occurs from California and Texas to Alabama, Georgia, Florida, and South Carolina.

This weedy plant can be an annual or a short lived perennial. Reaching three to six feet in height, the square, erect stems, sometimes hairy, can root at the lower nodes.

The simple, opposite leaves feature three to five toothed, ovate segments, four inches long. These can be hairy underneath.

This plant bears a large number of erect flower heads, which emerge from the leaf axils. If rays are present, these will be white or light yellow.

The flowers open mostly from April to frost, depending on the location. In Florida, this floriferous plant can bloom year-round, while in South Carolina it continues flowering into November. The seeds are spindle shaped.

Spanish needles are known to be good bee plants, particularly in the Southeast. The blossoms are a source of brownish-orange pollen and much nectar, particularly in late Summer.

This species is considered a reliable nectar source, especially when enough of the plants are available. The aromatic honey can be light amber, orange-red, yellow, or red. The flavor can vary from rich to mild. Usually, this doesn't granulate. **BC**

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

GLEANNINGS

SEPTEMBER, 2015 • ALL THE NEWS THAT FITS

FLOWERS CAN BE A THREAT TO BEE SURVIVAL

Flowers can pose a grave danger to bees by providing a platform of parasites to visiting bees, University of CA, Riverside researchers say.

The researchers found four common honey bee and bumblebee parasites dispersed via flowers – *Nosema apis*, which causes a honey bee disease, *Nosema ceranae*, which causes an emergent disease in honey bees and bumblebees, *Crithidia bombi*, responsible for a bumblebee disease and *Apicystis bombi*, mostly found in bumblebees.

These parasites are known to cause, lethargy, dysentery, colony collapse, and queen death in heavily infected bees.

“Flowers are hotspots for parasite spread between and within pollinator populations,” says Peter Graystock, a postdoctoral researcher in the university’s Dept of Ent.

“Both the flower and bee species play a role in how likely parasite dispersal will occur.”

The study, published online in the Proceedings of the Royal Society B, is the first to show that not only can bees disperse parasites around the environment but also that flowers are platforms for a host of pollinator parasites subsequently dispersed onto visiting bees.

“By showing that visits from parasite-carrying bees can turn flowers into parasite platforms, we can say that it is likely that heavily visited flowers may become more ‘dirty’ with bee parasites,” Graystock says.

“Planting more flowers would provide bees with more options, and parasite spread may thus be reduced.”

Bees are frequently transported across state and international territories and quarantine and parasite screening usually cover only the screening of host-specific diseases.

But bumblebees can transport honey bee parasites, the research team now has shown, and proposes that increased screening protocols be employed to protect pollinator diversity.

“With some 20,000 bee species, it is a surprise that only recently has research in pollinator health considered the interactions between bee species,” Graystock says.

“Our finding may also affect the national and international trade of flowers unless sterilization of parasites on these flowers can be guaranteed. Otherwise flower movements may also be moving pollinator parasites to new territories.”

He says commercially imported bumblebees have been found to contain a cocktail of parasites that are harmful to both bumblebees and honey bees.

“We know these commercially imported bumblebees, when given the opportunity, will forage on the same flowers as wild bees and honey bees,” he says.

Graystock and his colleagues allowed one species of bee – honey bees or bumblebees – from hives

BEEKEEPERS GET A BREAK

A new law signed by WA State Gov. Jay Inslee gives large-scale beekeepers tax breaks on earnings made from providing pollination services and from selling products such as honey and beeswax.

They are also exempt from paying sales taxes on production expenses such as bee feed and parasite treatments. Washington State University bee expert Steve Sheppard says the new law, defining the state’s commercial beekeepers as farmers, will allow the state to better reap the benefits of healthy bee populations while boosting a critical profession.

“Beekeepers’ work is similar in concept to managing tiny livestock,” says Sheppard, chair of the Department of Entomology. “More than that, it’s integral to agriculture, not only for the honey that gets produced but for the pollinating of crops.”

In Washington, those crops include everything from apples, cherries and pears to canola and mint.

“We don’t want our beekeepers going extinct because they can’t afford to stay in business,” Sheppard says.

Without enough beekeepers, crop production could decline and force

consumers to pay more for food.

“It only makes sense that they can get tax breaks the same as other agricultural producers do.”

The law doesn’t mean a backyard beekeeper with one hive can benefit from the exemptions.

To qualify as an “eligible farmer,” beekeepers must register their hives with the state’s agriculture department and have gross sales of \$10,000 during a year for bee-produced products or bee pollination services.

One of the largest beekeeping operations in the Northwest is run by Eric Olson of Yakima, Wash. He and his wife, Sue, manage millions of bees, trucking them to fields in Washington, Oregon and California to pollinate crops.

“Finally, we’re not being clumped together as service providers like doctors and lawyers,” said Olson, who lobbied for the legislation.

“Beekeepers have been taking big financial hits from bee die-offs and these tax breaks will lessen the sting, so to speak,” Olson says. “I’ve been doing this work since the 1970s. When I say this is a big win for Washington beekeepers, believe me, I know.” – Alan Harman

NEW NJ BEE LAWS

Three laws protecting bees and beekeepers cleared the New Jersey state legislature with unanimous votes.

NJ Acting Governor Kim Guadagno immediately signed the bills into law.

The legislation extends Right to Farm Act protections to commercial beekeepers; establishes exclusive state regulatory authority over apicary activities and allows for delegation of monitoring and enforcement authority to municipalities; and establishes the penalty for destruction of man-made native bee hives.

The new Right to Farm Act gives protection to commercial beekeepers who are producing honey or other agricultural or horticultural apicary-related products, or provid-

ing crop pollination services, worth \$10,000 or more annually.

The act protects responsible commercial farmers from public and private nuisance actions and unduly restrictive municipal regulations.

There now is a civil penalty of up to \$500 for each offense when a man-made native bee hive is intentionally destroyed. A man-made native bee hive is defined as a tube or other apparatus in which native bees may nest, and which is installed to attract native bees.

The acting governor was joined by NJ Secretary of Agriculture Douglas Fisher and representatives of the New Jersey Farm Bureau and the New Jersey Beekeepers Association (NJBA) for the bill signing.



A bumblebee (*Bombus melanopygus*) in flight towards a pansy flower: (UC Davis photo by Kathy Keatley Garvey)

Continued on Next Page

TRACKING & ANALYZING HONEY BEE HEALTH

Scientists from eight universities across the United States are tracking the health of honeybees in a partnership funded by the U.S. Department of Agriculture.

The Bee Informed Partnership includes the University of Maryland, Oregon State University, the University of Tennessee and Appalachian State University.

The \$5-million partnership, which includes beekeepers, now is its final year tracking hive losses and documenting beekeepers' best practices as a way to mitigate losses.

James Wilkes, chairman of Appalachian's Department of Computer Science, says the partnership has collected a lot of data.

"The next step is determining what it all means," Wilkes says.

More than 6,000 beekeepers from across the U.S. participated in the partnership's recent survey.

Wilkes and his team of four undergraduate students from Appalachian and a computer programmer from the University of Tennessee were responsible for building the database infrastructure for the project allowing beekeepers to submit their information, and the scientists to generate reports based on the data collected.

Beekeepers provided information about the number of bees they keep, how many they lost each year, what their management practices are and techniques they use to manage their bees, among other information.

Wilkes says the information is important for both the backyard as well as commercial beekeepers.

"The information is collected with the idea that the epidemiologists can look at the data and come up with correlations between particular practices and hive loss," he says.

The data collected since the project began indicates that beekeepers who treat their bees for the *Varroa* mite experience fewer losses than beekeepers who don't treat for the parasite.

Beekeepers in North Carolina who responded to the survey reported they lost 41.5% of their honey bee hives in 2014-15. Nationwide, the number of hives lost was 42.1%.

Wilkes says beekeepers in five states reported losses between 60% and 63%.

When the USDA grant ends next year, members of the Bee Informed Partnership plan to continue their research.

"We want the grant work to continue," Wilkes says. "Our goal has been to build a sustainable business model."

"We have formed a non-profit organization to carry on this work after the original grant ends in May 2016. Our vision of the program is to identify the best management practices in the current climate of beekeeping. If enough people change a few things, we could reduce the overall loss."

The partnership can be found at <http://beeinformed.org>

MANUKA – MORE SOLD THAN MADE

With demand for New Zealand's anti-bacterial manuka honey far outstripping supply, the hunt is on for a simple test so that importers and sellers can determine if the honey is true to label.

A report on the Australian Broadcasting Corp.'s Landline program says counterfeiters are rushing to get their hands in the honey pot predicted to be worth \$1 billion within a few years.

"It's massive overseas in that there's probably two or three times more manuka honey being sold in international markets than is actually being produced here in New Zealand," senior chemistry lecturer Peter Brooks of Australia's University of the Sunshine Coast tells the program.

"It's a case of someone taking a \$5 honey and selling it then for \$50 saying that it's a manuka."

Brooks and New Zealand scientist Terry Braggins have been commissioned by New Zealand's Unique Manuka Factor Honey Association to develop a chemical fingerprint for manuka honey.

The aim is for a simple test to prove the product is genuine.

"We are looking for unique compounds in the honey which come out of the nectar so we can trace it back to the floral source," Brooks says. "So that when you hold another honey up to it, if there's something mismatching from a different floral source, we can pick it out as not being true to type."

Narissa Harvey of Happy Valley

Honey outside Auckland told the broadcaster the industry has to make sure it protects the product and prevents fraudsters from ripping off manuka honey.

Production at the family's honey business has grown 15-fold – from 15 tonnes in 2008 to 225 tonnes in just six years – but it still can't meet the demand.

"When I said I didn't have what they wanted or could supply [one group] actually came back 20 minutes later and offered to buy the entire company," Harvey says.

The ABC says manuka honey with the highest anti-bacterial activity of UMF20+ could earn as much as NZ\$150 an export kilogram and sell for double that at overseas retail outlets.

Bees make manuka honey from the nectar of *leptospermum scoparium*, the manuka bush, which grows wild on public, government and private land.

Beekeepers tell the broadcaster competition for manuka bush sites is fierce.

"There's some crazy stuff – people kicking over hives, poisoning, stealing, fights going on over land and landowners fighting with landowners who are next door neighbors," beekeeper Richard Haddrell says.

Investors are experimenting with a manuka plantation. Manuka Bio-actives is aiming to get a double harvest: manuka honey, as well as oil

Manuka ... Cont. on Next Page

NJ ... Cont. From Pg. 91

New Jersey's 20,000 bee colonies, valued at \$350 a colony, represent a \$7 million honey bee industry for the state and contribute to the production of almost \$200 million in fruits and vegetables annually.

"Bees are central to New Jersey's rich agricultural history, and, more important, to New Jersey's agricultural future," Guadagno says. "These bills collectively provide appropriate protection to New Jersey's growing beekeeping industry, support the Garden State's commercial and recreational bee industry, and heighten public awareness of the importance of bees to our food chain."

Honey bees are NJ's official insect. In addition to honey bees, New Jersey's more than 3,000 registered beekeepers also tend other bee species that are critical to crop pollination, like mason and bumble bees.

"These bills are important to the health and vitality of the beekeeping

industry in NJ," Fisher says. "Bees are some of the most interesting creatures in nature and are essential to the pollination of our crops."

In NJ, pollination is crucial for the state's blueberry, cranberry, pumpkin, squash, strawberry, peach, and apple crops as well as a wide variety of annual and perennial flowers and tree species.

NJBA president Janet Katz says the legislation will aid commercial beekeepers in continuing to provide vital pollination services and give clear, enforceable guidance to municipalities

"We are confident that these bills will free our organization and the Department of Ag to focus on educating the public on the vital role our state insect plays in NJ agriculture and in providing our membership and all NJ beekeepers with the tools and guidance to be good beekeepers and neighbors," Katz says.

Alan Harman

Flowers ... Cont. From Pg. 91

containing parasites to forage on flowers for three hours.

The bees were then removed and a second group of flowers were added to the foraging arena along with colonies of a second bee species, not used before. The new bees then foraged upon both the new and previously foraged flowers for three hours.

All flowers were then sampled to see if parasites had dispersed onto them. Parasites found in the original patch confirmed parasite dispersal by the original hosts. Parasites found in the new group of flowers confirmed the non-target bee was able to disperse the parasites.

Graystock now is looking at how flowers may also be hubs for transmitting not just parasites but also potentially beneficial microbes. He is looking, too, at the role different flowers play on bee survival and development. – *Alan Harman*



VACCINATED AT BIRTH

Researchers have discovered how bees naturally immunize their offspring against specific diseases found in their environments in a breakthrough that could lead to the development of the first vaccine to fight serious diseases in the beehives.

A tri-nation research team made the discovery after studying a bee blood protein called vitellogenin and found the protein plays a critical, but previously unknown role in providing bee babies protection against disease.

The findings by researchers from Arizona State University, University of Helsinki, University of Jyväskylä and Norwegian University of Life Sciences appear in the journal PLOS Pathogens.

Arizona professor Gro Amdam says the process by which bees transfer immunity to their babies was a big mystery until now.

“What we found is that it’s as simple as eating,” Amdam says. “Our amazing discovery was made possible because of 15 years of basic research on vitellogenin. This exemplifies how long-term investments in basic research pay off.”

Co-author Dalia Freitak, a post-doctoral researcher with University of Helsinki, says she has been working on bee immune priming since the start of her doctoral studies.

“Now almost 10 years later, I feel like I’ve solved an important part of the puzzle,” she says. “It’s a wonderful and very rewarding feeling.”

The self-vaccination works this way.

In a honey bee colony, worker bees bring food to the queen. Forager bees can pick up pathogens in the environment while gathering pollen

and nectar. Back in the hive, worker bees use this same pollen to create royal jelly – a food made just for the queen that incidentally contains bacteria from the outside environment.

After eating these bacteria, the pathogens are digested in the gut and transferred to the body cavity; there they are stored in the queen’s ‘fat body’ – an organ similar to a liver.

Pieces of the bacteria are then bound to vitellogenin – a protein – and carried via the blood to the developing eggs. Because of this, bee babies are “vaccinated” and their immune systems better prepared to fight diseases found in their environment once they are born.

Vitellogenin is the carrier of these immune-priming signals, something researchers did not know until now.

But while bees vaccinate their babies against some diseases, many pathogens are deadly and the insects are unable to fight them.

But now that Amdam and Freitak understand how bees vaccinate their babies, this opens the door to creating the first edible and natural vaccine for insects.

“We are patenting a way to produce a harmless vaccine, as well as how to cultivate the vaccines and introduce them to bee hives through a cocktail the bees would eat,” Freitak says. “They would then be able to stave off disease.”

The researchers say such a vaccine would be extremely beneficial against American Foul Brood.

The researchers say their discovery could have far-reaching benefits for other species, as well as substantial, positive impacts on food production because all egg-laying species including fish, poultry, rep-



The discovery of how bees naturally vaccinate their offspring could lead to a vaccine to fight serious disease in beehives. (photo by Christofer Bang)

tiles, amphibians and insects have vitellogenin in their bodies.

The food industry could implement the use of natural vaccines that would not only be inexpensive to produce, they could easily be used in developing countries.

“Because this vaccination process is naturally occurring, this process would be cheap and ultimately simple to implement,” Amdam says. “It has the potential to both improve and secure food production for humans.” – Alan Harman

Manuka ... Cont. From Pg. 92

from the leaves of the manuka bush to use in anti-ageing and dermatological products.

Brooks says Australia is well-placed to get in on the Manuka gold rush.

More than 80 different varieties of bushes from leptospermum family have been identified in Australia, and honey from at least seven of them show the same bioactive properties as New Zealand’s manuka honey.

New South Wales beekeeper Mike Howes says there’s a growing market for Australian product because New Zealand can’t meet world demand.

“We are exporting already into Japan and Saudi Arabia,” he says. “China is definitely a market.”

Brooks says Australian bioactive honey producers need to follow New Zealand’s lead.

“We’ve got to catch up by doing our research showing that our leptospermum honeys are actually as active - not competing in the same market place, but be recognized for being Australian leptospermum,” Brooks says.

“The returns to beekeepers are going to be phenomenal if the recognition and value of the honey is put out there in the marketplace.”

Alan Harman

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CALENDAR

◆INTERNATIONAL◆

Apimondia International Apicultural Congress will be held September 15-20 in Daejeon, Korea.

The theme is "Bees! Connecting the world!" There will be many participants from the beekeeping world – beekeepers, scientists, honey traders, development workers and those who work in the equipment industries.

We invite you to visit the website www.apimondia2015.com to register to get a valid ID and password. The only register participants can submit abstract(s), booth ApiEX-PO booth(s) and get detailed information on the congress.

To participate in the Apimondia Congress 2015 all participants are required to pay registration fee.

Technical tours will be offered September 20 after the conference.

Please see the web page www.apimondia2015.com for more information.

◆ARKANSAS◆

The Arkansas Beekeepers Association will hold its Annual Conference at the Ozark Folk Center in Mountain View, October 9-10.

Featured speakers are Tom Seeley and Tammy Horn. For more details visit www.arbeekeepers.org.

◆COLORADO◆

The Colorado State Beekeepers Association will host the Western Apicultural Society conference in Boulder October 1-3.

For details visit www.ucanr.edu/sites/was2.

◆CONNECTICUT◆

Back Yard Beekeepers Association 2015 Speaker Schedule – September 29, Juliana Rangel Posada on the Reproductive Biology of Honey Bees; October 27, Sam Comfort subject Let's Stick Together; November 17, Michael Fairbrother of Moon Light Meadery on Mead.

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◆

The 19th Annual Field Day at the USDA Honey Bee Lab in Baton Rouge will be held October 10, located at 1157 Ben Hur Road.

Gates open at 9:30 a.m. and activities begin at 10:00 a.m. The fee is \$30/person 12 and over. The registration fee includes coffee, pastries and a catered lunch.

For information contact Lanie Bourgeois 225.767.9299, Sandra Hineman 225.767.9280 or Joe Sanroma 318.346.2805. Regarding registration contact David Ferguson 225.726.1664.

◆MISSOURI◆

The Missouri State Beekeepers Association will hold its annual Fall Conference October 16-17 at the Hilton Garden Inn in Columbia.

Speakers include Michael Bush. Register online at www.MoStateBeekeepers.org.

◆MONTANA◆

Master Beekeeping Certificate endorsed by MT State Beekeepers Association; The American Honey Producers Association and Project Apis m.

For more information visit www.UMT.EDU/BEE.

◆NEW YORK◆

The Long Island Beekeepers Club will host Chuck Kutick of the Empire State Honey Producers Association September 27 at the Frank Brush Barn, 211 E. main Street (Route 25), Smithtown from 2-4 p.m.

For more information visit <http://longislandbeekeepers.org/> or 631.265.8249.

The Long Island Beekeepers Club will host the all-day 2015 Greater NY Honey Bee conference October 18 at St. Johns University, D'angelo Center, Queens.

There are six seminars by Jay Evans, Diana Sammataro, Timothy Leslie and Rachael Bonoan. Beekeeping supply companies will be on hand to offer supplies.

For information visit www.longislandbeekeepers.org.

Western NY Honey Producers Association will host Reed Johnson discussing Pesticides and Poisons in the *Beehive*, September 26 at the Roycroft Auditorium in East Aurora, 9:00 1.m..

Cost is \$10 and more information is available at www.wnyhpa.org.

◆NORTH CAROLINA◆

Webinar - Feral and Managed Bees In Rural and Urban Habitats – September 14 presented by the Apiculture Program at NC State, hosted by the Surry County Beekeepers.

To sign up visit <http://entomology.ces.ncsu.edu/profile/david-tarpy/>. Starting time and starting time will be sent to you.

The Center for Honey Bee Research Haywood Community College, Clyde invites the general public to an all-day educational event, September 26.

The cost is \$55/person pre-registered. Speakers include Don Huber, Jay Evans, Melanie Kirby and Steve Sheppard.

Details and online registration available at www.chbr.org.

◆OHIO◆

Medina County Beekeepers Association meets the third Monday of the month at the Root Candle Company in Medina, OH. The meeting starts at 7:00 p.m.

September - Phil Craft

October - Dave Duncan and Ellen Harnish

For more information visit www.medinabeekeepers.com.

The Warren County Beekeepers Association will host a Beekeepers' Swapmeet and Pot Luck, September 13 at Armco park, 1223 N. State 741, Lebanon.

Lunch will be at noon and the swapmeet starting at 1:00 p.m. Please bring a covered dish to share. The club will provide the meal.

Please rsvp before September 1 by email to dmalonej@gmail.com.

East Central OH Beekeepers Conference will be held at F.O. E. 302 1275 E Market Street, Zanesville, September 19. Registration starts at 8:00 a.m.

Pre-register at www.e-coba.org. Cost is \$40/person, \$50 at the door. Lunch for \$8.00.

Speakers will be Tammy Horn, Jennifer Berry and Ed Karle.

◆OREGON◆

The Oregon State Beekeepers Association will hold its annual Fall conference November 6-8 at the Oregon Garden in Silverton.

Speakers include Peter Berthelsen, George Hansen, Pat Heitkam, Jay Miller, Randy Oliver, Ramesh Sagili, Nick VanCalcar and Clint Walker.

For more information go to www.orsba.org.

Oregon Honey Festival will be held October 17 at the Ashland Springs Hotel. This event showcases primarily small and medium sized beeyards.

Presenters include Marie Simmons, Susan Kegley, Lynn Royce and John Jacob.

For information contact Sharon Schmidt, oregonhoneyfestival@outlook.com or 541.951.5595.

◆PENNSYLVANIA◆

The Philadelphia Honey Festival will be held September 11-13 at Wagner Free Institute of Science, Friday; Wyck Historic House, Garden, and Farm, Saturday; Bartram's Garden, Sunday.

For information visit www.phillyhoneyfest.com

The Western PA Beekeeping Seminar will be February 19-20, 2016 at Doubletree by Hilton, Mars, PA.

Speakers include Jeff Harris, Diana Sammataro and Christine Grosinger.

For information contact Lyn Szymkiewicz at lynszym@comcast.net or 412.855.0710.

◆WEST VIRGINIA◆

The West Virginia Beekeepers Association will hold their Fall Conference September 25-26 at Jackson's Mill State 4-H Camp & Conference Center, 160 WVU Jackson Mill, Weston.

The main speaker will be Tom Seeley.

For more information visit www.wvbeekeepers.org.



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Working my bees in July at 9,000 feet on the Colorado Flat Tops, I heard the jet-roar we all love to hate. The air filled with swirling honey bees as they poured out of a hive through a pollen trap.

We beekeepers try to keep our hives from swarming, but better to watch them swarm than to wonder where the little darlings went.

If Fate gives us lemons, make lemonade. It took the bees a half hour to settle four feet off the ground on a pine bough 30 yards distant. "Fair enough," I thought, "I'll take them home."

I pulled apart a dead-out hive from the beeyard, removing the comb from one of the two brood supers. I used my pocket knife to cut the limb supporting the swarm and gently placed it inside the empty super, which sat on top of the comb-filled super in the back of my '86 Toyota Tercel wagon. I didn't shake the bees onto the comb. I just set them on top in that empty super, clinging to the pine bough. I didn't make any special effort to secure or seal the inner cover I placed on top of this double-deep colony. I did place a telescoping cover above the inner cover. They'd be fine.

You remember the old Toyota Tercels? High clearance, four-wheel drive, easy on gas, go anywhere. We'd had some rain. I needed 4WD that day because my yard sat at the far end of a rough track pockmarked with mud holes.

"I'll jostle these bees a little, but they'll be all right," I mused. It wasn't like I'd never hauled bees in a passenger car before!

My first inkling that all might not be well came when I stopped at the farm gate leading back into the national forest. A few dozen bees crawled on the inside of the hatchback window. I hadn't expected this so soon. But only a half mile of water-filled ruts lay between me and good gravel road. I attacked my driving challenge with gusto, sending water and mud flying and nearly putting my bald pate through the headliner on one great bump. By the time I arrived at the county road, a couple hundred bees had gathered on the hatchback window.

"This is not a crisis," I told myself. "What's the worst that can happen?" I was 45 minutes from home, with a bee veil on the front seat next to me.

I kept the windows up for the trip home. By the time I arrived, bees covered the side and rear windows, and I was wearing that veil. The two supers into which I'd placed the swarm were completely empty. I opened all the car doors and windows and walked away.

Next morning early found me on the Flat Tops again, this time dropping off a pickup load of bees. Moving 'em from a dead yard to a sweet Flat Tops honey flow! Halleluia! We don't get these every year.

When I arrived home mid-morning after dropping off that pickup load of bees, little bee beards hung from the still-open Toyota doors, and bees had clustered in some empty honey supers in the car. I put the honey supers on a bottom board outside the car and shook the bee beard bees into it. Plenty of bees were still flying around.

"Where's the queen?" I wondered. But I knew that bees sort things out better than we ever could for them. The little darlings didn't need any more "help" from me. They needed a little time, that's all.

At noon, Marilyn still slaved away baking rhubarb cherry pies, but we had to get to my 50th class reunion in Greeley. I had to crack the whip.

The reunion spanned three days. Name tags proved handy, although if you looked closely, you could generally recognize a familiar face behind the mask of old age. We sang a rousing geezer rendition of the school fight song, to the bemusement of the wait staff. We capped it all by honoring our dearly departed classmates



with stories from long ago.

I hardly thought about that swarm all weekend in Greeley. When we got home, I checked right away. At the hive entrance, a steady stream of bees came and went. "Wonderful!" I thought. "The queen must be in there!"

She was not. Maybe I missed her when I picked up that swarm in the pine tree. Maybe she got stuck in the pollen trap as the swarm issued from the mother hive. Maybe a bird ate her.

I can tell you this. When I went back to the Flat Tops after the reunion, that mother hive was still one of my strongest colonies. How could that be? It had just cast a swarm! I never checked for a laying queen, but those bees will do fine. Honey bees almost always sort things out.

Ed Colby

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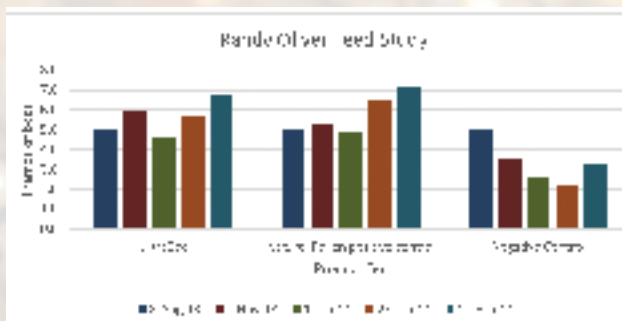
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