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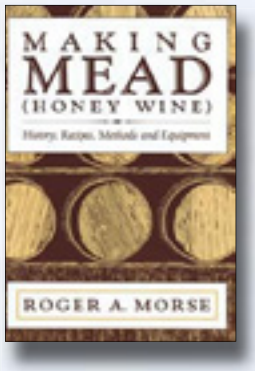

X34 Making Mead
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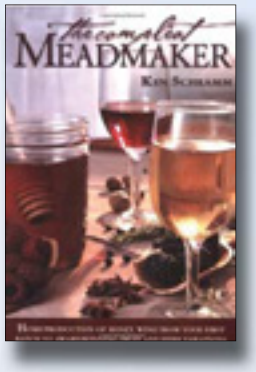
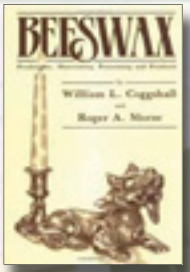


X197 Beeswax Alchemy
How to make your own candles, soap, balms, salves and home décor from the hive. By Petra Ahnert. Everything beeswax. Absolutely everything. And candles, and wicks, and lotions and potions and much, so much more. Beautiful art, extraordinary information and a long list of resources. Soft cover, 136 pages, all color. 8"x10" **$25**



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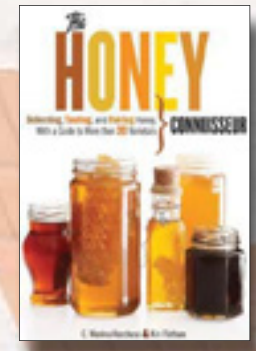

X181 The Honey Connoisseur
By Marina Marchese & Kim Flottum. Explore how honey is made by the bees, harvested by the beekeeper, what can go wrong & what you get when everything goes right. Examine 30 common & exotic honey plants. 208 pages and color throughout. Hard Cover 7½"x9" **$30**

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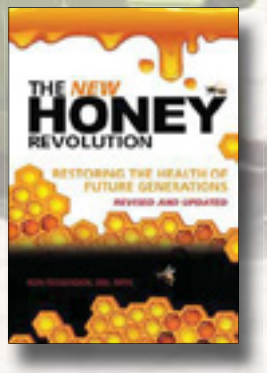

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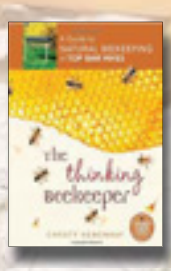

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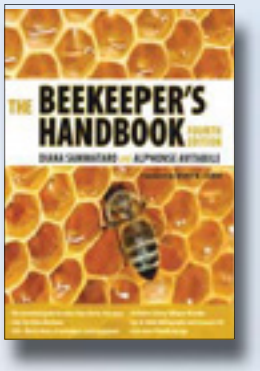

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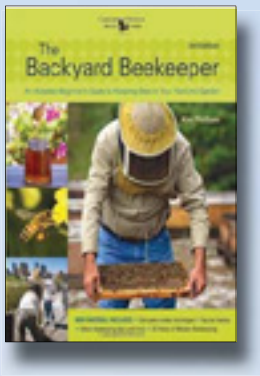

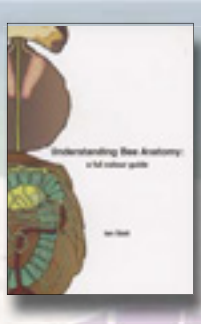

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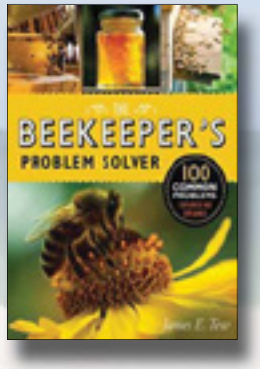

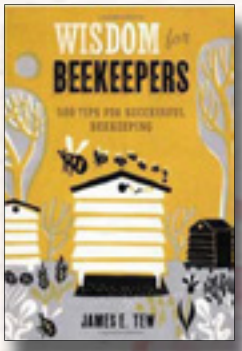

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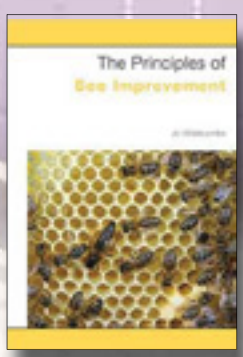

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This book explains how to select and improve bees from the local bee population. It discusses the problems of importation, the use of natural and artificial selection, assessment of colonies and selection within a strain. By: Jo Widdicombe Soft Cover 6"x9" **$20**

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Bee Culture

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Executive Publisher – John Root
Associate Publisher, Senior Editor – Kim Flottum, Kim@BeeCulture.com, Ext. 3214
Assistant Editor, Design – Kathy Summers, Kathy@BeeCulture.com, Ext. 3215
Social Media & Event Specialist – Amanda DeSimone, Amanda@BeeCulture.com, Ext. 3255
Advertising – Jean Newcombe, JNewcombe@BeeCulture.com, Ext. 3216
Layout & Design – Joy Nank, Joy@Beeculture.com, Ext. 3220

Contributors
Clarence Collison • James E. Tew • Ann Harman • Kim Lehman • Phil Craft • Larry Connor
Connie Krochmal • Jessica Louque • Jeff Harris • Toni Burnham • Ross Conrad • Jennifer Berry • Ed Colby

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Purple Loosestrife is great Fall honey, from an invasive. (photo by Kim Flottum)

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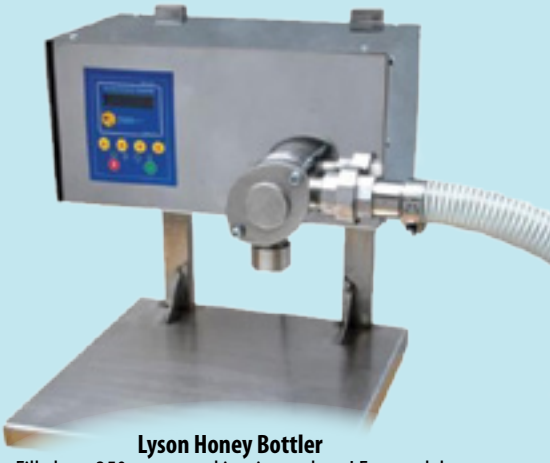

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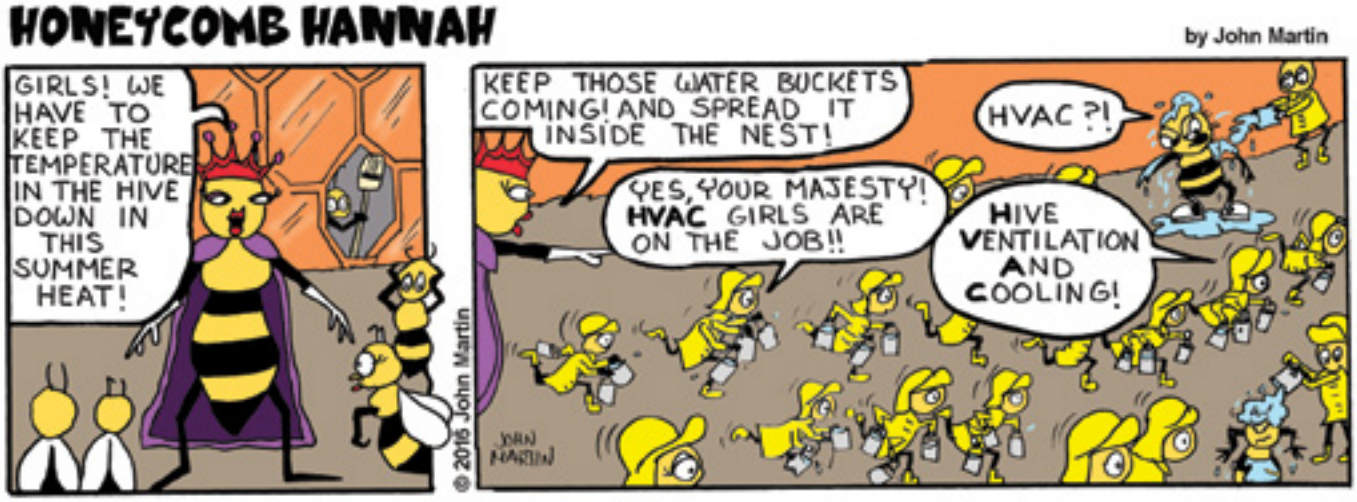

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Climate Change Kerfuffle

I have been enjoying the climate change kerfuffle that has been the topic of recent letters to the editor.

In the May issue, Louis Pofahl proclaimed himself "a proud climate change denier" in responding to my April letter in which I suggested that if *Bee Culture* runs letters from climate change deniers, it also should consider letters from those who have strong opinions about such things as 9/11 plots, Kennedy assassination conspiracies, and government gun grabbers.

I seem to have touched a nerve with Louis. I absolutely did not say that climate change deniers are "buffoons, idiots and clearly incapable of any reasonable thought" – those are Louis's words. I was merely trying to put their claims into perspective, and I thank Louis for his assistance.

Louis has helped me in another way in that regard. In his letter Louis cites an article in the Wall Street Journal by Joseph Bast and Roy Spencer calling into question the scientific claims supporting man-made global warming. A simple internet search shows that Bast is the president and CEO of the Heartland Institute. Heartland has been funded by conservative organizations like the Charles Koch Foundation as well as companies like ExxonMobil. In the past, Heartland was involved in a campaign funded by Philip Morris to question the links between smoking, secondhand smoke, and health risks. As the old saying goes, money talks.

Clint Wilder's letter in the June issue was quite entertaining as well. My favorite lines were when he remarked on the "obviously left-leaning, environmental greenie eco-wacko types that subscribe still to global warming, oops, I meant climate change" and "leftist folks [who] use 'climate change' and carbon tax efforts as a way to push their political agenda by taxing wealth and achievement, plain and simple."

Whew! Clint got wound up pretty tight in that letter. At least, he knows a conspiracy when he sees one, too! Yep, them thar tax-and-spend librals are ruinin' the country. They're the same ones that want to fluoridate the water, take away our guns, and let you-know-who into the military. Before you know it, they'll be trying to put another of them there communists in the White House. Go git 'em, Clint. Tell 'em what for.

And, Clint, you are exactly right on that climate change conspiracy, too. Those 177 countries that signed the Paris Accord last December to limit greenhouse gas emissions are all trying to wreck American free enterprise. It is a vast international libral conspiracy. It is a shame that we don't have a modern day Joe McCarthy now when we really need one.

Tom Chester
Tucson, AZ

MO Master Beekeepers

They are teaching the beginners course, Basic Beekeeping, a first four-hour course in the newly developed Certified Master BeeKeeping curriculum developed by Dr. Moneen Jones, University of MO research entomologist at the Fisher Delta Research Center, Portageville, MO.

This program can be entered following completion of the first introductory level, Basic Beekeeping. New beekeepers are required to join local beekeeping associations

Basic Beekeeping has no hands-on training to advance to the next level, you need one year's experience, volunteer hours, and pass the exam.

In addition to the five-year beekeeping curriculum, the certification program will require students to complete a public speaking or press course. We have been working together with local beekeeping associations in order to draw volunteer mentors and instructors.

By having a more stringent certification program experienced beekeepers will know that the person they hire has passed rigorous university requirements for certification. The cost of the first class is $50 plus $11 for the book.

All in all there are six levels to go through before completing the beekeeping certification program. For more information, **extension.missouri.edu/masterbeekeeper** or contact Dr. Moneen Jones directly at **jonesmon@missouri.edu** or 573.379.5431

Bee Culture

623 West Liberty St.
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Varroa in Sweden

I now work 25% with non-beekeeping organizations and at least 50% with bees, my own bees mostly. And do some consulting jobs for my former employer.

I enjoy reading *Bee Culture*. Inner Cover is the first article I read. In the May issue you cover an important issue. How to keep your bees alive, not only for your sake, but for the sake of the country actually. For the sake of pollination. It's more important to have your bees survive than having a top crop without an extra molecule of for example thymol, which is harmless for the consumer and gives no extra taste. So your message is basically correct and important.

That said, the story doesn't stop there. I know there's only two pages and I know you will continue. The part you tell is the basic one. And you ask a question. How does it work for me to get the bees to survive and give a crop (smaller than before the mite maybe?)

If I start with the basic part, I think that for many parts of the U.S. the situation is quite similar to most parts of Sweden, but the season is longer with you. So the mite population has a longer period of time to grow. Now I myself don't aim at maximum survival for the bees, but enough good survival, plus selection possibility for *Varroa* resistance, so I'm not the best candidate for giving the best choice how to best save the bees to the next season, though I have about 10-15% annual losses. This last Winter 10%. **www.elgon.es/diary/?p=345**

If I learn from myself and from successful beekeepers that go for survival (with no *Varroa* resistance selection) they and I don't use

WANTED: Beekeeper. No TV, No phone. If you don't like dogs, if you can't work all night, don't apply — Alamo, Nevada.

I'd like to meet the ol' boy that wrote that ad. You can almost picture him in your mind. We're all acquainted with somebody that fits his description. He might be willing to give you a month off to go see your ailin' mother but better not ask for every Saturday and Sunday off to go huntin'! He's not liable to set down and give you a two hour lecture on mite control theories but work beside him for a year or two and you'll learn more about protecting the environment and workin' with nature than you'd read in thousands of BMP pamphlets.

He probably wouldn't have much sympathy if you dropped a deep full of honey on your foot but if yer wife's in the hospital he'll make sure you have everything you need.

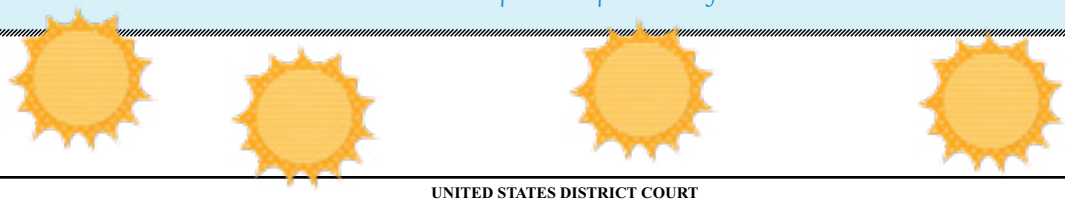
He'd look the other way if you get picked up by the deputy for getting rowdy in town but if you don't get every pallet picked up and stacked there'll be heck to pay!

The person that answers that ad ought to know better than to set down and start askin' bout paid holidays, days off, cost of living escalators and a five-year contract. However, if I don't miss my guess, he'll get a day's pay for a day's work, good grub, a warm bunk and that kind of "Family feelin'" that comes with beekeepin' people.

There's plenty of good hands that could answer that ad and fit right in. If he gits the job you can bet yer silver snuff can lid he's a keeper. A reporter asked me awhile back if I was a beekeeper. I said no. That name is reserved for them that puts food on the table with bees. It didn't bother me to be mistaken for a keeper though, matter of fact I'm proud of it. But that honor belongs to that particular feller who gits up every day, lights his smoker, gits his veil and goes to work.

Them that writes "BEEKEEPER" in the blank space after 'occupation' on the IRS form; they're what I'm talkin' bout. Real beekeepers; the backbone of the bee business.

Adapted with permission from a Baxter Black Column. www.BaxterBlack.com



UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

IN RE
HONEY TRANSHIPPING LITIGATION

) Hon. Joan B. Gottschall
) Case No. 13-CV-02905

NOTICE OF CLASS ACTION SETTLEMENT AGREEMENTS

Defendants Honey Holding I, LTD, HHI Management, LLC, Douglas A. Murphy, Sunland Trading, Inc., Odem International, Inc., National Honey, Inc., Jun Yang, Urbain Tran, Bees Brothers, LLC, and Ecotrade International, Inc. (collectively, "Settling Defendants") have agreed to Class Action Settlements resolving allegations against them regarding the unlawful importation of Chinese honey.

YOU MAY BE ENTITLED TO RECEIVE A SETTLEMENT PAYMENT IF YOU ARE A MEMBER OF THE SETTLEMENT CLASS:

All individuals and entities with commercial beekeeping operations (300 or more hives) and packers of honey that produced and/or sold honey in the United States during the period from 2001 to October 2, 2015.

Excluded from the class are alleged co-conspirators of the Released Parties and the following individuals and entities who have prospectively opted-out of the Class: Chris Moore d/b/a Moore's Honey Farm, Cox Honey of Utah, LLC, Brett Adee d/b/a Adee Honey Farms, Kelvin Adee d/b/a Adee Honey Farms, Daniel C. Whitney d/b/a Davis Honey Company, Bauer Honey, Inc., Bee Natural Honey, LLC, Bernard Casavan d/b/a Casavan Apiaries, Blake Shook d/b/a Desert Creek Honey, Ruby's Apiaries, Inc., Kallas Honey Farm, Inc., Wind River Honey Company, Heaven's Honey, Inc. d/b/a Chip's Bees and Bennett's Honey Farm, Brad Stromme d/b/a Stromme Honey, Dan's Honey Co., William H. Perry d/b/a Perry Apiaries, McCoy's Sunny South Apiaries, Inc., Willow Bee, LLC, GloryBee Natural Sweeteners, Inc. and Orange Apiary, Inc.

Description of the Settlements

The Settlements are intended to resolve all damage claims brought against Settling Defendants for claims arising from or related to Defendants' alleged importation, packing, and sale of unlawfully transshipped Chinese-origin honey. Plaintiffs have sued the Settling Defendants and others to recover damages. Settling Defendants deny any wrongdoing whatsoever.

The Court has conditionally certified the Classes for settlement purposes only. The Court has not determined the merits of any claims or defenses of the parties. The Settlements will become effective only upon final approval by the Court.

If the Settlements are approved, Settling Defendants will pay a total sum of $796,312 to the Settlement Fund. The Court shall establish a fair and equitable procedure for the allocation of the Settlement Funds among the various interests that have claimed entitlement to the same.

Counsel for the Class are seeking, in the aggregate, attorneys' fees of no more than 33% of the Settlement Funds. The fees and costs incurred in the administration of the Settlement Funds (including the cost of Notice) are to be paid out of the Settlement Funds.

The Court shall consider Counsel for the Class' application for attorneys' fees, reimbursement of expenses, and payment of incentive awards to named plaintiffs, and award only those fees, expenses, and incentive awards that the Court finds to be reasonable. Class Counsel's motion for attorney's fees and expenses, together with all supporting documentation, shall be filed with the Court by July 29, 2016, and shall be posted on the Settlement Website at the time filed for review by all interested Settlement Class Members.

The remainder of the Settlement Fund after deductions for Court approved fees, expenses, administration costs, and incentive awards (the "Net Settlement Fund"), shall be distributed amongst eligible Settlement Class Members who have submitted valid Claim Forms, as reviewed and approved by a Settlement Administrator, on a *pro rata* basis proportional to the mass of honey produced or packed (whichever is greater, mass produced and mass packed shall not be added together) validly claimed on the Claim Form of each eligible Settlement Class Member that submits a valid Claim Form by the deadline.

Claim Forms

Claim Forms are available for download from or for online submission on the Settlement Website: www.HoneyTransshippingLitigation.com. Claim Forms may also be obtained by calling the toll-free number provided below and requesting them. Claim Forms must be mailed or submitted online by **January 28, 2017**. If you already submitted a Claim Form to recover under the first settlement in this litigation against Groeb Farms, Inc., you do not need to submit another Claim Form.

Opt-Out Notices and Objections

Settlement Class Members may opt-out the Settlement Class. If you elect to opt-out, you will be excluded from sharing in the Settlement Funds. The procedure for electing to opt-out is set forth in detail in the Class Notice. Opt-out notices must be post-marked on or before **October 14, 2016**.

Settlement Class Members may also object to the Settlements. The procedure for objecting to the Settlements is set forth in detail in the Settlement Agreements. Objections must be post-marked on or before **October 14, 2016**. Settlement Class Members who object to any one of the Settlements may not opt-out of any of the Settlement or Settlements that they object to. Persons wishing to attend the Joint Fairness Hearing may appear as described below.

Joint Fairness Hearing

A Final Fairness Hearing will be held on **November 10, 2016** before the Honorable Judge Joan B. Gottschall in courtroom 2325 of the United States District Court for the Northern District of Illinois, Eastern Division, 219 South Dearborn, Chicago, Illinois, 60604 at 2:00 p.m. to determine: whether the requirements for certification of the Settlement Class have been met; whether the proposed Settlements should be finally approved as fair, reasonable, adequate, and in the best interests of the Settlement Class Members; whether the award of fees and litigation expense reimbursement to Class Counsel should be approved; whether incentive awards should be paid to the Class Representatives; and whether a final judgment should be entered dismissing the Complaint against the Settling Defendants on the merits and with prejudice. The place and time of the Final Fairness Hearing may be changed by the Court without further notice.

At the Final Fairness Hearing, any Settlement Class Member who has provided written notice of the intention to object to the Settlements may appear in person or by counsel and show cause why the Settlements should not be approved and why these actions should not be dismissed on the merits with prejudice. Such Settlement Class Member may present any admissible evidence relevant to the issues to be heard, provided that such Settlement Class Member has timely provided any and all papers in opposition to the Settlements upon which the objection may be based.

Effect of Final Court Approval

If the Settlements are approved, the Court will enter an Order and Judgment dismissing the Litigation on the merits with prejudice as to Settling Defendants as identified and described in each of the Settlement Agreements.

Date: August 1, 2016
Honey Transshipping Settlement Administrator, PO Box 43355, Providence, RI 02940-9554; 888-706-3404; www.HoneyTransshippingLitigation.com

anything else than thymol as a treatment substance, and no drone cutting.

– Regular treatment with thymol pads in April before any main flow

– and in August after harvest.

Amount of thymol (total area of pads) is adjusted according to the strength of the colony. In Sweden we can use Apiguard (which is not a pad but gel) or make our own pads by for example pouring melted thymol crystals on them. Api Life Var seems to be an alternative for the U.S. beekeepers that are most similar to what more and more beekeepers do themselves in Sweden. And this is legal and considered organic.

With a somewhat longer season with you in U.S. and maybe many times more reinfestation due to more hauling of bees probably a similar treatment in a low flow period in the middle of the summer, if there is one, maybe could be added. And the last treatment made in September after harvest.

That said again, it should be mentioned that there is a growing number of beekeepers in US that havn't treated at all for about ten years now. Many times enough isolation, not total, is the first parameter. About a couple of miles to other beekeeper's bees (not too many at that distance of course) **www.elgon.es/diary/?p=829**.

But there's at least one example of a beekeeper pollinating almonds and running 1500 colonies giving his bees a hard time. Chris Baldwin in South Dakota, going to Texas after almonds and splitting, renewing and developing the resistance of his stock still further. Kirk Webster, by the way another example of a beekeeper successfully not treating for mites, writes about him in this article of his, **http://kirkwebster.com/index.php/feral-bees**.

Well, that was a long response. Hope you came through it.

To sum it up, in my own beekeeping I get a smaller crop in average than before the mite, but I counter with having more hives than I would have otherwise needed. I get a stronger *Varroa* resistance for every year. I look forward following Hans-Otto Johnsen in dropping the treatment totally **www.elgon.es/diary/?p=880**.

And when will you retire then Kim? Never I think, it's an impossible thought

Erik Osterlund
Sweden

Crisis In New Zealand

This is a letter to the Editor of The Hawk's Bay News, sent in by John Berry, Beekeeper and chairman of the Hawke's Bay hub of APINZ

There has been endless publicity over the last few years about bees disappearing from the earth. While this is true in some parts of the world in New Zealand we have the opposite problem. Beehive numbers have more than doubled since 2000 with most expansion in the last five years. There has been a large increase in the number of hobby beekeepers, there are new commercial beekeepers and mid-sized beekeepers have increased hive numbers. The biggest change however is the establishment of corporate type beekeeping and they are changing the nature of beekeeping and putting the country at huge risk.

Honey is the lifeblood of the beekeeping industry but for the New Zealand economy it is insignificant compared to the value of honey bee pollination. Without honey bees there would effectively be no stone fruit, no pip fruit, no avocados, no berry fruit, no blueberries and no kiwifruit. A huge loss to the country's economy, but again, insignificant when compared to the most valuable crop pollinated by honey bees in New Zealand – Clover pastures.

The corporate beekeepers are trying to take over Hawke's Bay. They have no interest in pollination of clover or anything else. *They focus only on manuka honey production and are taking over business and bee sites.* The local beekeepers used to supply hives for crop pollination and clover flowers but the corporates do not. The corporates push thousands of hives into limited spring sites which beekeepers have used for generations to build up hives for pollination. The sites are overstocked. This is a serious problem leading to weaker hives, disease, increased costs and inability to get hives up to

pollination standards.

Traditionally beekeepers respected each other's apiary sites because not to was unethical, uneconomical and *just plain stupid*. Accepted distances between apiaries were originally two miles but are now down half that as established beekeepers try to combat corporates ignoring ethics and common sense.

In many cases corporates are jamming hives in within a few hundred metres of existing apiaries in the hope that if someone has bees there it must be a good place – bad enough with normal sized apiaries but disastrous with apiaries 10 times bigger. They approach farmers and offer deals based on these inflated hives numbers that local beekeepers cannot match – because the local beekeeper has the history to know what an area can sustain. Borrowed money is being used to force out local beekeepers.

One Hawke's Bay beekeeper I know lost a site to a corporate who offered a cost\profit-sharing agreement to the land owner. *At the end of the season the farmer got a bill for $15,000*. That's what happens when you put 200 hives where there should be 24. I assume farmers are occasionally paid what they are promised but I have lost count of the excuses I have heard for non-payment and promises not kept.

I was talking to a farmer at the Farm Market last week and he was irate that hives had been dumped on a neighboring farm. When he asked the neighbor if he was aware that there were already bees on his property he was told yes but the new beekeeper had told them that beekeepers didn't mind other beekeepers being that close. ***Newsflash – they do!*** No farmer would like to feed 500 extra cattle dumped on their farm or a few thousand extra sheep.

I was talking to a farm worker who can't run down his own road ⇨

for rugby training anymore – because a corporate beekeeper has dumped a huge site right beside the road – too lazy and too ignorant to manage correctly for public safety. I had another complaint that a corporate asked a lifestyle block owner for permission to put a few hives on their property – next morning 40 hives arrived.

Of even more concern are reports of stand over tactics being used to force existing beekeepers out of their areas. There is talk of threats to use hive dumping to over run the area if beekeepers do not sell up to the new corporate.

New Zealand's economy needs honey bees for pollination. A few local beekeepers do still make hives available for orchard and crop pollination. They charge for this service but it would be much better economics for them to just produce honey. These beekeepers continue to provide hives because they look at the long-term picture and they care about Hawke's Bay. They also try to ensure hives are available for farmers with clover pastures. *BEEWARE - they are being bought out or squeezed out at an alarming rate.* These beekeepers need farmers and land owners to support them. Check with your local beekeeping firms. Check with your neighbors. Don't accept bribes and false promises.

Honey prices are currently very high - particularly for manuka honey, but they are not high enough to compensate the growers and farmers of Hawke's Bay should the traditional beekeeper disappear leaving no one to provide honey bees for pollination.

John Berry
New Zealand

Look At What's New For You –

Based out of Toronto, Canada, the clothing line Apidae Apparel is on a mission to save bees – fashionably. Founded by trained bee biologists, **Apidae Apparel** mixes environmentalism with a stylish edge through its line of men's and women's shirts that raise awareness of the importance of managed and wild bees and the factors contributing to their decline.

In line with their mission for bee sustainability, Apidae Apparel has partnered with the award-winning nonprofit organization ALUS Canada to plant and maintain one square meter of native pollinator habitat for every dollar spent on their clothing.

Show others you are an advocate for bees and pick up one of their tees at **www.apidaeapparel.com**. Their whole collection is made from bee-friendly, certified organic cotton. Join the swarm and follow them on Instagram at **@apidaeapparel** and on Facebook for more photos of their clothing, educational posts, store events, and promotions. Keep wonderous, keep mindful, keep bees.

BeeVital was founded by Werner G. Hohl in the late 80s, originally as a honey trading company. When trading honey Werner became familiar with beekeepers' necessity to actively care for their bees' health regarding pests and parasites. Werner started to work on natural solutions but always ensuring that the products did not influence the quality of honey, were efficient, safe and easy to use and did not harm the environment.

Three years ago BeeVital, Inc. was founded in California and the operation started with commercial customers first.

Today BeeVital USA serves the U.S. through its online shop and local warehouse in Arizona with fast delivery and an increasing base of local distributors.

New Product BeeStrong

- Bees are under pressure from diseases, pesticides, poor nutrition
- Base of a colony's strength? -> the brood nest.
- It is important to support bees in the brood build-up:
- BeeVital® BeeStrong – natural colony booster : ideal amino acid balance, a product that helps bees in brood build-up
- Helps colonies rear strong brood: increased survival of healthy larvae
- Results in more vigorous bees: increase bee body-weight
- Stronger bees can resist stressors better
- Ultimately strong colonies bring a benefit to the beekeeper
  -> more bees for pollination
  -> up to 20% more honey

The result is BeeVital® BeeStrong a concentrated BeeFeed that is naturally sourced, with high quality ingredients. It is based on purified protein and has the ideal amino acid composition almost like the bees' Royal Jelly.

What is the effect of BeeStrong?

When BeeStrong is included in the bees' diet for the brood more larvae developed successfully into adult bees. This helps the colony to build up faster or recover faster from a period of low bee population.

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

The results show that the survival increases with the BeeStrong group.

After this finding the group wanted to find out if BeeStrong had an effect over adult bees.

When the weight of the bees was analyzed, after larvae were fed with BeeStrong, it was also found that the Bees on average were 5-10% heavier. This was not only found in caged experiments but also in bees which developed in a hive with BeeStrong in the feed and which were collected and weighted immediately after hatching.

Best times to use BeeStrong are

- In Spring with the incentive feeding to kick-start the colony into the new season and assure the colony can start with healthy brood.
- In late-Summer at the end of the season – to rear strong and healthy wintering-bees This helps the colony with overwintering.

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

BeeStrong is easy to use. It is sold in concentrated form in different sized containers from single dose to 200 doses. This allows to simply put BeeStrong into the feeding sugar syrup and mix before feeding it to the bees.

The typical annual cost for one colony ranges from $8 to $16/US.

This price estimation is based on a two times a year feeding of BeeStrong – for the Spring or pollination build up and the low season preparation.

You can find information about BeeStrong on: **www.beevital.us/**

More New For You –

Bee venom therapy has been recognized for over 5,000 years since ancient times as being helpful in the treatment of diseases and injuries; it was practiced by ancient Egyptians, Chinese, and Greek therapists. Bee Venom has traditionally been applied using live bees and stimulating them to "sting" in the affected area of the body.

Today from bees you can collect honey, propolis and royal jelly, as well as bee venom which is completely ignored even though it has economic justification. By collecting bee venom your income can increase up to 200%.

Bee venom is obtained from the bees without killing them and is stored in ampoules. Bee venom is then diluted with anesthetic and injected into tender body points.

We can collect venom from early April to late September. Panels of collector are placed on the entrance of the hive. After collecting we take off the panels and scrape venom from glass.

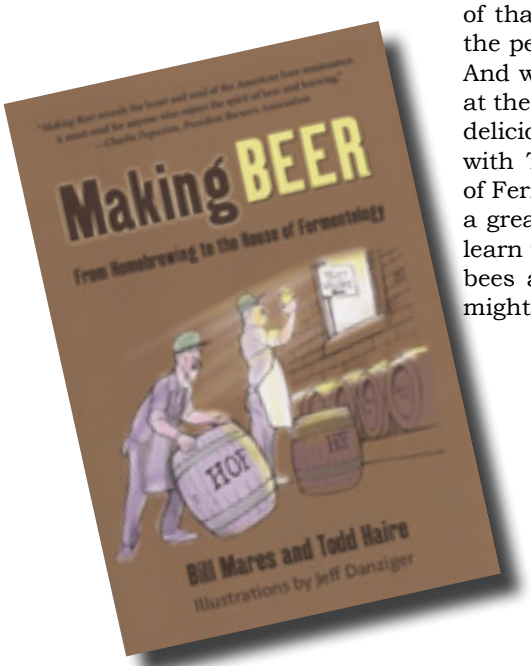
The device Bee Vee Collector consist of a specific type of receptacle box and number of panels, depending on a set you purchase. The Collector works on a 12V accumulator or batteries. It has voltage regulator and the pulse duration.

The panel is made of a special plastic material with stainless steel wires beneath which is a 3mm glass plate, in which bees sting and leave the venom that we later collect. The panel surface is 155x285 mm.

The amount of collected venom depends on the strength of the bee colony, the number of bees, their age and the method of collecting venom. Per one collecting we can scrape off from 0.043 g to 0.35 g venom.

You can find us here: **http://www.beevee-collector.com/**

The House of Fermentology opened in early June, selling out their first 400 bottle batch in less than a week, as did their second batch.



Making BEER. From Homebrewing to the House of Fermentology. By Bill Mares and Todd Haire. Published by Bard Owl Books, Shelburne, VT. www. Windridgebooks.org. ISB N 978-1-944485-15-3. 125 pgs., Soft cover. Black and white. $16.95.

You can't make beer without the BEE, but this isn't a book about making beer with honey, or keeping bees, or even how to make beer. Rather, it's the story of how two people made the journey from a simple homebrewing hobby, to their own business in Burlington, VT.

There's much about beer here though. From making it, what goes into it, how it's made, the yeasts, hops, and other ingredients, along with the timing, the barrels, the flavorings and more. I learned more about making beer in this brief encounter than I knew existed. Moreover, I learned why I don't particularly like the King Of Beers, or almost any of the rest of the dishwater sold as premium beer in this country.

In fact, the best beers are never the same. Brewers are always experimenting with different yeasts, timing and the like to make wild beers that actually have flavor, even soul if you will.

Bill Mares is a beekeeper though, and that's what got me interested in this book in the first place. He's done a hundred things in his life I'd like to try, though I'm not sure opening my own brewery would be one of them. But he was an EAS President when I was part of that group and his meeting, and the people who helped were superb. And we had some of his home brew at the auction and banquet that was delicious. But his journey, along with Todd's dream and The House of Fermentology is the real story. It's a great ride, a great read and you'll learn that making beer, and keeping bees are a lot more alike than you might think.

Kim Flottum

Foundations

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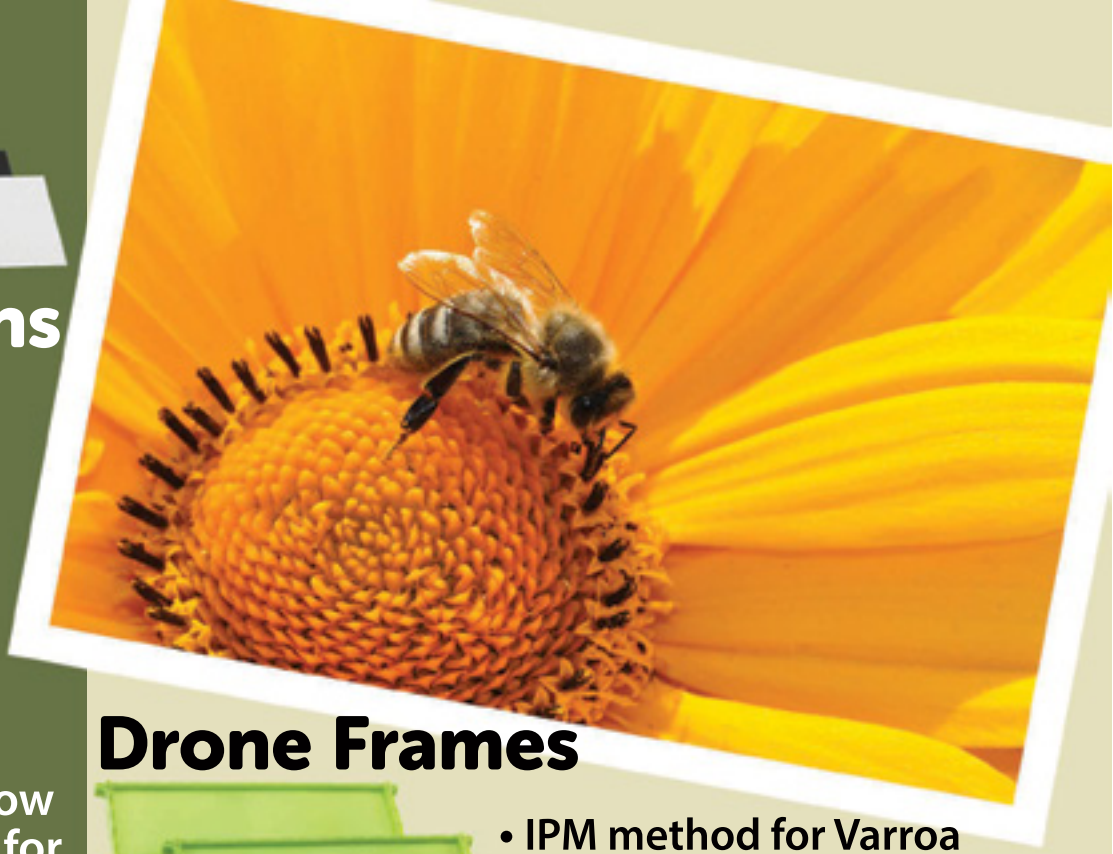

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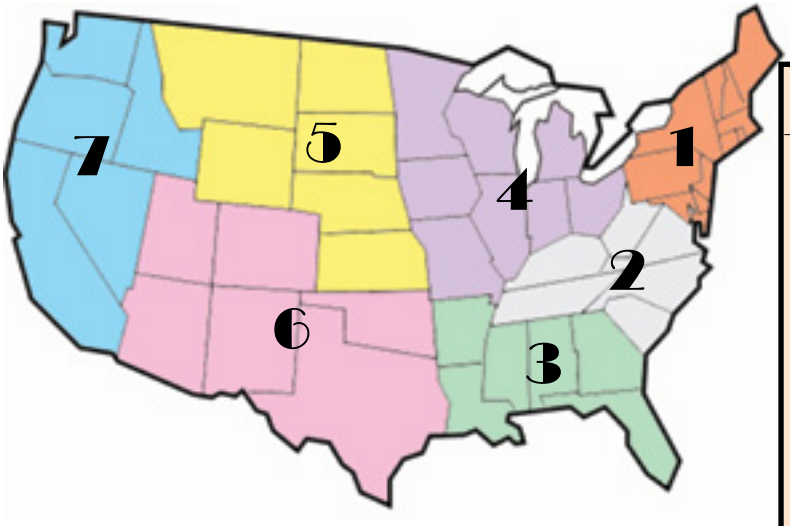
AUGUST – REGIONAL HONEY PRICE REPORT



	% Important					% Less Important				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Price	80	59	53	55	59	20	41	47	45	41
Label Design	64	46	49	35	38	36	54	51	65	62
Name on Label	71	67	64	60	71	29	33	36	40	29
Local Honey on Label	96	61	77	66	61	4	39	23	34	34
Variety of Honey/label	27	32	19	24	23	62	78	81	76	77
Second Label	17	5	8	9	14	83	95	92	91	86
Location I sell	61	57	58	54	58	39	43	42	46	42
Time of Year	36	17	28	17	23	64	83	72	84	77
Glass Container	52	35	31	36	35	48	65	69	64	65
Plastic Container	25	19	17	19	14	75	81	83	81	86
12 oz. size	55	32	35	32	38	45	68	65	68	62
1 lb. size	74	56	60	55	48	26	44	40	45	52
2 lb. size	65	35	55	37	35	35	65	45	63	65
5 lb. size	43	38	42	36	23	57	62	58	64	77
Quart jar	57	46	45	44	45	43	54	55	56	55
Pint Jar	52	42	40	36	41	48	58	60	64	59
Specialty Jar	30	10	13	13	11	70	90	87	87	89
Gallon	-	-	-	24	15	-	-	-	76	85
Raw	-	-	-	67	67	-	-	-	40	33
Color	-	-	-	27	41	-	-	-	73	59
Other Products	-	-	-	-	2	-	-	-	-	98

We surveyed our reporters this month to find out what principles and what items were important to their honey sales strategies. Price is always important, but that focus changes occasionally. A couple of years ago it was most important to almost 60% or our reporters, dropped to almost half, then slowly rose again. We suspect it has to do with pressure from inexpensive foreign competition keeping prices lower that we would like. Having your name on the label is mandatory for most beekeepers, and is becoming even more important in marketing plans. We suspect it has to do with identifying a local honey, the two subjects being no. 1 and no. 3 for most important this year. And being local is important. Down a tad this year, but still a must have. One pound, quarts and pints in glass still dominate for containers, while specialty jars lag far behind. However, though we didn't ask, those 2 oz. plastic bears are really coming on strong as a popular item to sell. For special events, like wedding favors, or samples of varietal honey to sell in up scale markets, these bears are difficult to ignore, from a seller's, and buyer's point of view. We weren't surprised at the popularity of the gallon container. To get your money's worth it should cost over $100, which few civilians are willing to pay upfront. $10 for a pound is steep enough for many. Where honey is sold seems important. Work, home, farmers markets, grocery stores…these are explored in another survey we do in the March issue each year. Last year's top locations were home of course, but followed by seasonal and year round farm markets, organic and health food stores and local mom and pop stores. Well, that's where folks sell, but the most honey, by far, goes to small, medium and large packers, who use it for their outlets. We also asked this year if having additional items to sell was important and were surprised at how little influence this had. Go figure.

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	1.85	1.99	2.17	2.78	2.10	2.06	2.35	1.50-3.40	2.17	2.17	2.19	2.29
55 Gal. Drum, Ambr	1.65	1.99	1.88	2.63	2.19	1.91	2.40	1.40-3.18	2.08	2.08	2.06	2.18
60# Light (retail)	216.25	189.25	211.67	201.79	171.00	179.50	265.00	126.00-300.00	208.34	3.47	203.74	207.09
60# Amber (retail)	212.50	187.60	210.00	194.15	207.03	175.40	260.00	120.00-300.00	204.07	3.40	200.47	203.05
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	83.00	74.60	67.50	48.00	51.84	88.50	117.50	48.00-120.00	79.06	6.59	80.42	81.97
1# 24/case	125.62	106.40	110.86	100.40	127.16	96.25	156.60	45.00-192.00	117.58	4.90	119.27	116.23
2# 12/case	107.72	96.50	100.13	94.20	97.44	92.25	132.00	76.80-156.00	104.40	4.35	110.42	109.37
12.oz. Plas. 24/cs	102.21	83.80	96.67	86.77	74.40	102.40	108.88	64.80-168.00	95.91	5.33	95.06	97.27
5# 6/case	125.37	103.67	129.96	109.80	102.30	97.50	137.00	84.00-204.00	115.92	3.86	117.16	114.83
Quarts 12/case	183.53	125.28	131.33	121.80	155.32	138.30	148.33	105.00-240.00	142.72	3.96	135.48	139.09
Pints 12/case	101.93	88.80	71.67	92.00	111.00	73.20	98.00	54.00-138.00	91.05	5.06	83.11	91.97
RETAIL SHELF PRICES												
1/2#	4.54	4.20	3.70	2.93	3.80	3.63	5.50	1.89-7.50	4.20	8.41	4.57	4.42
12 oz. Plastic	5.72	4.75	5.08	5.41	4.93	6.20	7.50	3.00-9.50	5.67	7.56	5.64	5.48
1# Glass/Plastic	6.93	6.58	6.50	6.31	6.46	7.02	9.95	3.00-12.69	7.11	7.11	7.11	6.82
2# Glass/Plastic	12.74	9.85	11.47	11.87	10.23	11.87	15.00	6.00-22.00	12.02	6.01	12.03	11.53
Pint	12.56	8.88	7.50	11.12	8.20	8.88	12.50	4.00-17.70	9.91	6.61	9.91	9.39
Quart	18.80	14.89	13.67	16.95	15.44	16.08	19.03	8.00-29.00	16.48	5.49	15.82	15.43
5# Glass/Plastic	25.11	28.90	41.00	27.13	20.93	27.54	27.50	14.48-50.00	26.71	5.34	26.22	25.16
1# Cream	9.32	9.00	8.75	6.78	7.16	6.00	9.33	5.00-13.50	8.25	8.25	9.17	8.59
1# Cut Comb	11.76	10.07	9.00	8.63	8.50	4.50	14.50	4.50-20.00	10.61	10.61	10.67	10.06
Ross Round	8.05	6.28	8.20	9.00	8.20	10.60	9.20	6.00-10.60	8.10	10.81	8.70	8.55
Wholesale Wax (Lt)	8.71	5.31	4.49	5.73	6.00	5.45	6.81	2.45-15.00	6.31	-	6.35	6.27
Wholesale Wax (Dk)	7.76	4.86	3.95	5.88	6.31	3.00	5.50	2.00-12.00	5.61	-	5.42	5.37
Pollination Fee/Col.	99.17	65.00	55.00	77.50	80.00	90.00	95.00	30.00-200.00	81.60	-	84.50	80.93

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INNER COVER

On the 10th of August we're holding our second Pollinator Day here at the Root Company's Pollinator Meadow, behind our Corporate Headquarters. There's a several acre field back there that, for over a hundred years had sat idle, a playground for deer, rabbit, groundhogs and the occasional meadowlark. Then, a couple of years ago we started simple, with just a frost planting of a pollinator mix from Pennsylvania's Ernst Seeds. That did so good that last year the local Medina County Master Gardeners wanted to join in with a phenology garden, part of a statewide program they have where they put the same flowering ornamental, landscape and pollinator plants several places in the state – running south to north – and record flowering dates at each location. They do a bang up job of taking care of the plot they have, mulching, fencing for those deer, groundhogs and rabbits, with even a bench to sit on and contemplate... phenology, I guess. It's been working out quite well for them and they are good neighbors to have.

Also last year we cleared the way for another garden, this one sponsored by The Pollinator Partnership and their Monarch butterfly monitoring program. They got that planted and going great guns by bringing in a boatload of transplants. During last summer and this summer they come in on a schedule and count visiting adult Monarchs, other butterflies, and any larvae. They have these volunteer gardens all over the state and it's a good project to be a part of.

The list of plants they use is striking. *Zizia aurea* (Golden Alexander), *Liatris aspera* (Blazing Star), *Lyrthrum alatum* (Winged Lythrum), *Eupatorium purpureum* (Sweet Joe-Pye-Weed), and *Veronicastrum virginicum* (Culver's Root) is there. There are a few more species, but since they haven't bloomed yet, I'm not sure what all will be coming back. Not all of these plants have come back at each site from last year, I'm told by Amber Barnes, the student who is running this for the group. Other species on the planting list that may come back are: *Asclepias exaltata*, *Ascelpias incarnata*, *Asclepias tuberosa* (three milkweed species), *Echinacea purpurea* (Purple Coneflower, a very popular pollinator plant). Then there's *Pycnanthemum virginianum* (Mountain Mint), *Solidago nemoralis*, *Solidago rigida*, *Solidago speciosa* (three Goldenrod species), *Symphotrichum laeve*, and *Symphotrichum novae-angliae* (both Asters). And right now the wild bergamot, *Monarda fistulosa*, (wild bergamot) is in full purple display, as is *Parthenium integrifolium*, (Wild Quinine) a huge white-flowered umbel.

Then, this year they added two more plots to their plantings. They have a program where a couple of seed mixes are used to plant buffer strips alongside agriculture fields giving the beneficials a safe place to go before and after the crop blooms so there's something there for them to eat and reproduce on so the population grows for next season. There's an all wild flower mix and a legume/wildflower mix and we have one of each that's just now (July 1) in full bloom. It's a pretty impressive planting.

The Ohio State Beekeepers, working with the Pollinator Stewardship group have a plot up there too that we started this year. They have a seed mix from Ohio's Ohio Prairie Nursery that is being used to establish larger plots on volunteered corporate and homeowner land. The land owners donate use of the land, now almost exclusively in turf, get the land prepared, and then, using seed from the Nursery paid for with grant money, lay out fairly large pol-

Pollinator Garden Day. Harvesting.

Part of the Monarch garden, with the Phenology fence visible.

The wildflower buffer strip garden.

The wild flower/legume buffer strip just starting to bloom.

linator-friendly plots in urban and suburban settings that will last several years. It's a good program and, yes, we're glad we can help show it off.

This all goes back to five years ago when we placed some hives on the front lawn of what is now called the Homestead, the home A. I. Root built for his family next door to his new factory way back when. The hives were set almost next to the house, back from the street a bit, with the thought to encompass the whole rest of the front yard with bee plants. Although we ended up not using the whole yard, we put in a lot of those plants around and near the hives. At the same time we tore up the tree lawn in front of our main office building across the street from the Homestead and factory and put in a variety of bee friendly plants there, too. We're located on a major traffic street in Medina and our flowers have gathered some attention in town. But it's taken us a bit to find those plants that can tolerate some shade (there are, of all things, some Bradford pear trees planted on the tree lawn – more on them in a bit), and the salt spray from winter traffic. Each year we get a bit better at choosing replacements for those lost in Winter, and those that are thriving in that environment are multiplying – much like a Mother Nature Selected Queen, you could say.

The other thing we have to do is sit back and watch – the deer, the ground hogs, the gophers, the rabbits – who all want lunch in the middle of all this (not so much the street plantings, but those in the Meadow take a munching daily, or nightly, actually). We have to be able to say that, yes, these creatures will visit, but their visits won't do the gardens in, but simply offer a bit of pruning when they get too tall. What worth would a roadside or agricultural field buffer planting have if you had to fence it, too? Fences certainly don't keep out bees or butterflies, but the cost would be…well, any cost would be too much, let alone maintenance or replacement. So, these plants have to stand not only the test of local, the test of are they attractive to pollinators, but the test of all of nature's hungry inhabitants. The Phenology garden is the exception to being eaten however. The Master Gardeners have to keep everything there in tip-top shape so they can compare apples to apples as it were, so a pretty solid fence keeps their garden safe from most of these floral predators.

We keep expanding each year, spreading from the tree lawn on the street to the green islands in the parking lots alongside our building, and some of the areas bordering the parking lots so the 'floral look' starts at the street and your gaze follows the flowers across the asphalt and up to the field behind our building, finally reaching those plots in the Pollinator Meadow.

This next year we'll be expanding a bit more. We have plans to test some of the commercially available pollinator planting mixes sold in seed stores, farm outlets and the like to see how good they really are, or aren't. So we're getting the plots ready now for frost planting in December. We have a couple of acres left open, I think, so we're not done yet, and we're talking to Medina County Soil and Water who's doing pollinator plantings, and we're looking for more to test and try.

Our input is minimal really. We prepare the plot area the previous fall, then plant after frost and it goes from there. We don't have to weed, feed or manage…just water when it gets really dry (I spent a lot of years figuring out irrigation logistics on land a lot larger than this so it's kind of fun doing that again). After all, these are all native plants, all wild and all Mother Nature Selected. Jeff, the guy who mows all this doesn't mind at all because every time we put in a new garden there's that much less he has to mow. But, there's lots more corners and short pieces to mow so there's more turning and jockeying around. But Jeff's a pretty easy going fellow and it seems to work for him. Of course, there's also that much more to feed the deer, groundhogs, rabbits and such too, so I'm not sure who comes out ahead.

I mentioned those Bradford Pear trees planted in the tree lawn, put in by the city of Medina Forestry Department a bunch of years ago. They are a popular street tree, but they're not native, and, when first introduced, were supposed to be sterile and non-reproductive. Well, that changed somehow, and now they are just another pretty face, taking up space, spreading like wildfire and basically making a mess everywhere they are planted. The bloom is striking, which is why they were picked for showing off, but the blossoms actually have a fairly foul odor, not unlike all pear blossoms, so you'll never see a bee on one of these trees. Plus, they are incredibly susceptible to disease and after only a few years the tips begin dying back, then whole branches, then the tops and finally the whole tree. A Bradford

The phenology garden.

The Ernst Seed Garden, starting its second season

In June we invited The Medina Beekeepers, and anybody who wanted to, to come visit the gardens, and talk to reps from all of the garden sponsors.

Continued on Page 89

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It's Summers Time –

It's been another crazy, busy month for us – lots of travel and activity. We leave tomorrow for the Mother Earth News Fair in West Bend, Wisconsin and then we're home for awhile. As all of you busy people know, that doesn't mean we don't have anything to do – it just means we won't be in any airports for awhile.

We really enjoy the Mother Earth News Fairs, but the Wisconsin trip is extra special because that's where all of Kim's family is and we'll see most of them this weekend. But then it will be good to be home.

There's some bad news this time. My sweet little duck was taken last Sunday morning. As I'm writing this I just remembered that the female was taken on a Sunday morning also. How strange! We found the remains in the pen. It must have been a hawk, but it seems strange that he would have left anything behind. But we saw no evidence of something getting into the pen.

Last weekend Kim did have an encounter with a fox, two different times, both in broad daylight. We've known there was a family of foxes that have been living under the neighbor's barn for several years. But I've never seen them and the neighbor would only see them when she walked her dogs in the fields way back behind the barn. Well, this one came right out of the brush and just sat there looking at Kim. Kim tried to scare him off, but he didn't seem bothered at all. Maybe Kim is just not very scary. The next morning, Sunday morning (the same day we found the duck) Kim saw him/her just sitting by our driveway – again in broad daylight, right by the house. I don't think this is typical behavior, although I don't have a lot of experience with foxes.

Our new neighbors have chickens and they also have guns, so he has been on a mission to rid the area of some of the varmits. I'm not fond of guns, but I really like my chickens.

Our garden is amazing this year, in spite of all of the travel we've had. One major thing we did different this year is to lay down cardboard and a heavy layer of straw between the plants. So we're hopeful. Actually, lots of things seem to be doing better this year – not sure why. My Rose of Sharon were pathetic last year and look so much better now. We planted Elderberries two Summers ago and they are doing very well. Of course, it's a race between me and the birds. I think I'm going to have to net them in order to get any for myself.

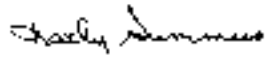
And, our bees are doing very well. In fact, Kim called a friend the other day to ask him if he wanted some bees. We need to do a couple of splits and we have way more bees than we can handle efficiently. We harvested five or six supers this week, so we'll have some nice honey for the holiday gifts this year.

The last weekend in July we travelled to Brushy Mountain Bee Farm's PA location. Brushy held their first annual joint Field Day at all three locations – NC, OR and PA. It was about a four and a half hour drive for us. Not bad. The PA branch headed up by Jim Wilson treated us very well. Jim and his team are excellent hosts. They couldn't control the weather though – it was right around 90° on Saturday, the day of the event. We were outside in a tent the whole day. Kim and Deb Delaney each gave two talks and then we opened up some hives for the mostly beginner group of beekeepers. They were some of the most gentle bees we've every worked. It was a good weekend. Thanks to Jim and Shane for inviting us.

We have some good news here at *Bee Culture* Magazine. Anthony James DeSimone was born June 28 to Matt and Amanda DeSimone. Amanda has been a part of the *Bee Culture* team for several years. We are so happy to welcome our newest little *Bee Culture* guy. We'll get him in the beeyard as soon as we can.

Please check out page 41. Our October event is fast approaching. This year's theme – A Case For Local Honey. We've got wonderful speakers coming to Medina to tell us how they've made it work to become sideline beekeepers and make money doing what we all love to do. See the list of speakers and all of the details. We just found out we've got someone from the National Honey Board coming also. If you have any questions contact any of us here at *Bee Culture* and we'll help you out. We'd love to have you here in Medina in October.

I hope you have a great rest of your Summer.



The Pennsylvania Farm Show
100 Years Of Incredible Education

The January 2016 Pennsylvania Farm Show was the 100th anniversary of this grand event. The PSBA does an outstanding job every year, and this was no exception. Because so many associations do 'something' at their fairs each year, we thought we would share what the PA people do each year that works so well for them. So take a look at their activities, and steal as many good ideas as you can. It works for them, and it will for you, too. Hats off to the PSBA for decades of success.

Bee Culture Editors

The Pennsylvania Farm Show held in January, is an event like none other. This year was the 100th anniversary of the first show, which began in 1917. Much has changed since the beginning, but one thing is for sure. With great volunteers and exhibits like those from the Pennsylvania State Beekeepers Association, the show will certainly keep visitors coming for a hundred more!

While just about every state hosts its state fair during the Summer or Fall, Pennsylvania waits until the most forgotten and underutilized time of the year to put on its premiere agricultural event, but it's not in vain. The Pennsylvania Farm Show is the largest agricultural fair under roof in the United States. The 24-acre complex holds over 13,000 exhibits and 300 vendors, and attracts more than half a million visitors during its eight day run. It's one of a kind, for sure! And each and every January, the Pennsylvania Farm Show Complex and Expo Center in Harrisburg becomes home base for the Pennsylvania State Beekeepers Association.

For those of you who aren't familiar with the PSBA's involvement at the Farm Show, allow me to explain. Throughout the complex, there are myriad activities happening at any given time. From commodities and animal judging to cooking demonstrations and sampling to live shows and contests and everything in between. Plus, there are hundreds of vendors and food booths, judged exhibits, animals on display, farming equipment, etc. Sprinkle in 75,000 people and quite literally it's a zoo. But there is a method to the madness and the PSBA is well represented within the functional areas of the complex.

Products were grouped by producer and region to help folks looking for products most local to them.

The Pennsylvania State Beekeepers Association sponsors three booths throughout the Farm Show. The first of these is the Learning Center, prominently located near the famous Butter Sculpture. This area includes a well-staffed booth of volunteers who stand near the dual observation hives, eagerly answering questions for the groups of children and adults alike who want to learn more about honey bees. These folks answer questions that range from, "Where is the queen?" or "How do they make honey?" to "Are bees still disappearing?" and "How do I become a beekeeper?" There are plenty of educational materials and handouts available to guide people in the right direction. It's not uncommon to see the Pennsylvania Honey Queen spending time at this booth as well. 2016 PA Honey Queen Sarah McTish will spend this year educating the public about honey bees, and the Farm Show is one of her first big events. Of course, this area also includes all of the judged apiary exhibits- comb, extracted, and creamed honey; block and molded wax; candles; frames of honey; baked goods; mead and melomel; plus individual and county educational exhibits. In addition, this is the place where children can find a bee stamp to complete the Farm Show scavenger hunt. However, they don't leave without adding their thumbprints to the annual bee collage. If you look up, you'll see previous years' canvases decorating the space above the exhibit.

The next booth is located in the Marketplace, just around the corner from the PA Preferred Culinary Connection Stage. This is the place to go for honey and beeswax. Each year, our members provide thousands of pounds of wholesale

honey and beeswax to stock the booth. As people filter past, they are drawn to the booth, whether it's to stock up on their favorite honey, or simply for a handful of honey sticks. The variety is astounding- black locust, wildflower, clover, goldenrod, Japanese knotweed, buckwheat, creamed, smoked, etc. There's truly something for everyone. Most folks want to find a certain flavor, or they're looking for a variety that's local to them. The volunteers at the booth are knowledgeable and patient, helping each person find exactly what they're looking for. This booth is a buzz of activity right up to the last moment. Of course, it's even busier after the daily honey extraction demonstrations on the stage right around the corner.

A small group of dedicated volunteers gathers every day to host an informative honey extraction demonstration. Over the years, the crowds have grown, as everyone finds this demonstration to be exciting. After learning about the PSBA, honey bee biology, hive structure, and tools of the trade, visitors see the uncapping process, spinning, straining, and eventually get to taste the delicious final product. The question and answer session at the end gives visitors the opportunity to learn more about the process. But make sure to stay until the very last moment because you just might win a prize during trivia!

As the day passes, visitors are increasingly in need of refreshment. The PSBA sponsors a honey waffles and ice cream booth in the Food Court section of the Weis Expo Hall, all the way on the other side of the complex. The most common question our volunteers get here is invariably, "Oh, they're all made with honey?" That's right- each variety (Vanilla, Chocolate, Strawberry, Raspberry, Cinnamon, Butter Pecan, and Salted Caramel Pretzel) is sweetened with Pennsylvania honey to give it a unique flavor and creamy texture. There's something special about handing a big softball-sized scoop of honey ice cream perched atop a cake cone to a wide-eyed visitor. Everybody loves it! Plus, the fresh-made hot waffles are sweetened with

Matt Libhart has a couple of focused listeners.

a generous amount of honey as well. Order a waffle with a variety of small scoops and then positively smother it with honey at the condiment bar. Visitors can also purchase a small variety of the honey and beeswax products that are available in the Marketplace, too. – *Alyssa Fine*

Honor Of A Lifetime

Judged entries arrive on Thursday before the show. Before entries can be checked in, the tables need to be exactly where they need to be, just like a foundation. Then tables for dropping off entries and people assigned to specific products and check-in tasks. Check and re-check tags to paperwork. Sorting colors of honey is the toughest part. We did better using a digital pfund scale. But drawing 20° honey out of a container with a syringe to get a test sample has its challenges. So much gets done in the first few hours that I was shocked it was only lunch time, because it felt like a whole day's work. To add more chaos, the butter sculpture becomes the center of a media blitz with reporters and cameras spilling into our exhibit area for the unveiling. Each county brings a truck-load of parts and people for their county's exhibit and pretty soon it gets crazy. Honestly, it's like 'old home days,' because the air is full of camaraderie and cooperation. Somehow, this is sounding like the inside of a hive. And somehow the chaos is orchestrated into order so that by 6:00 p.m. the day's work is settled and done.

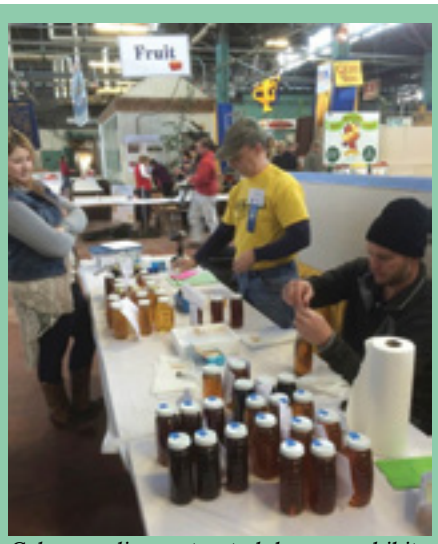
On Friday, exhibits are judged. Work begins by 9:00 a.m. In order to get so many different exhibits judged and judged fairly requires people able to discern the qualities of what they are evaluating. We had two judges

The renamed Ziegler-Keeney Award in tribute to Paul Ziegler and Dennis Kenney debuts in a magnificent case built by Dennis' coworkers at the Farm Show. Winner is Ricky Freeman's Molded or Designed Beeswax figure of a fox, chosen as Best of Show of the Best of Show in the classes of Beeswax, Extracted and Comb Honey.

specifically for honey and waxes. Two judges for baked goods. Two top quality winery owners judged Mead. The County and Individual Collective exhibits are first 'fact-checked' by the honey judges who are in the science of beekeeping. Then a team of the PA State FFA advisor and two officers individually score the collective exhibits. The FFA is disciplined in following specific criteria in many contests in which they compete. This team brings the public perspective of an older generation, a young man and a young woman. They look for what draws their attention, how quickly the exhibit explains itself, balance, organization and educational value within the rules of the premium book. They bring their individual scores together, justify their reasons and settle on award placement. Each year, I ask the advisor how he feels about the outcome. Each year he can justify points that helped decide. The scores are often close, which reflects the quality on display.

This year, the Ziegler Award became the Ziegler-Keeney Award. The Ziegler Award was previously awarded at the PSBA annual meeting's honey show. As the honey show

From top, Perry Arlia, brings more entries to judging table. Danica Fine records moisture content while judge, Bart Smith, scores for flavor, cleanliness, debris, fill and clarity.



Color grading extracted honey exhibits. L-R Jessica Aurand, Steve Finke, Tom Butzler.

Mead judges – l) Jamie Williams of Wilcox Wineries and Bob Mazza of Mazza Wineries discuss qualities of this dry mead.

lacked participation and available space, it was decided to bring this prestigious award to the Farm Show. Awarding it to the best of the 'best of show' in the classes of extracted honey, beeswax and comb honey. In April, the Farm Show agreed to provide or build a display case. After size considerations, I sent a pencil sketch with some basic dimensions. For those that don't know, Dennis Keeney operated Ziegler honey by day and worked at the Farm Show by night. He passed away unexpectedly last year. His co-workers built this case and it shows the love and respect they had for Dennis. There was a lot of time, talk, wrangling and logistics at play. The engraved silver plate arrived only a week before the show. As fate would have it, a good friend of Dennis won the Ziegler-Keeney Award at the 100th Farm Show.

For this 100th Farm Show, Blue Ribbon Event, we ordered blue ribbons with "PA State Beekeepers Association", keystone-bee logo and "100th Pa FARM SHOW" in gold lettering for all PSBA volunteers to attach to their name tags. Both a way to easily identify our group and a souvenir to take home. It also served to give us some idea how many volunteers help between the Learning Center, Honey Market and Food Court Honey Ice Cream. All 150 ribbons were used.

What turned out to be an attempt to be lucky enough to earn a ribbon signifying a part of history, turned out to be an Honor of a Lifetime.

I dusted off some of our molds, still left lost from a fire a couple years ago, to see if we could be lucky enough to earn a ribbon signifying the historical 100th Anniversary of the 2016 PA Farm Show. Competition can be very challenging and strong going up against the many talented beekeepers across the state including the respected excellence of Eugene Taylor and his family. After the birth of our son, we hadn't competed for many years. Matter of fact the week our son was born, I helped Dennis with extracting that September. Our friendship has spanned many years.

I have numerous fond memories of the many sleepless nights helping Dennis with pollination. Fun sleeping in a truck waiting for your pollination shift to start or grabbing a couple hours before going to your regular job after working on a pollination move. It is truly amazing how many hours straight he used to go at times. It just proved the caliber of strength that Dennis possessed and for the love of his craft. Sometimes it could be very tiring, but Dennis's fun sense of humor and friendship made hard work easy and fun. We had a lot of amusing ways of keeping each other awake or working through equipment "malfunctions" including brakes, road curves and yes, stings. How many times have we been asked that question? Our nicknames of Dennis being "Spanky", I being "Alfalfa" and Dan Schwartz being "Buckwheat" had given us a brotherhood of beekeepers practicing our love of beekeeping while helping farmers with their orchards and crops. Elaine, Julie, and Sandy would tease about their husbands spending nights together. Ruth Keeney had fondly become "Mom" and our son refers to her respectfully as "Grandma Ruth." In later years as Brendin became older, there was a weekend when he helped with pollination. We laughed about the night Brendin fell asleep on Dennis' shoulder coming back from a pollination job one early morning. We had many laughs over breakfast at Midway after a long night of moving bees. Dennis' expertise taught us so much. We had the opportunity of getting to know and listen to the expertise of his uncle, Paul Ziegler; learning how to keep bees and how to do a good job with them especially their magical touch with queens. I could go on, with the caring, intelligent, knowledgeable and enjoyable ways that Paul and Dennis touched every one of us.

So the Ziegler-Keeney Award comes as a great honor at this year's 2016 PA Farm Show. It TRULY has personal meaning. I thank the Ziegler and Keeney families and the PA State Beekeepers for making this award possible. I think Paul and Dennis are continuing their work making heaven beautiful and their voices can be heard. Look down on us beekeepers and give us wisdom so we, too, can make our heavenly earth beautiful and help these amazing creatures feed our world. And in closing I say "Thank you Spanky for touching my life once again. It has truly been a pleasure being a beekeeping brother, friend and "Rascal" with you". 'Till we meet again my friend…

Rick, Julie, and Brendin Freeman

Apiary Learning Center

The Apiary Learning Center again featured two observation hives that fed into a common atrium. The atrium is divided inside to prevent drifting. Jim Pinkerton, of Lancaster, provided both observation hives and keeps the atrium in the off-season. The backdrop to the Learning Station is made up of super-size honey bee photos. These high resolution photos were taken by Bill Mondjack, of Lehigh County. The photos are educational and a compliment to the PSBA Learning Station.

The Learning Center is where some volunteers are most comfortable. Teaching, talking and story telling at it's best. It also allows some flexibility with manning the Honey Market and Food Court. Stan Poleshuk took on the task of scheduling volunteers. At least 2 per shift, from 8:00 a.m. to 9:00 p.m. Often times, more volunteers show up. That's never a problem with so many visitors with so many questions. This is the place where we have the time to answer all those bee questions and give direction for new beekeepers.

A main attraction again this year was the observation hive, which as usual generated much interest and many questions. It is a pleasure watching young children excited to see a "queen", listening to experienced beekeepers tell about their own beekeeping experiences, and answering questions from people curious about how honey bees live, work, collect pollen, make honey, raise new queens, and deal with things like mites and pesticides. My favorite questions are always "Is the queen born with a dot on her back?", "How do beekeepers get the honey out?", "Where can I buy honey?", and "Which way is the honey extraction demo?" Quite a number of visitors this year expressed interest in possibly starting their own hives, and the PA State Beekeepers were ready with various informational materials to help them on their way.

The displays set up by beekeeper clubs and others were wonderful again this year and are a great success in providing visitors with information about every aspect of honeybees and beekeeping. Club members are to be truly commended for their originality, talent and time that went into educating the public and sharing their love of honey bees with others.

I can't end this article without mentioning the enthusiastic and energetic worker bee with the antennae on her hat who each year fills a wall with Bee Thumbs big and small. Who'd have thought learning about bees could bee so much fun, even for us older folks who might not have acted like a kid for quite some time?

Diane Nacko

The thumbprint banner on the isle side of the honey-baked goods had many visitors. Often it was the 'ice-breaker' for a child. It's a place to leave your mark, autograph or bit of bee-graffiti. The banner has become a 'must stop.' Cathy sometimes chases politicians or celebrities for the collection. With no state budget, very few politicians showed this year

The 100th Pennsylvania Farm Show is now in the history books with record attendance. Many people visited the Farm Show Complex, with many also visiting the Honey/ Apiary display. We started out with a blank eight- foot banner, with a blue sky background. The goal was to obtain 2016 thumbprints to fill the banner. Cathy started out by speaking to a State police officer who demonstrated the correct way to finger-print persons. [Place firmly and roll both ways for a complete fingerprint.]

After Saturday and Sunday- Cathy had collected about 650 thumbprints. She was very persistent in gathering thumbprints throughout the week. Many people of all ages and sizes stepped up to assist Cathy with meeting her goal of filling the banner with thumbprints. Secretary of Agriculture, Russell Redding, and his wife were volunteers, along with the State FFA Officer Team. Some people were also willing to assist in making the thumbprints into honeybees by adding two antenna, three body parts, four wings and six

Always fascinating to watch at all ages.

Suzanne Matlock grabs the audience attention while explaining mysteries of the hive.

The 2016 100th Farm Show thumb-bee banner is taking shape with contributors from thousands of visitors to the Farm Show.

legs to their prints. We ended up with some pretty snazzy looking honey bees. Good news – and bad news – the banner was looking pretty well-filled, and people began adding prints to the other banners. Grand total of thumbprints was over 1800.

People have asked what we are doing with the banners that we have used in the past. Well, the past banners are displayed over the Apiary/Honey exhibit area. This activity has become a tradition with some Farm Show attendants. Several families were heard saying they have given their prints every year.

Our goal is to involve elementary schools to make banners showing their knowledge of bees/beekeeping for display each year. Kudos to Nate Webber for contacting Mountain View Elementary for this year's banner. Special thank in advance to Eugene Taylor and Brad Dennis for volunteering to obtain completed banners for next year from local schools.

Also at the Education Station, maps were also being stamped for the Ag Explorer activity. This is an activity sponsored by Turkey Hill. Participants were asked to visit 15 of 34 stations at the Farm Show and get a stamp on the map. Before stamping, participants were asked to name something they knew about honey bees. They were then given an additional bit of information about bees. This station was also a drop-off point for completed maps and we were commended on turning in the largest amount of maps as any station.

A thumb-bee isn't complete unless it has wings, legs, antenna, eyes and a name.

Thumbs up! Here is where you can become part of the swarm with Cathy Vorisek.

The 100th canvas nearly completed.

Exhibits

Even before set up was complete, exhibitors began assembling their displays and dropping off entries. What fun it was to talk with first time exhibitors who were excited, proud and yes somewhat nervous and apprehensive about submitting their entries. The many entries of honey, molded wax, baked goods and other food items, and (my favorite) mead and other apiary products were carefully unpacked, cataloged, graded, and arranged on display tables, ready for the judges the following day.

1st Place County Collective Exhibit is Capital Area Beekeepers Association.

2nd Place County Collective Exhibit is Northwestern PA Beekeepers Association.

A close 3rd Place County Collective Exhibit is Montgomery County Beekeepers Association.

4th Place County Collective Exhibit is Franklin County Beekeepers Association.

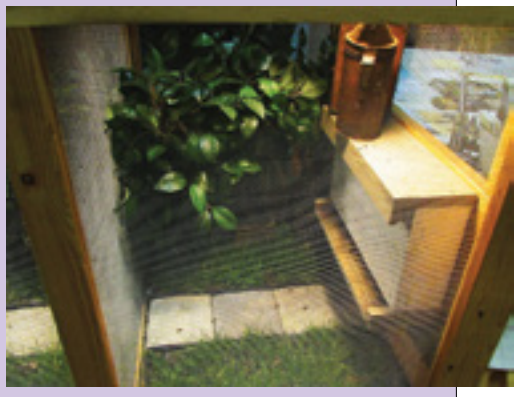
A fitting entry for the new 'Novelty Frame' of honey reads PA Farm Show.

First place individual exhibit illustrates products and theme of how bees Winter in the hive.

The Bees Are Back

Well the bees are back from the Farm Show. Several people, both beekeepers and others asked, "How do you get the bees back in the hive". In past years it has not been an issue. But this year the one hive, from the first day of the show, just seemed to not to have all the bees that were in there from the start. There were few dead in the "bee run" cage and they did not escape, but they were nowhere to be found! Well, when I got them home I found them. They were clustered in the decorative hive front that was in the caged area – probably about a pound of bees. I tried several ways to get them to go into the observation hive . . . in a cool room blew air on them with a fan, tried a mist of water "hey It's raining go in", left them set over night . . . nothing made them move, they just clustered a little tighter. So, I had to get creative. I taped the suction hose of a small shop vac in the feeding hole (it is screened so no bees would be sucked up), taped all holes shut and put a vacuum hose in the entrance. Make shift "bee vac"– the hive becomes the vacuum bag. All are now back in the hive and all is well. The small vac and the air leaks in the hive reduce the suction so no bees are hurt – just another windy day in the hive.

Jim Pinkerton



A "Thank You" to Mann Lake bee supply for donating over $1,500 worth of equipment for the Learning Station and Honey Extraction Demonstrations. Mann Lake employees also helped with setup and showed up several days to help scoop ice cream at the Food Court. BC

A big thank you also to the PA folks that helped us put this article together by furnishing all of the photos and the information – Charlie and Cathy Vorisek, Ronda Fawber, Debbie Morse, Alyssa Fine, Jim Pinkerton, Diane Nanko.

Dadant

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Protecting bees from pesticides just got easier with the release by Oregon State University of a smartphone app that farmers and beekeepers can use to consult a publication when they're out in the field.

The smartphone app accompanies OSU Extension's 2013 publication, ***How to Reduce Bee Poisoning from Pesticides***, PNW 591.

Farmers and beekeepers can now remotely consult the publication's pesticide tables on their phones or tablets. The popular guide lists 150 insecticides, fungicides, miticides, slug killers and growth disruptors – all of them now searchable by trade name or chemical name in the new app.

"It's a smartphone world," said the publication's lead author, Ramesh Sagili, an entomologist and Extension bee researcher in Oregon State University's College of Agricultural Sciences.

"How to Reduce Bee Poisoning" was first published in 2006. It was expanded in 2013 by coauthor Louisa Hooven, a toxicologist and bee expert in the College of Agricultural Sciences, with an extensive update of the pesticide information.

"We looked at the crops grown in the Northwest," she said, "and then at all the products that are likely to be used when the crop is flowering—which is when the bees will be foraging. Those were the pesticides we included."

Products are sorted into three classes: highly toxic, toxic and "no bee precautionary statement on label." The ratings are based on the cautions and restrictions required by the Environmental Protection Agency and listed on the products' labels, Hooven said.

In addition, the guide estimates "residual toxicity" for several of the products – that is, how long their harmful effects persist in the environment. That information, which is not required by the EPA and may or may not be on the label, came from Hooven's extensive search through EPA risk assessment documents and the toxicology literature.

"There was some information on residual toxicity in the previous edition," she said. "We expanded the number of products quite a lot, so we included residual toxicity information for those products for which that's known, and we updated the information for the products already listed."

The guide recommends best practices for managing pesticide applications to protect all bee species—not only honey bees (*Apis mellifera*), but **mason bees** (*Osmia lignaria*), alkali bees (*Nomia melanderi*) and alfalfa leafcutting bees (*Megachile rotundata*). These bee species are also managed as agricultural pollinators.

It also tells how to protect native ground-dwelling species such as squash bees, long-horned bees, sweat bees, mining bees and bumblebees.

"Pesticides will affect these species differently than honey bees or other managed species," said Hooven, "because they have different life habits and are present at different times."

West Coast agriculture is critically dependent on pollinating insects, said Sagili, who has authored or coauthored **four other Extension publications** on honey bees.

Oregon beekeepers manage about 70,000 commercial honey bee hives, he said. The bees pollinate about 50 Oregon crops, including blueberries, cherries, pears, apples, clover, meadowfoam and vegetable seed. Sagili estimates the value of these crops at more than half a billion dollars yearly.

The best protection for bees, he said, starts with good communication between grower and beekeeper.

"Pesticide use and bee protection are not mutually exclusive," he said. "There's a balanced way to control pests and protect bees, both. We want this guide to be a useful tool for growers and beekeepers to make informed decisions together."

The publication and accompanying app are available from **OSU Extension and Experiment Station Communications (EESC)**. A user survey is included, and users are asked to complete it to guide EESC in future improvements of the app.

How to Reduce Bee Poisoning" was produced jointly by OSU, the University of Idaho and Washington State University. Its cost was underwritten by beekeeper associations in Oregon, Idaho, Washington, and California, and by the Oregon Department of Agriculture.

Gail Wells

Protecting Pollinators

Gail **Wells**
Moneen **Jones**

A new program developed by University of Missouri Research Entomologist, Dr. Moneen Jones, offers beekeepers an opportunity to protect hives from pesticide drift. The Missouri Pollinator Conservancy Program (mopollinatorconservancy.com) gives spatial and visual tools to alert pesticide applicators to nearby beehives.

The MPCP is a collaborative effort between the University of Missouri. Missouri Department of Agriculture, and non-profit organization, FieldWatch, Inc. The latter operates DriftWatch Specialty Crop Site Registry, an online mapping tool created by researchers at Purdue University Agriculture and Biological Engineering department to facilitate communication among specialty crop producers and applicators. The latter two are responsible for the data and website infrastructure, whereas Jones is responsible for bridging the communication between all supporters of the project. The program's partners hope to open communications between farmers, consultants, applicators and beekeepers to protect the more than 400 species of bees in Missouri.

Registry for Apiary Locations

Missouri beekeepers are not required to register the location of apiaries with the state, but using DriftWatch

is a good way to let applicators know the locations of beehives and how to contact hive owners. In addition, a placard listing the hive owner's name and emergency contact information should be placed in a highly visible and prominent location in the apiary. She encourages beekeepers to register their hives on the programs's website (**https://fieldwatch.org/**). Participation is voluntary, and beekeepers can limit what information (i.e. map coordinates of beehives) is available through public viewing. Beehive locations are kept confidential by a license agreement between pesticide applicators and use of DriftWatch™. Beekeepers do not need to worry about their personal information being sold or distributed without consent. DriftWatch Specialty Crop Site Registry website offers real-time information for pesticide applicators to consider before applying chemicals to fields near beehives. Diffused pesticides can "drift" from the intended target in one area to another.

BeeCheck Flags

Following beehive registration at DriftWatch™, beekeepers are highly encouraged to purchase large,

visible yellow-and-black BeeCheck flags through links on the website that will alert applicators to nearby hives. These flags serve as a visible reminder to farmers and pesticide applicators that honey bees and other pollinators are present in the area.

We want to *help reduce economic losses* for farmers and beekeepers by managing row-crop pests and lessening the effect of pesticides on honey bee colonies.

Partners in the program are Missouri Agricultural Aviation Association, Missouri Department of Agriculture, Missouri Farm Bureau, Missouri State Beekeepers Association, Fisher Delta Research Center and MU Extension.

Pollinator Program Received Positive Comments

Early reaction to Missouri's new initiative to protect beehives and reduce pesticide has been positive. Clayton Lee, vice president of the Missouri State Beekeepers Association, said the new program is a breakthrough and will have a positive impact on all parties involved. "It's about communication and getting everybody on the same page," he said. "And, yes, I see positive implications for the cotton production area in the Missouri Bootheel area. There are a lot of beekeepers in that region."

Consultant Bill Emerine of Crop Tech says farmers do not want to affect bee populations in an adverse way. So far, he hasn't encountered any situation where a farmer wasn't willing to adjust his spraying schedule. According to Emerine, the problem occurs when farmers don't know where beehives are located or who owns them. "Sometimes I've asked farmers to wait until later in the day to spray their acreage," he says. "That usually prevents any damage to the bee populations. I'm really pleased that each side knows what to expect in all of this." Emerine believes Missouri may have created a blueprint for the rest of the country to follow. "I believe these groups will work together well," he says. "I don't think there will be any animosity or resistance."

Results Thus Far and Future Goals

It has been a little over a year since the program started for Missouri. The goal was to promote dialogue among all industry groups to preserve bees' and their contribution to value of crops. There has been a 248% increase in the number of participants in the program. Participants now include producers (513), beekeepers (199), aerial applicators (44) and apiaries (456) that have registered through the mo.driftwatch.org site. Without federal regulation or requirements to register bee hives, Missouri beekeepers are demonstrating that the state can solve the problem by themselves.

If your state is interested in participating or developing their own Pollinator Conservancy program, please contact Dr. Moneen Jones at **jonesmon@missouri.edu**. BC

Dr. Moneen Jones is the Research Entomologist at the University of Missouri. Her research program emphasis is integrated resistance management of row crop pests, and her extension duties include Director of the new Missouri Master Beekeeping certification program.

When Is Your Colony Ready For The

PUBERTY TALK?

Michael **Smith**

Puberty is an unlikely topic for a beekeeping journal, but it is a special time in any organism's life, and I'll do my best to keep this professional. Before puberty, an organism invests its resources in two areas: survival and growth. Once an organism begins to also invest in reproduction, puberty begins. Sure, that 13-year-old boy with a cracking voice probably isn't producing sperm and fathering children, but he certainly is on his way. It's a critical developmental transition that all organisms undertake, even colonies of honey bees.

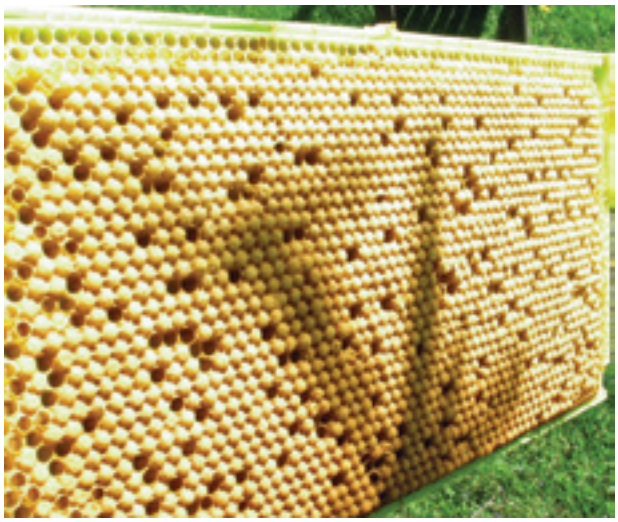
What does puberty in a honey bee colony look like? A fully reproductive honey bee colony is a hermaphrodite, capable of reproducing by producing males (drones) or females (swarms). Mature drones are produced before swarms, so to determine the very first investment in reproduction, we have to go back to the very first stage of producing a drone. And what's that? Yes, it's our favorite comb, those large cells of drone comb. When workers build drone comb, it's the equivalent of the colony going through puberty. Even if the colony might not use the drone comb for rearing drones until the following year, the specialized cells are a sign that reproduction is somewhere on the horizon.

So, what do we already know about honey bee colonies going through puberty? Since the 80s we've known that large colonies begin to build drone comb earlier than small colonies (Lee and Winston 1985). But large colonies are different from small colonies in almost every way: large colonies have more worker comb, more honey stores, more brood, and more workers (Rangel and Seeley 2012). What is it about being in a large colony that triggers workers to build drone comb? This is what my colleagues and I set out to determine.

We wanted to see which colony parameter(s) would trigger workers to construct drone comb. These parameters included: number of workers, area of worker comb, area of worker brood, and area of honey stores. We needed to increase just one parameter, such as the area of worker comb, while keeping all other parameters equal. Therefore, we could see how increasing a single parameter might (if at all) increase the area of drone comb built.

Feel free to take a minute here and think about which parameter you think would trigger a colony to build drone comb. I'm sure you have lamented the zeal with which bees seem to build drone comb wherever they can, and you might have also noticed that the largest colonies built drone comb with the most fervor. But remember that "large" encompasses many parameters, so what part of "large" really matters? To be perfectly honest, any of the parameters were plausible, or even a combination of the parameters. Once we amassed the data, however, we found that increasing the number of workers was the only parameter that led to an increase in the proportion of drone comb built. Furthermore, if we increased the number of workers in all the treatment groups, there was no additional drone comb built even if the colony also had more worker comb, worker brood, or honey stores. We had a solid answer: the colony parameter that induces a colony to switch from building worker comb to drone comb is the number of adult workers (Smith et al 2014).

What does this mean? First off, it's cool! The workers are somehow detecting the number of other workers in the colony. If that number is over a size threshold, then the workers begin building drone comb. As with most research, answering one question raises more questions. Why use worker number to trigger puberty? If I can speculate a bit, this might be because the number of workers in a colony is the most reliable currency that a colony has for detecting that it can afford to invest in future reproduction. Worker number is intricately linked to other important metrics of colony survival, such as the amount of honey a colony can store before Winter. Therefore, colonies that do not have enough workers to adequately survive and grow cannot invest in reproduction. But how exactly does one bee "know" how many other bees are in her colony? Right now, I have no idea, but investigating that mystery is the next stage of my PhD. Stay tuned.



If you would like to read more about this project, please check out the full publication (references below). If you're unable to obtain a PDF of the article, please get in touch. I know a guy who knows a guy. BC

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Timing The Honey Harvest

Some Dos, And Don'ts For Success

Ross **Conrad**

When is the best time to harvest honey from the hive? . . . It's a question that crosses the mind of most every beekeeper eventually. As with many beekeeping questions, the answer is "it depends."

The honey bee is one of the only creatures on earth, other than humans, that will take more than they need from the environment around them. This is due to their powerful hoarding instinct. As long as there is room in the hive to store nectar and ripen it into honey, and there are nectar sources accessible due to favorable weather, a hive of bees will keep collecting nectar and storing it in the hive as honey even though they may already have far more honey stored than is necessary in order to survive a long cold Winter.

Beekeepers take advantage of this hoarding instinct by increasing the capacity of the hive to hold honey whenever the combs in the hive are close to being fully utilized by adding another honey super to our Langstroth hives or additional frames to the top bar hives. Some beekeepers have even designed top bar hives so that standard Langstroth style honey supers with frames can be added on top after all the top bars have been filled below (see photo).

There are numerous factors that go into the decision when to harvest honey from hives. To begin with, one must be patient. The bees must be given adequate time to collect nectar and process it into honey by reducing the moisture content of the nectar below about 18%. Rush the process and harvest before it is fully ripened by the bees and you may end up with fermented honey. Not the end of the world since it is still edible and makes great mead, but if high quality honey that stores well or is for sale is your goal, low moisture is what you want. A good rule of thumb is to not extract unless at least 75% of the cells in the honey combs are capped. By extracting one uncapped honey frame for every three capped frames of honey, the overall moisture content will tend to be below the level where fermentation will occur.

The other extreme is to wait until all the blossoming plants have finished blooming in order to maximize the honey crop by harvesting as late in the season as possible. Unfortunately, in the Northeast the last of the major nectar flows ends in late September when temperatures typically are getting quite chilly at night. The cold temperatures make honey in the combs thick and much more difficult to extract. Robbing pressure is also very strong at this time of year. With no other sources of nectar to forage on and Winter right around the corner, honey supers must be kept covered and protected from marauding bees as they are being taken off hives. The extra effort involved in defending your crop from robbing bees greatly reduces the joy of the honey harvest.

Another reason why it is not usually preferable to put off the honey harvest until late in the season is because some of the treatments used for pests and diseases are temperature sensitive. Wait too long and average daytime temperatures may not be favorable for effective treatments.

Since most pest and disease treatments should not be used when honey supers to be harvested are on the hive due to contamination concerns, all harvesting may need to be completed before any treatments can begin. Given the importance of "taking care of the bees that will raise the bees that will live through the winter" (to paraphrase *Bee Culture* editor Kim Flottum) treatments for *Varroa* and disease must take place early enough to ensure healthy Winter bees. As a result, the temperature requirements of treatments may serve to dictate when the honey harvest should happen.

When a colony has stored far more honey than they can reasonably be expected to consume during a long Winter, I believe it is best to harvest the excess rather than leave it on the hive for the Winter. While some well-meaning beekeepers will wait to harvest their honey in Spring rather than Autumn in an effort to be sure the bees have enough honey for Winter, there are a number of reasons why I don't believe this is a good idea.

Winter honey that does not get used and is still in the hive come spring will often become crystallized (at least in the Northeast). Thus, each Spring the bees can be seen uncapping honey that was unused during the Winter and sucking up what little liquid remains of the honey, while the numerous sugar crystals will be found on the bottom board or on the ground as they are removed from the hive as debris by the bees. In addition, crystalized honey is hard to extract. This makes life for the beekeeper much more difficult both due to the longer time it takes to extract crystalized honey and the extra wear and tear on the extracting equipment. It also increases the potential for comb blowouts during the extracting process and additional energy will be

The Spikenard Top Bar Hive is billed as the first commercial top bar hive to include a Varroa *screen and accommodate 10-frame standard supers. A portion of the proceeds from all sales go to supporting Gunther Hauk's honey bee sanctuary at Spikenard Farm in Virginia.*

required to run the extractor since the crystalized honey will require it to run for a longer period of time.

The combs holding the honey left over in spring may also become moldy depending on weather conditions and the strength of the colony, and this may impact the quality of the honey harvested. In addition, leaving more space on the hive than necessary (in the form of extra honey supers that the bees don't need), which must be maintained and patrolled by the colony is usually a bad idea during these days of weak hives, small hive beetles, wax moths, etc.

Perhaps the most important reason why I don't like the idea of waiting to harvest honey from hives until Spring is because the bees may need any honey that is found left over in the hive in Spring to get themselves ready for the upcoming Winter. Life for the honey bee in the Northeast is primarily about reproducing and surviving Winter. Although colonies of bees may historically build up and store enough honey for Winter in your location, what if this is the year that a drought or some other weather abnormality prevents the bees from storing enough honey to survive the coming Winter? Any honey left over from the previous Winter and found in the hive in Spring may just be what is needed to ensure the colony will be well provisioned for next Winter. At minimum, it can help reduce the amount of feeding that may be required by the beekeeper during Winter preparations. Since I can't predict the weather and know with any certainty what the season will be like, I prefer to only harvest all excess honey in late Summer here in Vermont. This is because this is the only time of year when I can be pretty sure just how much honey the colony is likely to have going into Winter and I am able to determine if the amount of honey in the hive is going to be enough for the colony to survive the cold season dearth.

There are a few exceptions to the general rule of a single late summer harvest that must be acknowledged. For example, a beekeeper that wants to offer honey varietals in order to serve novelty markets or to compete with other beekeepers by specializing their product line will have to take the risk that the honey varietals that are harvested in Spring or early Summer will not be needed in order for the colony to get through Winter. Sure, such a situation may be remedied by feeding sugar syrup to the bees later in the season, but given the mounting evidence that indicates that bees are much healthier when raised and maintained on natural honey and pollen rather than substitutes, the wisdom of harvesting early and potentially leaving the hive short on naturally derived food stores becomes questionable.

The Bee Escape Board which acts as a one-way door to remove bees from supers, works best when the honey harvest is timed to occur when days are warm and nights are on the cool side. Cool nights provide bees with an extra incentive to leave the honey supers when they pass through the Bee Escape on their way to help warm the brood nest.

Another potential reason a beekeeper may decide to harvest honey before late Summer or early Autumn in the Northeast is due to poor planning (or limited finances) that results in the beekeeper not having enough equipment to super hives in a timely manner and take advantage of the area's major nectar flows. Full supers of honey can be harvested, quickly extracted and put back on hives to fill up again, making up for the lack of extra honey supers. Such a scenario is a lot more work than simply harvesting all at once at the end of the season, but on some occasions this may be the best that one can do.

Harvest honey too late in the season and the honey in the comb may become crystalized, making it difficult to remove from the comb.

Whenever one chooses to harvest their honey, it is critical these days that the harvest is timed so that extracting can be done within two-to-three days of removing the bees from the frames of honey and taking the honey from the hive. The sooner extracting and processing takes place after harvesting the better in order to prevent wax moths, or small hive beetles from getting established on the unprotected combs and ruining all the hard work done by both bee and beekeeper.

The honey harvest is often one of the most enjoyable and rewarding parts of keeping bees. In a sense it is the culmination of all the hard work that has come before. When timed correctly, it can go fairly smoothly and efficiently while at the same time helping to set the colony up for a successful Winter and high productivity in the following season. May your harvest be fruitful and timely this year. BC

Ross Conrad is the author of Natural Beekeeping 2nd *Edition published 2013 by Chelsea Green Publishers.*

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A Closer LOOK

NEST MATE RECOGNITION

Clarence **Collison**

Within the honey bee colony, recognition of nestmates from aliens is based on olfactory cues..

Recognition of colony members is extremely important in maintaining the integrity of the honey bee family. To discriminate between nest mates and non-nest mates, guard honey bees antennate and lick workers encountered at the nest entrance (Butler and Free 1952), thereby assessing the entering bee's odor recognition cues. The cues used to discriminate between nest mates and non-nest mates are suggested to originate from various sources: queen (Moritz and Crewe 1988; Saleh-Mghir and Darchen 1990; Breed et al. 1992), stored food (Ribbands et al. 1952), and comb wax (Breed et al. 1988, 1995).

Within the honey bee colony, recognition of nestmates from aliens is based on olfactory cues, and several studies have demonstrated that such cues are contained within the lipid layer covering the cuticle. Such cues may be both self-produced and exogenous (Breed et al. 1998). Self-produced cues may have both a genetic and an environmental component, for example depending on the type of food, while exogenous cues may also have a genetic component (as, for example, the odors acquired from other nestmates or from the nest material produced by nestmates) as well as an environmental one. Heritable self-produced cues appear to be of little importance in nestmate recognition, at least in a natural context, and guard bees appear to be unable to discriminate between related and unrelated conspecifics if these have lived within their hive during adulthood (Downs and Ratnieks 1999). Among the environmental components, nest material (Breed et al. 1998) rather than food source (Downs et al. 2001) and odors acquired from flowers (Bowden et al. 1998; Downs et al. 2000), appear to be the most important source of recognition cues.

The lipids covering the body surface are usually a complex mixture of tens of compounds in which aliphatic hydrocarbons are generally the major components. Dani et al. (2005) tested whether artificial changes in the cuticular profile through supplementation of naturally occurring alkanes and alkenes in honey bees affect the behavior of nestmate guards. Compounds were applied to live foragers in microgram quantities and the bees returned to their hive entrance where the behavior of the guard bees was observed. In this fashion they compared the effect of single alkenes with that of single alkanes; the effect of mixtures of alkenes versus that of mixtures of alkanes and the whole alkane fraction separated from the cuticular lipids versus the alkene fraction. With only one exception (the comparison between n-C_{19} and (Z)9-C_{19}), in all the experiments bees treated with alkenes were attacked more intensively than bees treated with alkanes. They concluded that modification of the natural chemical profile with the two different classes of compounds has a different effect on acceptance and suggests that this may correspond to a differential importance in the recognition signature.

"Wax comb in honey bee colonies serves as a source and medium for transmission of recognition cues."

Worker honey bees are able to discriminate between combs on the basis of genetic similarity to a learned comb. The nestmate recognition cues that they acquire from the comb also have a genetically correlated component. Cues are acquired from comb in very short exposure periods (five minutes or less) and can be transferred among bees that are in physical contact. Gas chromatographic analysis demonstrates that bees with exposure to comb have different chemical surface profiles than bees without such exposure. These results support the hypothesis that comb-derived recognition cues are highly important in honey bee nestmate recognition. These cues are at least in part derived from the wax itself, rather than from floral scents that have been absorbed by the wax (Breed et al. 1995).

Breed et al. (1988) showed that worker honey bees kept in paper cartons on comb wax will accept workers who have been exposed to the same comb as themselves but reject workers exposed to a different comb. Worker relatedness had no significant effect on acceptance. Chemical analyses have shown that workers acquire new chemicals

when exposed to comb (Breed et al. 1995), supporting the conclusion that environmental cues are used during recognition. Breed (1987) also showed that a test group of workers kept in a paper carton will reject sisters kept in a hive for one to five days and then introduced into the carton, presumably because they acquired new cues while in the hive.

Wax comb in honey bee colonies serves as a source and medium for transmission of recognition cues. Workers learn the identity of their primary nesting material, the wax comb, within an hour of emergence (Breed and Stiller 1992). Research has shown that the wax combs are important in the acquisition of colony odor. However, many of these studies were conducted in the laboratory or under artificial conditions. D'ettorre et al. (2006) investigated the role of the wax combs in nestmate recognition in the natural context of bees at colony entrances. Wax combs constructed by each experimental colony were swapped between hives and the acceptance of nestmate and non-nestmate forager workers was recorded before and after the swap, and in relation to a control hive not involved in the swap. A standard assay of guard discrimination (Downs and Ratnieks 2000) was used. Returning forager workers without pollen were captured at the entrance of their own colony (the source colony), individually placed in plastic vials and cooled in a portable ice chest. The chilled bees were then allowed to warm up before being released individually at the entrance of a discriminator colony. The chilling made the bees reluctant to fly away even though they were fully active on release. They observed the reaction of guards for five minutes. An introduced worker that was bitten, stung or dragged by guard bees was classed as rejected. Workers that were only antennuated or licked by guards or that remained at the entrance for five minutes without receiving aggression were classed as accepted. Introductions were made by a pair of researchers, one of whom acted as the observer and was blind with respect to the colony of origin of the introduced bee. To introduce bees, they collected three returning foragers from one source hive. One

Wax combs play a role in nestmate recognition.

was introduced back to its own hive (nestmates) and one each into the other two hives (non-nestmates). The procedure was repeated with foragers from the other two hives to constitute one round of nine introductions. Colonies that exchanged combs became more accepting of each other's workers than of workers from the third colony. The overall acceptance of comb swap non-nestmates increased significantly from 3% before the swap to 23% after the swap in the first year, and from eight to 47% in the second year. This effect wore off within three weeks. Chemical analyses showed that the cuticular profile of non-nestmates involved in the experimental comb swap became more similar to each other after the swap, and that acceptance by guards of bees from different hives was negatively correlated with chemical distance between the hydrocarbon profiles of the workers from different hives (D'ettorre et al. 2006).

Honey bee colonies rob honey from each other during periods of nectar shortage. Persistent robbing can kill weak colonies. Primarily responsible for preventing robbing are guard bees. Previous research has shown that the probability of both nest mate and non-nestmate workers being accepted by guards at the nest entrance increases as nectar availability increases. The mechanism responsible for this change in guard acceptance may be explained by two competing hypotheses: Odor Convergence and Adaptive Threshold Shift. Similarity in colony odors caused by foraging on the same plant species is referred to as Odor Convergence (Downs and Ratnieks 1999). Downs et al. (2001) tested the Odor Convergence hypothesis. The acceptance by guards at the nest entrance of workers transferred between four colonies that had been fed either odorless sucrose syrup (two colonies) or diluted heather honey (*Calluna vulgaris*) (two colonies) was measured three days before feeding and during two weeks of feeding. Despite the large sample sizes, the probability of guards accepting non-nest mates was not affected by the similarities or dissimilarities in food odor between guards' and non-nest mate' colonies. This finding contrasts with the accepted belief that food odors are important in nest mate recognition and strongly rejects the Odor Convergence hypothesis.

The Adaptive Threshold Shift hypothesis predicts that as the costs and frequency of robbing declines, the acceptance threshold of guard bees becomes more permissive. Downs and Ratnieks (2000) provide data strongly supporting this hypothesis. Over several weeks guards became more accepting of both nest mates and non-nest mates as foraging conditions changed from nectar

"The olfactory cues which workers use when discriminating between queens may be odors that the queens have acquired from the hive environment, or may be pheromones that the queens have produced themselves."

dearth to abundance. Eventually, all bees, both nest mates and non-nest mates were accepted.

Worker honey bees recognize their own queen and can distinguish her from others on the basis of odors. Boch and Morse (1982) demonstrated this experimentally by giving a swarm of bees the choice between its own queen and a queen from another colony; swarms moved to their own queen in most trials (Boch and Morse 1974, 1979, 1981). The olfactory cues which workers use when discriminating between queens may be odors that the queens have acquired from the hive environment, or may be pheromones that the queens have produced themselves (Breed 1981). Queen pheromones vary among individuals in both quantity and composition and may convey information on the physiological state of the queen, reflecting differences in diet, rearing history, age, mating etc. (Ambrose et al. 1979). The recognition odor cues of queens are in part genetically determined and in part acquired from the hive environment (Boch and Morse 1982).

A honey bee queen is usually attacked if she is placed among the workers of a colony other than her own. This rejection occurs even if environmental sources of odor, such as food, water, and genetic origin of the workers, are kept constant in laboratory conditions (Breed 1981). The genetic similarity of queens determines how similar their recognition characteristics are; inbred sister queens were accepted in 35% of exchanges, outbred sister queens in 12%, and non-sister queens in 0%. Carbon dioxide narcosis results in worker honey bees accepting non-nest mate queens. A learning curve was developed over a 30 minute to five hour period, indicating the time after narcosis required by workers to learn to recognize a new queen. In contrast to queens, worker transfers normally result in only a small percentage of the workers being rejected. The reason for this difference between queens and workers may be because their recognition cues come from different sources.

The intolerance and the aggressive behavior of workers toward alien individuals of the hive are widely known. But in some circumstances, workers of different hives can live together without fighting. Saleh-Mghir and Darchen (1990) looked for factors which stop this aggressive behavior toward alien individuals. Basic to our understanding of these aggressive behaviors is the effect of colony odors which have various origins, including the hive materials and metabolic products of the workers or the queen. They investigated the effects of the queen's metabolism on nest mate recognition.

Experiments were made with populations of 75 workers of various ages taken from the same hive and kept in cages. Seventy-two hours elapsed between the time when the workers were put in cages and the first observation. Five workers were introduced from cage X into cage Y and vice versa, and the aggressiveness of the receiver workers towards one worker chosen amongst the five workers introduced was classified from one (no aggressiveness) to five (struggle and killing of the intruder). Every set of observations lasted 10 minutes and was repeated daily for seven days. They demonstrated that the queen's odor played an important part in the colony odor. They found that: 1) queenless sister workers readily recognize one another, even a long time after their separation, 2) workers living with a queen easily accept their queenless sisters, and 3) queenless workers reject their sisters that have lived with a queen for 72 hours. The first two results may be explained by aspects of kin recognition but not the last one. They hypothesized that queenless workers slowly lose their queen's odor, while workers with queens are continuously marked by the queen pheromone (Saleh-Mghir and Darchen 1990).

Worker honey bees recognize their own queen, from odors from the hive, or pheromones from the queen.

Fatty acids, normally found in comb wax, have a strong influence on nestmate recognition. Previous work has shown that bees from different colonies, when treated with 16- or 18-carbon fatty acids, such as oleic, linoleic, or linolenic acids, are much less likely to fight than bees from two colonies when only one of the two is treated. Previous work also shows that the influence of comb wax on recognition has practical applications; transfer of empty comb between colonies, before merger of those colonies, reduces fighting among workers within the merged colony. Flax oil contains many of the same fatty acids as beeswax. Breed et al. (2012) tested the hypothesis that treatment of individual bees with flax oil affects nestmate recognition; the results proved to be consistent with this hypothesis and showed that treated bees from different colonies were less likely to fight than untreated bees. These results suggest that flax oil may be useful in facilitating colony mergers. BC

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Clarence Collison is an Emeritus Professor of Entomology and Department Head Emeritus of Entomology and Plant Pathology at Mississippi State University, Mississippi State, MS.


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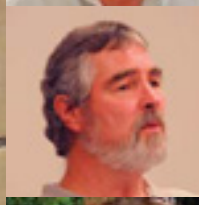
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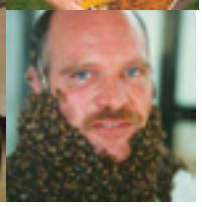
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SCHEDULE AT A GLANCE
(subject to change)

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

**Additional Charges*

Beeyard Thoughts

James E. Tew

Most swarms come with a story.
When does swarming look like robbing?
Unhappy bees at the beach.
For The Brand New Beekeepers – It's not impossible for a new package to swarm.

Swarms usually come with a story

The Dale Swarm

The father of a friend had died. We were dressed and on our way to his calling hours to express our sympathy. It's not like I was dressed for a formal wedding, but rest assured, I was not dressed for beekeeping. As we left our home and headed for the car – there they were – thousands of them – an unsettled swarm in flight.

There is always a brief moment before an idea or a realization is formed, at least for me anyway. Does anyone else have that "fleeting moment" experience? For the briefest of moments, I felt puzzlement – what is that? Cicadas? Leaves? And then the slam comes – ***that's a swarm***! Beekeepers, you know the rules. It's a swarm, and like Superman, we must do what we must. We have to try to hive it.

I was unprepared for the surprise of a swarm – again. I dashed to my shop to find any equipment that was there. To make the walk to my equipment storage barn would take more time than I had. Happily, I had a new plastic foam nuc that I had recently purchased. With a few frames – each having problems that I had been photographing – I improvised a catch box. Actually, it was a good one.

My wife exploded into the shop saying that there was a swarm in the air. I barely had time to talk. As those who have read some of my previous swarm stories, know that I have either lost swarms outright or had them pitch so high as to be unreachable. I hoped that I could do something to keep these bees low (enough). This swarm seemed to be landing about 12 feet from the ground. I set up two ladders and began the process of shaking and disrupting the settling cluster hoping some roaming bee would find my enticing bee box. You know the scene – bees everywhere – chaos. (*Yet in all this biological bedlam, I had the thought, "Possibly we could attend the funeral tomorrow and miss the calling hours today." Don't forget, I was on my way to a formal event. Surely all beekeepers and funeral-goers would understand.)*

I had done a pretty good job of relocating the cluster, but it was mingled with tree limbs, two ladders, and me wearing impractical clothes. It was at this point, that my neighbor – who is not a beekeeper at all – asked if he could help. I had no idea he was at the scene, so I was completely surprised. The bees had been perfectly gentle. No stings. I had not taken time for protective gear. What should I do for my neighbor while in the middle of a swarm and on my way to a calling hours? It's one of those situations – do you tell him "no" and ask him to move back? *(For any long time readers, I have referred to my neighbors in the past. I have had swarms land in his yard. My bees have been at his humming bird feeder and at his birdbath. Through the years, my neighbors have tolerated a lot from me and my bees. I absolutely could not be rude.)* I told him I could use help setting the box on the ground. He helped. Nothing happened and he appeared to absolutely love the experience. Happily, my wife had the presence of mind to photograph all of this with her cell phone.

To designate the swarm, I named it the *"Dale Swarm"* after my neighbor. I made it to calling hours only a few minutes late, a bit winded, with a few bee poop spots on my shirt, and one unusual story.

Afterwards, I moved the swarm to my apiary. Two days later, I found the queen. I will replace her later this Summer. Compared to so many others, so far, this swarm story has had a happy ending. I love happy endings.

The poop swarm

You have no reason to know that I have serious hearing loss. I wear hearing aids that make my serious hearing loss only "somewhat" serious. Essentially, I do not hear well.

My neighbor's first bee experience.

Swarming bees clustering around a caged queen.

I take frequent trips to my home apiary for no other reason than I simply want to make the walk. A few days after the Dale Swarm event, I did that very thing. As I approached the apiary with my poor hearing, even I could hear the happy foraging sounds of eager bees. I had the thought that these bees were really foraging. All was good. Once inside my fence *(I wrote about the fence installation, too.)*, the bees from all hives were crazy active. I relished the contribution that my bees and I were making to my local ecosystem.

As I strolled, in front of one hive – on the ground – was a queen. Her wings were stuck together with wet bee poop. It was the strangest thing I have even seen from a queen. I put in her in a queen cage and placed her at the entrance of several colonies, but no bees gave her the slightest interest *(Sadly, so sadly I did not photo the bee-poop queen. My bad.)* At this instance, please review my comment above about the mental confusion just before an idea arrives.

Wait a minute – all that foraging sound – was that truly only foraging noise from all these hives? I moved from beneath the apple tree canopy and away from the blue spruces that surround my beeyard and looked up. There were thousands of bees in the air. Could it be that the poop queen was theirs? Where to put her? Where to put her? Think fast. Where is a good photographic spot? I placed her atop one of the fence posts and waited. Within three minutes, the bees began to settle around her. I literally spent the remainder of the afternoon photographing and videoing the swarm as it settled, and as I moved it into a five-frame nuc. The poop swarm was a unique event for me.

I still have the poop swarm. It is an established colony and seems to have settled into my hive equipment. The queen was quickly made all nice and clean.

One final point is that I may have been very lucky with this swarm. Though bees quickly found the caged queen, they took quite a bit of time settling on the fence. When I moved the caged queen to the nuc box, only a few hundred bees went with her. The others took to the sky in an area that I estimate to be about 3/4s of a football field. The swarm really scattered. After a short hour, the swarm finally returned to the nuc box. I strongly suspect that they had another site selected, and it was not my nuc box. I think I lucked out with this one. But really, isn't that the case with all swarms?

When does swarming behavior look like robbing behavior?

The Free Bee Swarm

I was still feeling good about my bee swarm fortune. I checked them on a daily basis for a week to be sure they had not left. On one of my apiary walks, I noticed that some unused equipment was being robbed. In past articles I had wondered if robbing behavior could be used as an indicator of the absence of a nectar flow. When making splits or raising queens, knowing when to expect robbing behavior to start would be helpful.

I watched the robbers come and go. They did not seem crazy frantic as robbers normally are. That's puzzling. My thoughts flitted back to the robbing-as-a-management-tool idea. Maybe just lay a partially filled frame out in the open. Would some of the foragers visit this source? Is there any real difference between robbers and foragers? I didn't and still don't have a lot of answers.

Meanwhile back at the equipment that was being robbed, there were a few bees scenting. Why would robber bees scent? That would only increase competition for the scant food supply. A thought was trying to form. I was in the fuzzy phase. While my mind was on robbing behavior, this equipment was apparently being raided. Increasingly, things didn't look normal. When a couple of drones alit near the entrance, my fuzzy phase ended! That's not robbing. The bees are too calm, workers do not scent at the robbing site, and drones play no part in robbing. This has to be a swarm that had moved into my unused equipment. That's not uncommon, but it has not happened to me in many years.

I suited up and ripped into it. A stack of six deep supers had disorganized bees scattered throughout the equipment. There was no cluster – at least not at the moment. I had no idea where the queen would be. Apparently, the swarm had only been settling for a short time; so, leave it alone or do something? You know I could not leave it alone.

I went through four deeps and shook as many bees as possible into the bottom two deeps. I closed the two deeps up and waited to see what the bees did. They began to scent. I used my leaf blower to blow the remaining bees from the four deeps referred to earlier. I closed these now mostly empty deeps, but left a small opening for any remaining bees to escape or for the swarm to return to them should the queen still be in them. While there was some confusion, the bees were clearly accepting the two deeps as I had hoped.

I was not expecting yet another swarm. This was a pleasant surprise. As it were, these were free bees. For discussion, this is the *"Free Bee"* swarm.

The comb swarm

Yet a few days later on yet another apiary walkabout, I noted "robbers" again. This time had to be for real – right? If there were a dearth, it would be a good time to explore using robbers as a nectar flow gauge. I opened the extra equipment from some of last Winter's dead colonies

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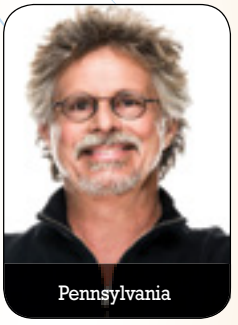

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I was expecting to see robber bees. Note bees scenting and drones.

to search for a partial frame of old honey. Immediately upon opening the equipment, I saw entirely too many bees to be robbers and a medium piece of burr comb hanging in an empty frame space. Robbers do not build combs – they destroy it. I suppose I was *somewhat* expecting it this time. This was a nice swarm, and my abrupt opening required that I quickly stop everything for some personal protective gear.

I was once again happy to see yet another swarm had settled in. I cannot believe these are all from my bees, but whatever . . . I am certainly glad to get them.

I did simply lay out a comb to monitor robber/foraging activity on an exposed food source. I had a look the next day only to find that the raccoons had left me a thank you note. The frame was completely cleaned and was laying several yards away. Back to the drawing board on that idea.

This has been a great year for colony buildup and for swarm retrieval. It feels good not to be composing another of my complaining articles.

The new swarm accepting the downsized equipment stack.

Unhappy bees at the beach

My extended family and I recently vacationed at one of the Florida panhandle beaches. We had a perfectly wonderful experience. The beekeepers who introduced me to this particular beach and helped me set the trip up know who you are – a sincere thanks to you.

It was supposed to just be a non-bee beach trip. That just could not happen. I found a nearby commercial bee yard with a heavy-duty bear fence around it, and photographed it. But more interestingly, my son-in-law, Doug, commented that he had seen a dead bee washed up on the beach. This was interesting, but I had no other thought – until ***I*** saw a bee washed up on the beach. Okay. There is little explanation for this. Late in the afternoon, I took a walk and counted about 30 bees – none alive – during about an eighth of a mile walk. Over the next three days, I found 50-55 (total) bees – nearly all in the later afternoon-in other approximately 1/8th mile walks.

While I never saw a water forager, I finally found one lone bee that was alive – if you could call it that. It was manically spinning on the sand at full speed – rarely stopping. Members of my non-beekeeping family said it was the strangest thing they had ever seen.

I only have a short bit of bad video, but I have posted it at:

YouTube URL: **https://youtu.be/OFEkVEUnZqs**
Shortened URL is at: **http://tinyurl.com/Beach-Bee**

I have precious little science on this subject. I don't know why the bees were along this beach. I really don't even have much of a guess. It could be anything and is probably a fluke. I simply don't know what is happening. Do you?

Senior Citizen Beekeeping

Last month, I wrote that I would continue this thread this month. However, that did not leave any of you who have Senior Citizen beekeeping experience any time to comment. Maybe you will and maybe you won't. At any rate, I would like to wait at least a month to see if any of you beekeepers who are long on experience have had some successes. I will follow up on this subject. Senior Citizen beekeepers, let me know what you do to make your beekeeping possible.

For the brand new beekeeper

All you new beekeepers who purchased packages last Spring, if all went well and there was a good nectar flow, you will need to provide space for that new queen to work out. While it does not happen all the time, it is not impossible for package bees to build up, become crowded and cast a late season swarm. Such swarms generally have little chance for surviving the Winter. It is normally better to give too much space than too little. We all have good intentions but you need to give these new packages space.

Thanks for reading. Good luck with your beekeeping. BC

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

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August Crossroads

Larry **Connor**

August is a frantic crossroad month when Summer management runs into the needs of Winter colony survival. While I have written about this before, I feel that it is one of the most misunderstood basic principles of beekeeping, and must be reviewed. If you are a new beekeeper, this is one of the essential times of the colony management season that many beekeepers ignore for some unidentified reason.

In August bees and beekeepers are busy:

Harvesting honey – This often is when beekeepers remove the summer honey crop from plants like the clovers, spotted knapweed, and even the honey produced during the spring from fruit bloom, tulip poplar, black locust, basswood and sumac. It is important that they let the bees 'ripen' the honey adequately and the moisture is low enough to prevent fermentation in the container.

Producing honey – Some beekeepers have apiary locations where their bees have access to those 'horrible and invasive' nectar sources like purple loosestrife and Japanese knotweed. These two species bloom in August and into September and, in some areas, produce a major nectar flow. The politics of invasive species drives me insane. There are groups of nature organizations, government agencies and farmer organizations that support the removal of certain invasive species in North America without ever mentioning the removal of other invasive species, like apples and humans.

Varroa mite treatments – After the flow is over and the spring and summer honey crop is removed from the hive, many beekeepers try to squeeze in a *Varroa* mite treatment before the nectar flow from the goldenrod and asters start. This can be a tight fit to comply with the miticides label for some compounds, but it will provide a treatment at a time that colonies that have higher mite levels will benefit from the mite reduction. I find that many commercial beekeepers use this window of opportunity to apply one of two or three treatments they make every year.

Many beekeepers' colonies benefit from goldenrod nectar. Or not. There is evidence that goldenrod is producing differently than before climate change was recognized as a major component in North American apiculture. If the plants are producing pollen with less protein and little or no nectar, it is a dramatic blow to many beekeepers in their colony management. During the past few years I have left the goldenrod and aster nectar on the hives, letting the bees ripen it and use it for Winter survival.

For the bees, August marks the start of their New Year!

Happy New Year bees! This is the time of the season when colonies start the cycle for next year's season by producing healthy and vigorous worker bees that will raise the final cycle of bees before Winter. The bees do not celebrate, and nor should the beekeeper, as it is essential that the beekeeper make sure the colonies have adequate pollen and honey nutrition entering the hive during the mid-August to mid-September period. Colonies that do not produce a healthy, well-fed brood cycle of late Summer bees will not have the nurse bees needed to produce the Winter bees, aka the Fat Bees. These are the bees that must live five to seven months and raise the first cycles of brood in the colonies during the Winter when flight is not possible in northern states. They are different from Summer bees because they carry nutrients in their cells that help raise the Winter brood.

A growing number of beekeepers are putting out dry pollen supplement during August when there is no natural pollen flow. They use the dry material to avoid issues with small hive beetles, and if the bees do not take it, it will be offered to them later in the season. Bees at dry protein feeders are fun to watch, covering themselves with the dusty produce and then grooming themselves as they fly over the material. They are undoubtedly adding nectar and honey to the product as they pack it on their hind legs.

As a rule, if there are few plants producing pollen, the bees will not find much nectar either. Nectar feeding using top feeders, jars or cans is a good way to offer 1 to 1 sugar syrup when the beekeeper is trying to build new combs, and 2 to 1 syrup when the objective is food storage.

Wrapping hives helps with Winter winds.

Small-scale beekeepers should not use open feeders for nectar feeding because the robbing bees will spread to their hives. Even commercial beekeepers who use open feeders tend to put the feeders some distance from the hives to minimize robbing in the apiary.

This past spring (2016), many beekeepers experienced the same thing that I observed: Certain colonies surviving the Winter into April, when a cold snap came and the bees died. Part of this was due to reduced colony population, but part of this was due to the lack of well-fed bees remaining from the previous season and the new bees that were being produced during the Winter being well fed as well. Fortunately, most of my colonies had adequate food from the previous season, and they were able to produce a large number of bees in the late Winter and early Spring.

I did not see a lot of this, and the colonies that were lost were likely to have had a problem with higher *Varroa* mite loads and the viruses that tag along with mite infestations.

What else are the bees doing from mid to late Summer? Replacing old and less than optimal queens.

When a Spring swarm is lead by a colony's old queen, this lady has built up two colony populations – the one that was strong enough to swarm and the swarm itself. By late July and early August and as the nectar flow is still on, the colony will quietly produce supersedure queen cells while the combs are being packed with nectar and honey. This is a bit of a lull that occurs just before the Happy New Year I just mentioned. These old queens are typically fading in brood rearing as a result of their fading viability and because of the seasonal decline typical of this time of the bee season.

You only want three or so mites when you do a mite test. This colony is dead but doesn't know it yet.

My colonies that did survive were the ones left basically untouched from mid season on. I was dealing with some health issues, and no honey was removed from the hives. This should be a major concern all beekeepers have when they decide how much honey they will remove from their hives. When in doubt, leave more honey on the hives, and don't assume that they will experience a strong flow from goldenrod and aster. I did not mention the asters above, but they are a very important source of pollen in the Fall (I don't think they have been followed with the effects of increasing $C0_2$ as goldenrod has).

Likewise, colonies that were new earlier in the season, from packages or nuclei, we are also actively replacing any queen that is not producing queen pheromone at a level the colony expects. Old USDA studies from the 1930s report that about 35% of the queens in package colonies are replaced by the end of the bee season, so there should be no surprise that nowadays package colonies have a higher rate of queen replacement than 35%. Some researchers have evidence that as many as 80% of the package queens are lost by the end of the first season, so the beekeeper should either prepare for the inevitable loss of colonies that is correlated with queen replacement, or actively replace queens that are failing with queens from the nuclei that they have hopefully established in their apiary. Even for first year beekeepers, having one or more nuclei on hand with young, viable queens is an ideal way to replace any queen that shows supersedure cells in the Summer and early Fall. This saves the time and money involved in getting a queen shipped, and an actively laying queen from a nucleus will always be accepted at a higher level than a shipped queen pulled by the producer from a queen bank.

In Nature, queens fail to mate and reestablish the colony about 25% of the time. Even a young swarm may be at risk when the old queen is being superseded. Certainly any swarm or nucleus colony will face the same statistical risk of queen loss. This is where the proactive beekeeper can save colonies and improve wintering success (in part by reducing mite levels by the brood break) by putting a young laying queen into a colony from a nucleus.

Mite control is often necessary in non-tolerant stocks. True, there is a growing number of beekeepers who do not medicate as the result of an active selection program against mites, and/or the purchase of stocks of bees that have one or more of the recognized mechanisms of mite tolerance: hygienic behavior, suppressed mite reproduction and grooming behavior. Many beekeepers sell their stock as being mite tolerant, but few beekeepers actually sample for mite levels. This is something all beekeepers should do on a regular basis.

Sampling may be done using various methods. Some like to use their screened bottom boards and either count natural mite fall or apply a dusting of powdered sugar and count the number of mites that fall from the sugar treatment. This is a good indicator of general mite levels, but is less than precise in indicating when a beekeeper needs to treat.

The powdered sugar roll is another method. A half-cup of bees from the brood frames is shaken into a tub and the bees measured out and put into a pint jar. That sample should be about 300 bees. Several tablespoons of powdered sugar are added and the bees shaken vigorously for five minutes, and then allowed to rest and let the sugar release the mites from the bees' bodies. The mites and sugar are then shaken out onto a white surface (I use a white paper plate). I will apply more sugar and shake some more to make sure I get all the mites. I want the mite count from the 300 bees to be less than three to six mites (one or two mites per hundred worker bees). I have performed sugar shakes with booming colonies that produced 40 to 80 mites per 300 bees. All indications are that such a colony is certainly likely to be dead in the Spring. In some cases, these colonies are dead by late Fall.

Help the bees rearrange their brood and honey

In nature, such as a colony in a bee tree, bees will fill the upper combs with honey during the Summer and shift the brood rearing to the lower part of the nest. Managed bee

colonies should attempt to duplicate this instinct. If the bees have moved up to the top of the brood chamber (filling honey supers above this), beekeepers are advised to move the brood nest to the lower hive body, and place brood frames filled with honey above the brood area. This will allow the bees to move upwards in the Winter. Heat rises and the bees will follow the heat as they Winter and eventually start to rear brood in the Winter. Once the bees are in cluster, they cannot move from the top box and crawl down to the stored honey and move it up unless there is a warm spell; and that can be very dangerous for the bees if the weather turns cold quickly and the bees are left stranded on the honey comb some distance from the brood cluster.

Purple Loosestrife is a good honey plant, but tends toward invasive. (photo from WatershedCouncil.org)

Reposition exposed hives

Wind exposure is hard on the bee colony. Many of the colonies that survive are the ones that have good sun exposure and protection from the strong Winter winds. Colonies located in open fields and ridge tops are better off moved to thickets of brush, behind buildings and other protected areas. I think it is too early to move most colonies in August, but the beekeeper must develop a plan for this, lining up help and reducing the size of the colony so it will be easier to move. Most beekeepers wait until late November or early December to make the last visit and prepare the bees with insulation and ventilation. This may be the end of a mite treatment plan when the colony needs to be brood free. Note that Italian bees and some others will continue rearing brood as long as the weather is warm and there are adequate stores in the hive.

When it is not possible to move colonies, make a windbreak from fencing material, bails of straw, wood pallets and other scrap materials. I like to have a one-inch insulation board between the inner cover of the hive and the top cover. This reduces heat loss and spreads the heat over the top of the hive, allowing the bees to spread their Winter cluster to reach more stored food. Provide an upper entrance in the top box, either as part of the inner cover or in a shim under the inner cover or an auger hole in the hive body. Studies done at Michigan State University started in the 1950s showed that an upper entrance was the most important Winter preparation a beekeeper could make to protect their hives.

Some beekeepers wrap their hives with insulation board or roofing paper. This is helpful when the bees are exposed to strong winds. BC

Goldenrod may not be as valuable as it once was.

Dr. Connor is scheduled to speak at the College of Lake County (Grayslake IL) on Saturday September 10th. Remember to bring your copies of his books for an autograph.

Look at ***www.wicwas.com*** *for new titles and upcoming programs.*

The Chemistry of Honey

Sharla **Riddle**

Honey bees are chemists. Using enzymes and dehydration, these scientists of the natural world are able to change the sugar in nectar into a supersaturated power food. It's no small feat-honey is composed of at least 181 components. Its unique taste is a result of complex chemical processes, which is why sugary syrup substitutes just can't compare. They can't mimic Mother Nature's chemical know-how. Last year alone, bees in the United States produced a whopping 158 million pounds of honey. That's a lot of chemistry.

Honey is composed mostly of the sugars glucose and fructose. It's what scientists term a supersaturated solution. When sugar is stirred into a glass of water, some sugar is usually left at the bottom. That's because the water (solvent) will only dissolve a certain amount. But, if the water is heated, more sugar can be dissolved. Consequently, in supersaturation, heat, enzymes or other chemical agents can increase the amount of material dissolved. These solutions tend to crystallize easily. Syrup, fudge and honey are all considered to be supersaturated solutions. Because of its supersaturation and low water content (15-18%), honey is *viscous*. That means it is rather thick in consistency and sometimes it's solid. Its main ingredients are carbohydrates (sugars,) but it also contains, vitamins, minerals, amino acids, enzymes, organic acids, pollen, fragrance and flavor compounds.

National Honey Board Photo

All honey begins with nectar. Whereas honey is viscous and has a low water content, nectar is about 80% water. It's a very thin solution- colorless and not nearly as sweet as honey. It's also chemically different. Through the use of enzymes, bees are able to convert the complex sugar in nectar into more simple sugars. This is why honey is more easily digested than regular table sugar. Its sugars (glucose and fructose) are simpler than sucrose (table sugar).

Sugars are sometimes called "sweet carbohydrates." (Carbohydrates are one of the three primary classes of foods, along with proteins and fats.) Some sugars like glucose and fructose are simple, while others such as sucrose (table sugar) are more complex. A honey bee's secret weapon is its ability to change these complex sugars found in flower nectar into simple sugars. This process is called *hydrolysis*. In order to change sucrose (table sugar) into glucose and fructose, heat, acids or enzymes must be added. It's a complicated process in the lab. But, when it comes to honey chemistry, bees (and their enzymes) are far more efficient than scientists.

Because 95 to 99.9 % of the solids in honey are sugars, in order to understand honey, it's necessary to understand sugar. Pure cane sugar is almost all sucrose. It's called a disaccharide and is formed when two simple sugars are joined. That's why it's sometimes called a "double sugar." Sucrose, which is found in nectar, is made of the simple sugars glucose and fructose. These simple sugars are called *monosaccharides*, which means "one sugar." Even though fructose and glucose have the same chemical formula ($C_6H_{12}O_6$), they're two different sugars. That's because their atoms are arranged differently. This difference in atomic arrangement, makes fructose taste much sweeter than glucose. Honey is also slightly sweeter than table sugar, because honey contains more fructose.

Honey bees don't just gather the nectar, they change the nectar chemically. They produce an enzyme called *invertase* in their salivary glands. Enzymes are organic compounds that speed up a biochemical reaction. These enzymes are not used up in the reaction, so they can be used over and over again. After the nectar is gathered by the bee, invertase is added. This enzyme helps change sucrose into equal parts glucose and fructose. It's the beginning of honey. Other enzymes also help honey taste better. *Amylase* is an enzyme that helps break down amylose into glucose. Glucose is easier to digest and it's what makes honey sweeter. Another enzyme, *glucose oxidase*, then breaks down the glucose and stabilizes the pH of the honey. *Catalase* changes hydrogen peroxide into water and oxygen. This keeps the hydrogen peroxide content low. (Even though some people believe that the hydrogen peroxide in honey is what helps preserve it, it's probably due more to its slightly acidic pH and low water content.)

Like any good chemists, bees follow a protocol in order to make honey. Forager bees draw in nectar through their

proboscis (straw-like tongue.) They then add invertase while they carry the nectar. This invertase begins breaking down the sucrose into glucose and fructose in the honey stomach (crop). The foragers then transfer the nectar to the house bees, where more enzymes are added. This enzyme-adding process continues each time another bee picks up the nectar. House bees regurgitate and re-drink the nectar over a 20 minute period, which further breaks down the sugars. When the nectar is about 20% water, it is deposited on the honeycomb, where the bees fan it to speed up the evaporation process and further condense the honey. The bees stop when the water concentration is between 17-18% and move it to its storage location. Thus, through the use of evaporation and enzymes, a supersaturated solution has been formed.

Like any supersaturated solution, honey tends to crystallize. Crystallization occurs when long chains of glucose (polysaccharides) in the honey are broken down. The glucose molecules start sticking to one another usually on a speck of dust or pollen. These glucose crystals then fall to the bottom of the jar. The problem with crystallization is that when the glucose is separated from the honey, the leftover liquid contains a higher percentage of water. Yeast, now with enough water and sugar causes the honey to ferment. That's why honey that crystallizes may ferment more quickly than non-crystallized honey. Temperature can affect crystallization. Honey is best stored above 50°F. Researchers have also concluded that honey removed from the comb and processed with extractors and pumps is more likely to crystallize than honey left in the comb because of the fine particulate matter introduced for crystals to begin on. Other factors that contribute to crystallization are dust, air bubbles, and pollen in the honey. Crystallization isn't always bad. Creamed (spreadable) honey depends upon controlled crystallization. While natural crystallization creates grainy crystals, controlled crystallization creates a smooth and creamy product.

Heating honey can cause chemical changes, as well. Sometimes, honey darkens due to a process known as the Maillard Reaction. Because honey is slightly acidic with a pH of about four, browning can sometimes occur over time. This is because the amino acids in honey begin reacting with the sugars. Caramelization, the browning of sugar, is caused when heating begins breaking the molecular bonds in the honey. When these bonds are broken and then re-form, caramelized sugar is the result. Heat can also affect both honey and high-fructose corn syrup. When fructose is heated, HMF (hydroxymethylfurfural) can sometimes form. HMF is deadly to bees. HMF can form at relatively low temperatures (110-115°F.) If honey bees are fed high fructose corn syrup that's been stored or transported in hot conditions, it might kill them.

Heat and crystallization can also affect the color of honey. Crystals in honey will cause it to appear lighter in color. That's why creamed honey is lighter in color. In nature, the color of honey is usually due to the type of flower nectar from which the honey derived. Consequently, honey collected in the Fall will usually differ in color than honey collected in the Spring. That's because different flowers are in bloom. The USDA classifies honey into seven color categories: water white, extra white, white, extra light amber, light amber, amber and dark amber. Light colors of honey most often have a milder flavor than darker honeys.

Honey is *hydroscopic*. That means it collects moisture. If it's left uncovered, honey will begin to collect moisture from the atmosphere. This extra moisture in the honey will allow the yeast to begin the fermentation process. Normally, honey has a low moisture content which helps in preservation. If, however, its moisture content rises above 25%, it will begin to ferment. That's why collecting capped honey from a bee hive is a good idea. It has a lower moisture content and is much less likely to ferment.

Honey is produced in every state of the U.S. The USDA estimates that there are over 266 million colonies in the U.S. with the average colony producing 59 pounds of honey. What makes these numbers most remarkable is that honey isn't manmade. It's only guided by man. The true chemists in the production of honey are the bees. Their ability to seek out and convert nectar into honey has resulted in literally hundreds of different floral varieties of honey. Those are some sweet statistics. BC

Sharla Riddle is a retired educator and freelance author. She has been named a Huddleston Scholar, Tandy Scholar and RadioShack Science Chair. Her previous articles have appeared in Bee Culture, Teaching Today *and* Gifted Child Today *magazines.*

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All The Buzzz in...

Hello Friends,

Enjoy the last days of the summer.

Bee B.Queen

Bee B. Queen Challenge

Share your artwork with me.

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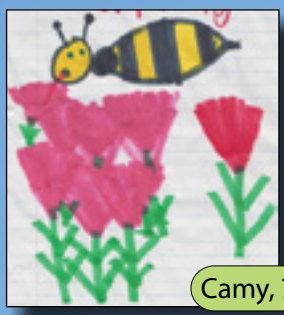

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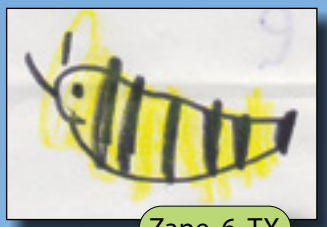

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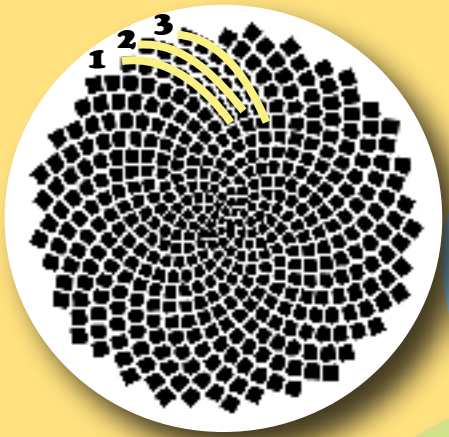
Sunflowers and the Fibonacci Sequence

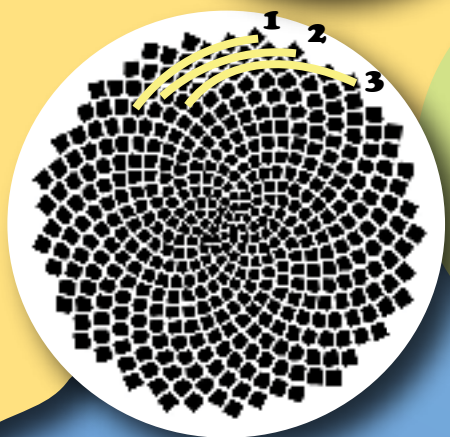
Sunflowers are a composite flower. A sunflower looks like one big flower but really it is made up of two types of flowers called ray and disk flowers. The ray flowers look like petals. In sunflowers, the ray flowers cannot form seeds. The center section of the sunflower is made up of many tiny flowers called disk flowers. These flowers have both male and female parts. Honey bees and other insect pollinators carry pollen from one sunflower to the next. This cross pollination helps the disk flowers to produce seeds. Use a magnifying glass to take a closer look at the ray and disk flowers of a sunflower.

Math and Nature Experiment

Each seed in a sunflower is produced by a single disk flower. The seed patterns on the head of a sunflower regularly correspond to the mathematical sequence called the Fibonacci sequence. Often the number of petals (ray flowers) and the number of seed spirals will be a number in the Fibonacci sequence:
0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89…

1. Pick a large sunflower. Lay it flat on a table.
2. Count the number of ray flowers which look like petals. Write down the number.
3. Identify the seed spirals in the center of the flower.
4. Begin by counting the spirals in a clockwise direction. Mark the beginning point by placing a straight pin in the first spiral. Place a pin at every ten rows to help keep count. Write down the number.
5. Count the spirals going counter clockwise using pins as markers. Write down the number.
6. Look at your numbers. Are any of your numbers a part of the Fibonacci sequence?





Sunflowers make up the genus Helianthus. In Greek, helios means sun and anthos means flower.

Who was Fibonacci?

Leonardo of Pisa was an Italian mathematician known as Fibonacci who introduced Europe to this number sequence.

... Bee kid's corner

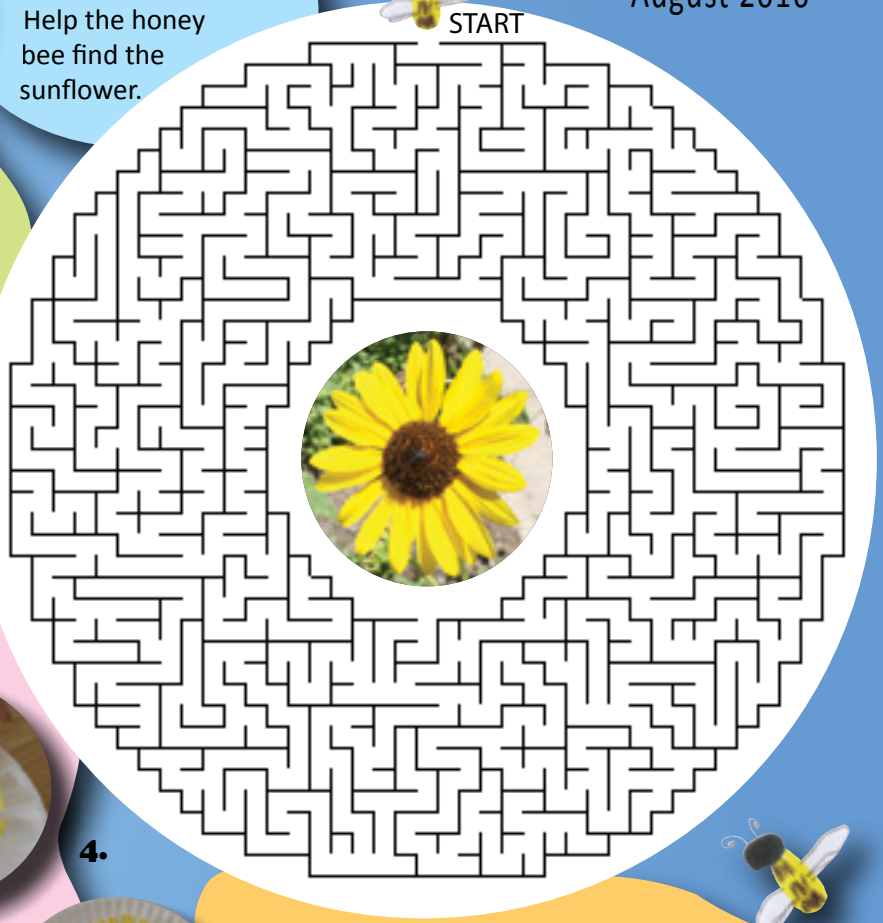
Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
August 2016

Citizen Scientist

Now is your chance to help gather data on pollinators in your area. It's easy!
1. Read all about this project at www.greatsunflower.org
2. Count the pollinators in your yard, garden or community.
3. Report your numbers on the website.
Remember if you see no pollinators enter 0. This is very valuable information.

Sunflower Search

Help the honey bee find the sunflower.



Pollinated Sunflower

Make a pollinated sunflower complete with seeds.

Materials
- yellow cupcake paper
- sunflower seeds
- paper plate
- white glue
- scissors


1.

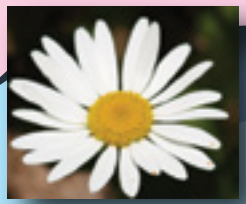
Directions
1. Snip around the outside of the cupcake paper to create ray flowers that resemble petals.
2. Glue the cupcake paper to the paper plate.
3. Drizzle some glue in the center of the cupcake paper.
4. Place seeds on the glue. Allow to dry.
5. Draw a honey bee on the plate since sunflowers provide nectar and pollen to bees.


4.


5.

Math

Decode the Fibonacci number sequence:
0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89…
Try adding two consecutive numbers of this sequence together. Look at the next number in the sequence. Can you see a pattern?



More Fibonacci

Find and count spirals in other natural objects. Are the numbers in the Fibonacci sequence?
- Count the petals (ray flowers) on a daisy.
- Count the clockwise and counter clockwise spirals on the end of a pinecone that was attached to the tree.
- Examine the hexagonal scales on a pineapple. Can you find and count three sets of spirals?

Beecome a Bee Buddy

Send two self addressed stamped envelopes and the following information to: Bee Buddies, PO Box 2743, Austin, TX 78768.

Name
Address
Age
Birthday Month
E-mail (optional)

We will send you a membership card, a prize and a birthday surprise!

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

Pollinator Decline & Self-Medication

Can we help pollinators help themselves?

Rachael **Bonoan**

Pollinators Can Get Medicine from Their Food

While there are plenty of activist groups raising money to help pollinators, there may be something we're missing, something simple that we can do to help pollinators help themselves. Recent research shows that pollinators are able to naturally medicate themselves by using certain plant chemicals – termed secondary compounds – that are found in their main food source: pollen and nectar. If we learn about how pollinators naturally medicate themselves using secondary compounds, we might be able to naturally mitigate their decline.

The use of plant secondary compounds by animals is not new knowledge – caffeine is a secondary compound that we are all familiar with. Though caffeine is toxic to most leaf-eating insects, many other animals (including humans) use caffeine to their benefit. According to Ethiopian legend, the energizing effect of caffeine was discovered by a goat herder named Kaldi. One day, while Kaldi watched his goats, he noticed that after they ate berries from a particular shrub, they became uncharacteristically energetic, frolicking wildly through the pasture. Kaldi tried the berries for himself and found a similar energizing effect; he spread the word and shared the berries with some monks in the area – the monks spent the night awake and alert. Today, we know that in addition to eating plant parts with secondary compounds for energy, many animals eat plant parts when they are sick – this is called self-medication.

Most medicines, whether it be for humans or for butterflies, are derived from secondary compounds. For example, the main ingredient in aspirin comes from willow trees. Secondary compounds are plant chemicals that are not used for growth or reproduction but rather for defense against leaf-eating insects. Leaves have high concentrations of secondary compounds which are toxic to many insects. In contrast, pollen and nectar – the main food sources for pollinators – have low concentrations of these compounds which are toxic to only the microbes that infect pollinators, not the pollinators themselves. Thus, pollinators may benefit from eating certain secondary compounds that are found in pollen and nectar. "Secondary compounds are present in nectar as an unavoidable consequence of plants protecting themselves against herbivores" explains Dr. Leif Richardson, a research fellow at the University of Vermont.

Therapeutic & Preventative Self-medication in Pollinators

There are four types of self-medication that animals use. The simplest types, preventative and therapeutic, consist of the animal directly medicating itself. For example, as a preventative measure, if you know you have allergies and the pollen count is high, you might take an allergy pill before going outside. Therapeutic self-medication is defined as taking medicine once you already have symptoms: you may have forgotten to take that allergy pill before you left the house, so you take aspirin once you get a headache. Preventative self-medication was found in monarch butterflies in the 1980s and more recently, therapeutic self-medication has been found in both bumble bees [1] and honey bees [2].

Monarch butterflies lay their eggs on milkweed plants, but out of the 108 milkweed species found in North America, monarchs only lay their eggs on 27 of those plants. Research in the 1980s by Stephen B. Malcolm and Lincoln P. Brower showed that compared to the other 81 milkweed plants, the 27 plants that monarchs lay their eggs on have much higher concentrations of a certain secondary compound which has detrimental effects on a common monarch disease. Thus, it is likely that monarchs lay their eggs on these specific 27 plants in order to preventatively protect their offspring.

Examples of therapeutic self-medication are found in both bumble bees and honey bees. Bumble bees infected with a common fungal disease, and then fed a sugar solution infused with a secondary compound, ended up with lower parasite loads compared to infected bumble bees fed a plain sugar solution. Moreover, "when you give choices in the lab, infected bees will eat more of the chemical that drives down their parasites." states Dr. Richardson. Similar results were found in honey bees by Dr. Silvio Erler, a molecular ecologist at Martin Luther University in Halle, Germany.

"We show that [honey] bees can in some way self-medicate by selective consumption of honey." explains Dr.

Erler. In Dr. Erler's study, honey bees infected with a common fungal disease were given a choice of various honeys: sunflower honey, linden tree honey, black locust honey, or honeydew. Overall, sick bees preferred sunflower honey. When the different honeys were tested for antimicrobial activity, the sunflower honey killed the most microbes, as expected. Somehow, infected honey bees knew which honey would help their infection. Based on Dr. Erler and Dr. Richardson's work, it is likely that pollinators know what they need to heal themselves.

Honey bees eating honey they had stored in their hive.

Trans-generational & Social Self-medication in Pollinators

The last two types of self-medication, trans-generational and social, are self-medication where the animal is helping its family and therefore ensuring its relatives survive. Ensuring the survival of your relatives is important – you share the same genes. Helping your relatives helps your genes persist in the population. Monarch butterflies medicate their offspring – trans-generational medication – and social bees likely medicate their neighbors in the hive – social self-medication.

When monarch butterflies pass on medicinal compounds to their children, it's the father that is important. Humans, however, passively achieve trans-generational self-medication via the mother. When a mother breastfeeds her child, she is passing on antibodies that her body has made over the years. To examine this effect in monarch butterflies, Dr. Eleanore Sternberg, a postdoctoral fellow at Penn State University, and her colleagues raised monarch caterpillars on one of two plants: "medicinal" milkweed with high concentrations of secondary compounds, or "non-medicinal" milkweed with low concentrations of secondary compounds [3].

Once the caterpillars became adult butterflies, Dr. Sternberg and colleagues mated males and females that were raised on the different types of milkweed. Following matings, the eggs were infected with a parasite that commonly targets both monarch caterpillars and butterflies. No matter the diet of the mother, the eggs that had a father raised on the medicinal milkweed were more resistant to infection than eggs from a father raised on the non-medicinal milkweed. Dr. Sternberg explains "the most interesting aspect is the fact that we do find a paternal effect. There's been quite a bit of interest in what mothers can provide to their offspring in terms of protection from parasites but much less is known about what fathers can provide."

As a social insect scientist myself, I find the fourth form of self-medication, social self-medication, the most exciting. But, it is also the most complex. Social self-medication consists of giving medicine to the people you live with. For example, if your sibling has the flu, you may give him or her medicine. Not only does this benefit you – if your sibling gets better quicker, your sibling will survive, and you might not get sick – but it benefits the rest of your family too: they might not get sick either.

Social self-medication has yet to be found in pollinators but given that bumble bees and honey bees are highly social insects, it is likely that both medicate their young, and neighbors, in the hive. Discussing his research on bumble bee self-medication, Dr. Richardson explains "The really interesting aspect is that [bumble] bees are social, and the workers are feeding the queen and larvae, sometimes the males." In both bumble bees and honey bees, the adult workers take care of their younger siblings (larvae) by bringing food back to the hive and feeding the young. The adult workers also take care of their queen bee, the only female in the colony that lays fertilized eggs, and sometimes their older brothers. Since the workers are the ones choosing which food to bring back to the hive, it is possible that upon an infection of their younger siblings, or the queen, the workers would find the right medicinal food to feed them.

Hence, social medication could reasonably occur in bumble bees and honey bees, but social self-medication is not easy to study; Dr. Erler explains that running hive-level experiments means "we have the environment as a factor including climate, humidity, rain, wind, we have the availability of different food sources, which varies much over the seasons, and we have many more different individuals of different ages." Although difficult to study, it is important to study social self-medication in pollinators – in our fight against pollinator decline, it is much more powerful to keep a whole hive healthy rather than only one individual.

So, what can *we* do to help?

The answer is simple: plant lots of flowers. Monarch butterflies know which plant to lay their eggs on, and bumble bees and honey bees know which flowers to visit when they are feeling under the weather. But, in order to let pollinators get the medicine they need, we have to provide them with choices.

Just as monarch butterflies choose which plants to lay their eggs on, bumble bees also make choices in the field. In nature, "when a [bumble] bee is infected, it forages longer, and on flowers with high concentrations of these [secondary] compounds rather than flowers with low concentrations." explains Dr. Richardson. Thus, sick bumble bees are making a choice – based on their

health – to seek out the best quality medicine.

While aspirin might work for your headache, it will not work for your runny nose; when you walk into a drugstore, you have your choice of which medicine to take. This may also be true for pollinators; sunflower honey worked well against a particular fungal infection in honey bees but a different type of infection may require a different type of medication. Regarding honey bees, Dr. Erler explains that "they should live in natural environments with a high diversity of plants" so that they have access to diverse types of medicines. The same is true for both monarch butterflies and bumble bees.

While there is still more to learn about self-medication in pollinators, when it comes to self-medication, the more choices you have, the more likely you are to find what works. Many beekeepers medicate their honey bee hives with expensive chemicals and man-made compounds but it is likely more productive, and definitely less expensive, to simply plant more flowers and let the pollinators make the best choices to naturally medicate themselves.

1. Richardson, L.L., et al., *Secondary metabolites in floral nectar reduce parasite infections in bumblebees.* Proceeding of the Royal Society 2015. 282(1803).
2. Gherman, B.I., et al., *Pathogen-associated self-medication behavior in the honeybee Apis mellifera.* Behavioral Ecology and Sociobiology, 2014. 68(11): p. 1777-1784.
3. Sternberg, E.D., J.C. de Roode, and M.D. Hunter, *Trans-generational parasite protection associated with paternal diet.* Journal of Animal Ecology, 2015. 84(1): p. 310-321.

BIGGER PICTURE

Jessica **Louque**

Sage Advice

We've chosen a lot of really cool plants to see what works for our bees this year. On some of them, we did a lot of research, while others were just speculation that they might work as a good pollen or nectar source. Some were just really pretty and I'm hoping the bees like them. As with most research endeavors, if there's a book about it, I've got an excuse to add to the library. In this case, I found a really cool series of books that have titles starting with "*The Plant Lover's Guide to* _____" and each book covers a different plant group. The reason I found it was because I was looking for information on salvia, and lo and behold! There's a guide to salvias!

Earlier in the year, I mentioned the blue pollen garden we were trying to grow. It sort of turned into a "hey that's blue, let's try it" thing. I've learned in my research that while a lot of plants have been cultivated to produce showier flowers at the expense of their nectaries, salvia has been able to maintain its nectar and pollen supply in sufficient levels to attract pollinators. They are also modified based on their indigenous area to maintain a mutually beneficial relationship with their expected pollinator. Old World (Europe/Asia based) salvias are adapted to bees, while New World (Americas) salvias are more adapted to hummingbirds. They have something really cool called a stamina lever mechanism, which is similar to the trigger in alfalfa. It basically causes the pollinator to get bopped in the head or the back with the stamen to move pollen to the next flower. In a honey bee's case, they usually only visit to collect nectar, but will take pollen after the trigger has been activated by a pollinator that doesn't mind getting the head bop. Salvia has emerged as a little less harsh than the trigger in alfalfa, with more of a gentle brushing of the anthers in an unavoidable area that will neatly end up on the pistil of the next visited flower. This lever mechanism is not specific to honey bees, and is sort of a "generic" version that also works on other bees as well as hummingbirds. Once the pollinator leaves the flower, the stamen will go back to their original position.

Getting into a little botany, we will follow the ancestry of salvia. If we skip along the branches of botanical naming, we see the family for salvia is *Lamiaceae*, the mint family. The *Salvia* genus is the largest group in the family, and all salvia species have the characteristic square stems, opposite leaves, and bilateral symmetry that all the species in the mint family share (like bee balm). One difference here is that there are only two stamen instead of the characteristic mint family four. There are hundreds of species and varieties available for purchase as well as wild growing, and adapted to nearly every climate that is even mildly hospitable to plant life. Most are not particularly cold tolerant, but can be drought tolerant. They can also be called by various names. In general, a species used for culinary or medicinal purposes is referred to as "sage", while an ornamental version is usually called "salvia". Medicinally, salvia is known for improving digestion, antioxidants, and helping with mood and brain function.

When I started buying seeds, I immediately fell in love with one particular species of salvia on Johnny's Seeds website. The Victoria Blue salvia, *Salvia farinacea*, is a gorgeous deep blue color, drought and heat tolerant, and can survive in poor soil. Another purchase (because how could you just by one packet of seeds? I mean, isn't that a waste of shipping?) in this order was *Salvia elegans*, which is purported to smell like pineapple when you crush the leaves and has fruity tasting flowers that are good in salads. There was also *Salvia viridis*, a mixed pot of vividly colored flowers that are also mildly sweet and perfectly edible, and also used in flavoring beer and wine. I had to buy some *Salvia officinalis* because hey, it's not the real deal until it has "official" in its name, but we do have it growing wild here, or at least some variation thereof.

Once I stopped my Johnny ordering, I skipped over to Outside Pride. They do not guarantee organic seeds like Johnnys, but they do have a large variety of flowers. They sell clary sage, *Salvia sclarea*, which is one of the few biennials we're trying. Normally, salvia starts to get woody and gross after a few years, but the

A field of clary sage being used as a backyard.

A field of clary sage in easter NC.

biennials don't even bloom until the second year. I didn't realize what a crop this was until I was driving to the eastern NC coast to deliver bees, and every field was full of clary sage. A friend of mine had just asked me if I had seen the fields yet, and that I would know because you can smell it in your car just driving by. I'm glad he told me or I might not have been able to tell just from going down the highway (or my rage at inconsiderate drivers swerving towards my trailer impacted my ability to focus on such things). You could definitely smell it, but it smells a lot like cat pee and flowers to me. Not just regular cat pee, but when your cat gets mad at you and pees in your shoe (just one of them) and you don't know until you wear them a week later and can't figure out why this dirty cat pee smell is following you. We probably passed over 50 acres of clary sage in about 10 miles.

Indigo salvia with our bee balm.

Besides the clary sage, I decided to spice things up with scarlet sage, which is *Salvia coccinea*. "Coccinea" comes from the Greek word "kakkos" which was used to describe red foliage from oaks in the fall. Now, it is used as the species name for almost any scarlet-hued plant. In some cases, I suppose it also relates to animals, such as cochineal scale insect that produces carmine (the "natural" red dye in food).

Because we're shooting to follow the blue theme, the *Salvia pratensis* was the next purchase since it was blue, but by the description, it appeared to be more attractive to pollinators while also needing more attention than the others so far. It had to be deadheaded like petunias to keep bloom progression throughout the Summer.

If you are interested in adding some easy to grow plant life to your yard that is bee attractive, there are some immense choices here with sage. I would definitely recommend the Salvias guide, as well as some general botanical research to see what is best in your area. *The Plant Lover's Guide to Salvias* also has a whole section on different species and their suitability to different areas. It also includes lists for what salvias are best in different kinds of gardens, such as rock gardens, container gardening, borders, and even attracting pollinators! One bee attractive sage was *Salvia mellifera*, which would immediately indicate a correlation with honey bees! On a weird note, it's called Black Sage but the flowers are white, and it pretty much only grows in southern California. Otherwise, there are gorgeous photos of all the species listed in the book, as well as hardiness, origin, cultivation, and landscape use for each one.

I have to say that I've learned a lot with my salvia searching. For instance, I didn't realize that the little purple flowers that pop up in patches around the yard and our field were salvia. I knew they were "minty" because of the square stems (pretty hard to ignore as a common characteristic), but I never took the time to think about what they were. We also grow Indigo Spires salvia in a small bed with scarlet bee balm, and somehow it never occurred to me that they were practically cousins until looking this up. Something that was more of an observation was that one of the pictures in the book shows a bee with pollen baskets that has a caption about the bee getting nectar, which is obviously not true since it has pollen baskets. This is really cool though because it shows a propensity to collect pollen (it was not blue pollen, FYI) from plants with a lever mechanism.

Overall, I think these will be some really cool plants to add to your garden. They grow fast, produce for an extended season, offer bright colors, and are attractive for multiple pollinators. They can last for years with a lot of care, or they can last for a few years if you ignore them like I plan to do. If you change your mind a lot about what you like, then you can just till them back in for nitrogen (and a temporary pleasant smell, if you like it). There're multiple medicinal uses for sage if you're interested, or you can just admire them from afar post-planting. These plants offer multiple benefits with a pretty low input on the gardener's end, and would be a great addition to any home! BC

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

The Pollinator Stewardship Council

BOARD MEMBERS ROLES AND RESPONSIBILITIES

Supporting the Mission and growing the Bee Club.

Michele **Colopy**

There are plentiful resources available for Board members to learn how to be good Board members. Your Secretary of State or Attorney General, where you must register and submit your bee club's annual reports, has guides for Nonprofit Board members. These Guides for Board members are readable, and advise your group how to be responsible and legal. "The responsibilities center on paying attention, being good stewards, and acting in the best interest of the

organization. Board members are guardians of the trust, serving on behalf of the community, regardless of personal interests. These duties apply whether or not the group is formally incorporated. They apply whenever an organization presents itself to the public as honoring or advancing a charitable cause. Trustees have the same obligations to their organization whether the group's budget is $100 or $100 million."[1]

"Charities are required by law to have board members to ensure integrity and accountability in their governance."[2] Today's beekeeping associations contain a diverse skill level within its membership, and members need to be appreciated, respected, and *asked* to lend their skills, experience, and knowledge to sustain and improve the bee club. If we accept the responsibility of being a Board member of an organization, we agree to working with others to promote, protect, and provide for the organization. No matter a fellow Board members' age, gender, life/work/beekeeping experience, or race, beekeeping association Board members must treat each other with the respect you wish to receive. How you treat your fellow Board members reflects your value of the organization. "Board members bring new ideas into organizations, provide oversight and guidance on mission and objectives, and help a successful group remain relevant and healthy. The lack of an active and engaged board can doom the future of a nonprofit organization."[3]

"Organizations seek community members to serve in this capacity for several reasons, including:

- Honoring an individual's previous volunteer services or commitment to those the charity serves.
- Adding credibility to the board through an individual's management and business skills.
- Strengthening an organization through an individual's significant contacts.
- Increasing the variety and level of skills on the board."[4]

"Directors and board members should:

1. Prepare for board meetings by reading and reviewing reports, minutes, and other materials distributed for the meeting.
2. Attend board and committee meetings and record all actions taken or decisions made.
3. Ask questions and obtain the information necessary to make informed decisions.
4. Review the performance of the charity's executive director or chief executive officer.
5. Exercise independent judgment rather than blindly follow the staff's requests.
6. Oversee the executive director and ensure that the charity's purposes are fulfilled efficiently and follow sound business standards."[5]

Most importantly, when managing public funds or member funds, bee club board members must be responsible stewards of the organization's funds. "Donors and the public place their trust in board members, and regulators are watching. Even if funds are not being diverted from a charity, the public can lose faith in an organization that doesn't appear accountable."[6]

"Duties of board members include:

- **Duty of care** – This involves being active in the organization's activities and understanding its mission.
- **Duty of loyalty** – Board members must acknowledge that the interest of the charity and its work must be the top priority. Charitable boards should develop and follow conflict of interest policies to avoid transactions that unfairly enrich the charity's leaders.
- **Duty to manage accounts** – A charity must be fiscally accountable. Board members must track budget data and establish and monitor internal controls.
- **Duty of compliance** – Charities have important legal obligations. Board members must ensure that their charity follows registration requirements, solicitation laws and tax provisions." [7]

"Failure to follow through on the legal duties of board membership can have devastating consequences for a charitable organization. There also may be civil or criminal penalties levied against board members who shirk their responsibilities, particularly in situations in which they have benefitted from their action or inaction."[8]

"Board members who know the facts, analyze the probable result of their actions, exercise sound judgment, and keep reasonable records fulfill their duty of care. Those who are regularly absent from meetings, who are inactive, or who fail to conduct adequate research prior to making decisions do not."[9]

Most *national* nonprofit

organizations require "Standards for Excellence" from their affiliate groups. The Ohio Association of Nonprofit Organizations (OANO) offers a certification program to nonprofits, for a fee, which covers eight areas of nonprofit operations:

- Mission and Program
- Governing Board
- Conflict of Interest
- Human Resources
- Financial and Legal Accountability
- Public Accountability
- Fundraising
- Public Policy and Public Affairs

"With 58 performance Standards covering a broad range of best practices under each of these operational areas, such as how often an organizations' board of directors should meet, what subjects should be covered in personnel policies, how often financial statements should be prepared, etc."[10] these are helpful standards to ensure a quality, reputable organization. Whether you have a state organization that provides guidelines for nonprofit standards or national groups such as the Standards for Excellence Institute (**https://standardsforexcellence.org/home-2/code/**), The National Council of Nonprofits (**https://www.councilofnonprofits.org/tools-resources/principles-and-practices**), or The Independent Sector (**https://www.independentsector.org/compendium_of_standards**), information is available and accessible to protect, guide, and advise Board members.

Now that you have Board members how do you keep them, and maintain a strong, educated, mission-focused Board? The Ohio Attorney General in their "Guide for Charity Board Members" advises the following to keep a board strong:

- "Ensure diversity in board membership
- Members should look for ways to recruit community representatives who have an interest in the charity's mission and represent diverse viewpoints or skill sets.
- Set term limits
- Consider term limits and rotation off the board or to other assignments as a

means of avoiding stagnation, tunnel vision, and the perception that the board is merely an insiders' club.

- Set a schedule to review operations
- Many groups orient new board members by reviewing governing documents, budgets, programs, and policies. Some do annual assessments of how the board is operating and whether the group is adequately addressing all necessary issues.
- Develop a strategic plan
- Boards may elect to engage in strategic planning to analyze the organization's strengths, weaknesses, opportunities, and threats. This analysis often can uncover areas for improvement and help focus the board's policy-setting responsibilities."[11]

To find resources in your state for Board members begin with your Secretary of State or Attorney General for Board member webinars, guides, and other instructional materials, as well as to register your nonprofit. Boards do not want to commit any of the 15 governance mistakes of Boards such as *Avoiding The Hard Questions, Insufficient Conflict Management, Lack of Awareness of Laws Governing Tax-Exempts, Operating with Outdated, Inconsistent Governing Documents, Airing Disagreements Outside the Boardroom, and Failing to Educate and Motivate Board Members.*[12] (see the full list at **http://charitylawyerblog.com/2009/10/05/top-15-non-profit-board-governance-mistakes-from-a-legal-perspective/**)

It is the responsibility of Board members to protect the organization, fulfill its mission, and represent the organization (and therefore all of its members) to the best of their ability. This is their duty of care, management, loyalty, and compliance.

Supporting the Mission and Growing The Bee Club

The mission of a nonprofit guides the organization and the Board of Directors in the goals, programs, and activities of the group. Generally, beekeeping associations are member organizations which support educational activities for its members and the public relevant to honey bees and beekeeping. As a membership nonprofit with the broad mission of education and support of beekeeping, most nonprofit beekeeping associations will not advocate for one style of beekeeping management, one race of honey bees, one method of treatment(s) for pests and pathogens, one type of harvested honey, etc. When a nonprofit is created for specific breeds, care and management type, and specific type(s) of end products, those are a different IRS classification: 501(c)(6) for Business Leagues as opposed to 501(c)(5) for Agricultural and Horticultural Associations, or even a 501(c)(7) for Social and Recreational Clubs. Your mission defines your IRS classification.

The Foundation Center defines the mission statement as providing "an overview of the group's plans to realize that vision by identifying the service areas, target audience, and values and goals of the organization."[13] The mission statement establishes "the long-term direction that guides every aspect of an organization's daily operations."[14] The goal of the Board of Directors is to work toward fulfilling the mission. *Ron Meshanko of Ecumenical Resource Consultants in Washington, DC advises "*A Mission Statement should be a one-sentence, clear, concise statement that says who the agency is (the name, that it is a nonprofit, and what type of agency it is), what it does, for whom and where. Period."[15] Mission statements are used in marketing, grant writing, volunteer recruitment, and can quickly convey to anyone what your organization represents.

Once the mission is set, goals and objectives may change based on current situations. Educating beekeepers in 1960 conveyed the honey bee health issues of 1960. Educating beekeepers post *Varroa* conveyed the honey bee health issues of the 1990s. Each beekeeping organization, however, continued to fulfill its mission of "educating beekeepers."

The mission of the beekeeping association is what governs the activities, programs, and actions of the group. Leadership of any nonprofit cannot insert their own personal political affiliation, faith, beekeeping management techniques/treatments, or preferred race of bees upon the association and its members. When a single leader or a few leaders rule the bee club for years, dictate to the membership a singular style of beekeeping management, hive treatments, and even products and equipment, they have violated the nonprofit's mission.

Growing a beekeeping

association will only occur with change, diversity, different ideas, and programs. Leaders must be open to growth (also known as change), and welcome it. Only through change of leaders, knowledge, and ideas will a beekeeping association have a full and vibrant life serving many generations of beekeepers.

William J. Moran, J.D., M.S.Ed. lists "12 Attributes of Great Nonprofit Leaders." "No one has all of these traits, but they are something to aspire to as we admire the brave hardy souls who lead our nonprofits.

1. **Self Starter.** Great executive directors are goal driven and possess a high degree of motivation and energy. They are "doers." They have a record of productivity.
2. **Passion for the Organization's Mission.** They are "driven" by the importance of the organization's mission.
3. **Ability to Accept and Motivate Others.** They have the ability to attract and inspire others, including volunteer board members and staff. They are open to and accept many different types of people.
4. **They are "Servant Leaders".** They are more concerned about what they can "give" to others rather than what they are going to "get" from the organization.
5. **Deals Well with Conflict.** They can handle adversity with grace. They do not take criticism personally. They keep a sense of perspective.
6. **Think Strategically, but Implement Tactically.** They see the big picture but are able to implement plans effectively in "bite-size morsels" to move the organization forward.
7. **Financial Acumen.** They understand finances. They know how to budget. They recognize both financial opportunities and threats.
8. **Fundraising Skills.** They have knowledge and experience in fundraising techniques, including major gift fundraising.
9. **Ability to listen.** They know how to actively receive input and listen to other viewpoints. They collaborate with others.
10. **Sound Judgment.** They have the ability to sift through alternatives, deliberate, and then arrive at a sound decision.
11. **Persistence.** They do not let obstacles stand in their way and can persevere through difficult times for the organization.
12. **Stamina.** They have physical and emotional stamina. They are able to tolerate long days. They can carry on a full day of back-to-back meetings and still function at an acceptable level."[16]

Integral to a quality, welcoming, long-lived nonprofit are those **"Servant Leaders."** "They are more concerned about what they can "give" to others rather than what they are going to "get" from the organization." Motivations vary for anyone who "runs for a leadership role." However, those "leaders" who dictate to the membership a singular beekeeping management style (theirs), who "encourage" the club's membership to buy only the leader's beekeeping equipment or honey bees, and who use the nonprofit to secure non-taxable grant funds to provide them with funding for research or their own bee business start-up are only serving themselves. These leaders are not serving the beekeeping organization's mission, or their fellow beekeepers. These leaders expect to be rewarded, and rationalize that any money the bee club gets should be theirs as they did all of the work. These self-serving leaders become problematic when their fellow Board members focus upon the mission, attempting to restore organizational ethics, thereby threatening the "control" of the "self-serving" leader.

Authors Deborah L. Rhode & Amanda K. Packel discussed Ethics and Nonprofits in the *Stanford Social Innovation Review*.

"Ethical challenges arise at all levels in all types of organizations – for-profit, nonprofit, and government – and involve a complex relationship between individual character and cultural influences. Some of these challenges can result in criminal violations or civil liability: fraud, misrepresentation, and misappropriation of assets fall into this category. More common ethical problems involve gray areas – activities that are on the fringes of fraud, or that involve conflicts of interest, misallocation of resources, or inadequate accountability and transparency."[17]

"Research identifies four crucial factors that influence ethical conduct:

- *Moral awareness: recognition that a situation raises ethical issues*
- *Moral decision making: determining what course of action is ethically sound*
- *Moral intent: identifying which values should take priority in the decision*
- *Moral action: following through on ethical decisions."*[18]

"People vary in their capacity for moral judgment – in their ability to recognize and analyze moral issues, and in the priority that they place on moral values. They also differ in their capacity for moral behavior – in their ability to cope with frustration and make good on their commitments."[19]

Cognitive biases can compromise these ethical capacities. Those in leadership positions often have a high degree of confidence in their own judgment. That can readily lead to arrogance, overoptimism, and an escalation of commitment to choices that turn out to be wrong either factually or morally.[19] *As a result, people may ignore or suppress dissent, overestimate their ability to rectify adverse consequences, and cover up mistakes by denying, withholding, or even destroying information.*[20]

"A related bias involves cognitive dissonance: People tend to suppress or reconstrue information that casts doubt on a prior belief or action. Such dynamics may lead people to discount or devalue evidence of the harms of their conduct or the extent of their own responsibility. In-group biases can also result in unconscious discrimination that leads to ostracism of unwelcome or inconvenient views. That, in turn, can generate perceptions of unfairness and encourage team loyalty at the expense of candid and socially responsible decision making."[21]

A study highlighted by authors Rhode and Packel provides insight into large and small group dynamics be they nonprofit or corporate structures.

"Moral blinders are especially likely in contexts where people lack accountability for collective decision making. That is often true

of boards of directors – members' individual reputations rarely suffer, and insurance typically insulates them from personal liability. A well-known study by Scott Armstrong, a professor at the Wharton School of the University of Pennsylvania, illustrates the pathologies that too often play out in real life. The experiment asked 57 groups of executives and business students to assume the role of an imaginary pharmaceutical company's board of directors. Each group received a fact pattern indicating that one of their company's most profitable drugs was causing an estimated 14 to 22 "unnecessary" deaths a year. The drug would likely be banned by regulators because a competitor offered a safe medication with the same benefits at the same price. More than four-fifths of the boards decided to continue marketing the product and to take legal and political actions to prevent a ban. By contrast, when a different group of people with similar business backgrounds were asked for their personal views on the same hypothetical, 97 percent believed that continuing to market the drug was socially irresponsible.[22]"

Whether it is a nonprofit, volunteer setting, or a corporate workplace environment the ethical climate of the organization sets the tone for everyone in the organization. Volunteers, staff, and Board members *"respond to moral cues from peers and leaders. Virtue begets virtue, and observing integrity in others promotes similar behavior."* "There are six areas in particular where ethical issues arise in the nonprofit sector: compensation; conflicts of interest; publications and solicitation; financial integrity; investment policies; and accountability and strategic management."[23]

"Although no set of rules or organizational structures can guarantee ethical conduct, nonprofits can take three steps that will make it more likely."[24]

1. Ensure Effective Codes of Conduct and Compliance Programs

2. Promote Effective Financial Management

3. Institutionalize an Ethical Culture

"In its ***National Nonprofit Ethics Survey****, the Ethics Resource Center categorizes an organization as having a strong ethical culture when top management leads with integrity, supervisors reinforce ethical conduct, peers display a commitment to ethics, and the organization integrates its values in day-to-day decision making. . . No organizational mission statement or ceremonial platitudes can counter the impact of seeing leaders withhold crucial information, play favorites with promotion, stifle dissent, or pursue their own self-interest at the organization's expense."[25]*

How can you as a nonprofit beekeeping association leader support the mission and your organization? Beekeeping Association leaders, and prospective leaders "should be willing to ask uncomfortable questions: Not just "Is it legal?" but also "Is it fair?" "Is it honest?" "Does it advance societal interests or pose unreasonable risks?" and "How would it feel to defend the decision on the evening news?" Not only do leaders need to ask those questions of themselves, they also need to invite unwelcome answers from others. To counter self-serving biases and organizational pressures, people in positions of power should actively solicit diverse perspectives and dissenting views. Every leader's internal moral compass needs to be checked against external reference points."[26] BC

Michele Colopy is the Program Director for the Pollinator Stewardship Council. She holds a Master's degree in Arts Administration/Nonprofit Management from The University of Akron, and has created, revitalized and held leadership roles in nonprofit organizations for 20 years.

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[23]Ibid

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[25]Ibid, page 7

[26]Ibid

picture from the **www.councilofnonprofits.org**

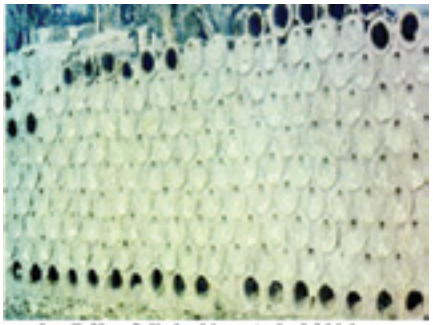
Are Beekeepers More Adaptive Or Inventive?

Jim **Thompson**

Have you ever wondered how beehives, hive tools and bee keeping procedures developed? The first reference to honey bee hives that I could find is in Psalms 81:16 and Deuteronomy 32:13 which mention that "honey came out of the rock". Reading elsewhere, I read that this meant that the bees were living in the clefts of the rocks and elsewhere in the hollows of trees. Thus one has to wonder if the bees were *dorsata* or Italian, but there is no way to really tell. The *Apis Mellifera dorsata* is known to live in cliffs and the *Apis Mellifera ligusticia* usually pick trees as one of their places to live.

Logically the next reference to bees would be in Egypt where bees were kept in cylindrical hives made of mud or clay. Here there is some question as to the size of the hives as one source mentions that the cylinders were 38 cm long and 7.8 cm diameter and had been fired. Another source said that the hives were 80 cm long and 44 cm diameter and were raw or unfired. The smaller hives could be stacked in rows up to eight cylinders high whereas the larger hives were located in one area and about 100 were found. What type of bee would normally live in a clay cylinder? A further report mentioned

Small Egyptian Cylinder hive showing entrance hole



Small Clay Cylinder hives stacked 8 high

that some bees lived in inverted straw baskets covered with mud. The bees had a mean temperament, so the beekeepers would shave their heads to avoid upsetting the bees from the oil of their hair. They wore nothing on their heads and relied on smoke to calm the bees. The small mud cylinders or tubes had an entrance hole at one end and the other end could be opened for harvesting the honey. The honeycombs would be scraped out, crushed, and strained through cow skin. The honey was then stored in sealed clay pots. The hive tools appear similar to some of the Top Bar hive tools of today.

Beekeeping was done in Europe, Asia, and Africa, but most of the recorded literature on bees came out of Europe.

Honey bees were not native to America and the first accounting of honey bees was on a ship's manifest of 1622.

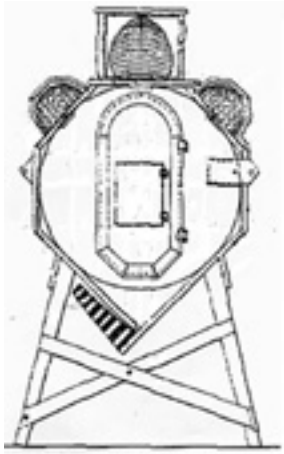
In America in the 1700s, did someone just happen to have a wicker basket and catch a swarm and turn it upside down or did they know about the mud covered baskets of the

Tools for mud cylinder hives

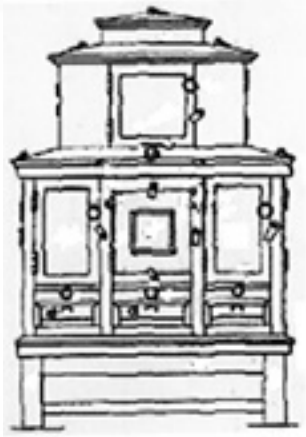
Hackle on a skep to keep off the rain

Egyptian time or the skeps that were used in Europe? The first of these "new" skeps had an entrance at the bottom, or was it just a coincidence that there was a break on the rim of the basket? On later skeps a hole was cut midway up the skep for the entrance. Maybe someone found that the lower entrance became plugged with debris. We notice that someone made a skep cover called a hackle, only to be outdone by a structure built to house skeps called a bee bole. Were these inventions or the copying of ideas? To harvest the honey from a skep, the bees would be killed and the honeycomb and honey taken. In later years, skeps of the same size were made and the bees were drummed from one skep to the other. This was an improvement as long as the skeps were located in a climate that never got cold and was lush with plants. Other skep features were skeps that were made in the shape of figures and

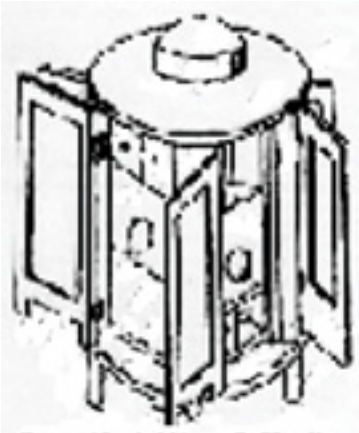
Bee Boles in Tolquhan Castle



Bee Hive W. Greve June 12, 1835
Patent No. X8,875 Drawing only recovered from fire

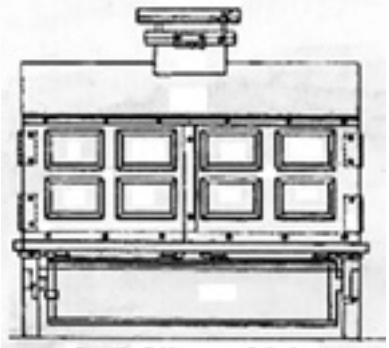


Patent No. 2,692 H. Hiser
Bee Hive June 27, 1842



Patent No. 3,664 L. Hamlin
July 13, 1844 Bee Hive
(actually 6 triangluar hives)

Pat. No. 4,343 A. Colton Bee Hive
Sectional view of a converted dresser
December 31, 1845



Pat. No. 7,991 A. J. Surles
March 18, 1851 Bee Hive
(actually 4 hives)

skeps with smaller additional skeps which could be used as honey supers.

The next beehives seemed to be gums, logs, and boxes. These could be as simple as cutting a section out of a tree that contained bees or to hollow out a log for the bees. Of course all of these items were various shapes and sizes and made it difficult to see what was happening inside. Sticks were jammed in the top of the gums or logs and the bees would use them for the guides for the combs. To harvest the honey, you would have to use a knife or a tool that could reach as far as you wanted to cut out the honeycomb. Beekeepers using a plain box allowed the bees to build their comb in any direction that the bees wanted.

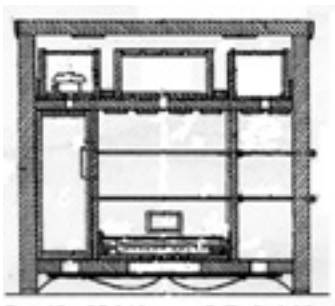
In 1852 Langstroth harnessed bee space, which led to the invention of the moveable frame. I won't rock the boat here, but Langstroth was familiar with Huber's leaf hive of 1789 and the work of Dzierzon because Sam Wagner translated Dzierzon's writings for him. So Langstroth developed five different hives which all used the same size frame. It is very interesting that the size of the "Langstroth" frame is basically the same size as the Hoffman frames, only with longer ears. However the original Hoffman frame was thinner. Now did Hoffman copy Langstroth or vise versa? When Langstroth built his hives, he used packing crates that had been discarded. Since he used a sliding table saw, it was more convenient to make the height of the boxes the same height as the crates and the joints of the boxes were butt joints. Thus we got standardization of the deep supers and frames until the lumber sizes changed in the 1950s.

Because bee space was defined and frames were now being used, many types of bee hives were developed. Many of the frames were made to fit a particular cabinet, dresser, or hive. Since they didn't have the foundation for the frames, the beekeepers would use frames that had a "V" on the top bar.

Some hives had a pointed or very sloped bottom. For those hives it was necessary to have legs to keep them upright. The hives with the pointed bottom offered excellent drainage of moisture and debris. However, many of these hives had frames that fit only certain places in the hive. This probably is the reason that books mention that you should not move frames around.

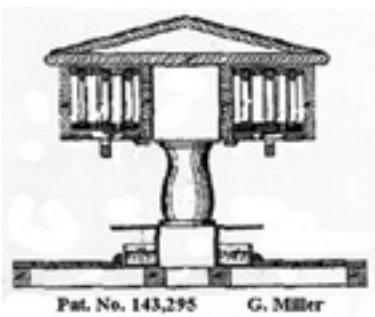
The slanted bottom board may have led Walter Diehnalt to develop the sloped bottom board. Its main purpose was to eliminate moisture within the hive. It never really caught on. Perhaps beekeepers would support the hive from the bottom board rather than the side rails and the hive would tilt backward.

According to my records, there were 1,119 beehives patented between April 11, 1810 and October 2009. Only 80 of the hives were patented before Langstroth was granted his patent October 5, 1852, but afterwards there were 822 patented beehives up to March 7, 1916 when

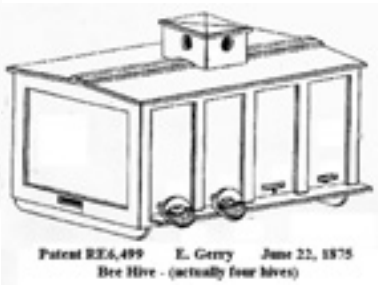


Pat. No. 37,310 J. B. Strickler
Bee Hive January 6, 1863

Pat. No. 117,815 Reeve & Parker
Bee Hive August 8, 1871
(Eight hives with frames)



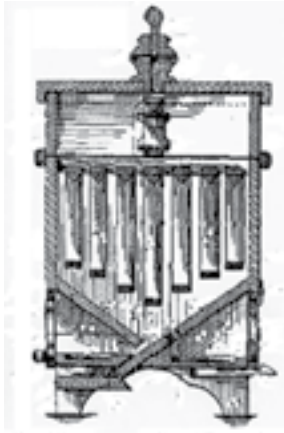
Pat. No. 143,295 G. Miller
Bee Hives September 30, 1873
(Appears to have been a table)



Patent RE6,499 E. Gerry June 22, 1875
Bee Hive - (actually four hives)

Pat. No. 197,481 J.H. Light
Bee - Hive November 27, 1877

Pat. No. 219,134 M. Wright
Bee - Hive September 2, 1879
(may have been sewing machine cabinet)



Bee Hive Pat. No. 396,724
Beeson & Hirschfeld Jan. 29, 1889

Sectional View of Hershiser Ventilated hive stand and bottom board. Gleanings in Bee Culture January 15, 1905 page 74

Danzenbaker was given his patent. Now I know that a person must make some changes and refile the patent to keep it current so the actual number of different patents is less than what I have stated, but it shows that there were several "inventors" that got their inspiration elsewhere. However there are several independent thinkers among the inventors.

There were hives with gabled roofs, finials, drawers, and working doors. These were probably so fancy that no one wanted to make one to use. There were hives that were Bee Condominiums, maybe the forerunner for two, three, four, and eight hive systems. It used to be that a patent didn't really have to work. Some patents will have a different nomenclature to avoid duplication of another's idea. A beehive could be a skep, gum, hive, moth trap, or any other set of words to make it a different patent. Sometimes a device may be identified for what it does rather than the commonly accepted name. One reason that a person will do such a thing is to "update" the patent so it is good for another term of years or to fool the inspectors that this is a completely different patent. Thus if you look through the various patents, you will see many similarities.

In 1905 there was a hive that featured a ventilated bottom board and stand. In the patents, you may see hives, tops, bottom boards and bee suits that are ventilated.

In 1907 the ideal hive tool and the Sawyer bee knife were introduced. Could these have been the forerunners of some of today's hive tools?

In 1908 there was a hive that you could harvest the honey without going into the hive. It employed a vacuum pump to draw the honey from the hive. I suspect that there were problems in removing honey before it was ripe, and filtering the honey so it didn't have wax and bees along with other things.

In 1909 the A.I. Root Company made several different sizes of extractors because there were several different types of hives being used. Newer types of radial extractors were made to spin the frames as spokes of a wheel. These radial extractors will accommodate most sizes of frames.

Charles Muth of Cincinnati, Ohio is given credit for developing the "Muth" jar. In my collection of honey jars, I have similar jars that were produced by I.J. Stringham, of New York City and a jar by Mr. Pounder. There may be some slight differences, but the jars sure look alike. Both Muth and Stringham advertised jars for sale in the 1901 issue of *Gleanings in Bee Culture*. In later years the Muth jar was reproduced and carried a mold mark of Honey Acres but it is now in production with still a different manufacturer.

There are many more things that have received patents and in later years you may notice that similar items are made, which makes one wonder if it really is an original thinker or someone has noticed a previous idea and made some changes. BC

Ideal Hive Tool

Listed as a bee knife
Patent 865,062

Jim Thompson is an avid historical beekeeping equipment and book collector living in Smithville, Ohio.

References:
Gleanings in Bee Culture, January 15, 1905, pages 74 to 77
Various Patents
Egyptian Bee Hive images, internet

Got A Question?

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He Knows!

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www.philcrafthivecraft.com

A beekeeper in Kentucky writes:

If I take honey supers off to treat with Apivar, what is the best way to handle the supers during the waiting period? The frames won't all be harvestable. How best to store them?

Phil replies:

The label instructions for many *Varroa* control products, including Apivar, caution that honey supers must be off the hive during treatment and for a certain period afterwards. Most beekeepers time applications of these products for early Spring, before supers are on the hive, or (as is my practice) for later in the Summer after they are removed. My advice to you is to do an alcohol wash, if you have not already done so, to determine what your mite load is. If the infestation is light and you can afford to do so, the simplest thing would be to wait until after you harvest honey and treat then. For a moderate mite count, you could consider using an interim application of a miticide which can safely be used with supers in place. Having knocked down the numbers sufficiently, you could then follow up with Apivar after taking your harvest. If you have a serious infestation which requires immediate, effective treatment, then the problem of storing the supers requires some serious consideration.

Wax moth damage. (photo by Mary K. Parnell)

The first concern in storing any drawn wax comb is damage from insect pests, in particular wax moth and small hive beetle larvae. In the Summer, these pests are so prevalent in hives in that any comb left unprotected is likely to be quickly invaded and destroyed. Even comb that appears to be pest free may contain eggs of one or both. In the hive, hatching moths and beetles are removed or contained by honey bees, but once comb is taken off and stored, it is vulnerable to damage. Beekeepers who sell comb honey often freeze it after packaging to destroy any wax moth eggs which might be present. The appetizing appearance of clean, white wax filled with sweet amber liquid is significantly marred by the presence of wax moth larvae crawling about on the same wax in a store display or on a kitchen shelf. To protect the wax in extracted and stored honey supers, many beekeepers use the chemical paradichlorobenzene, sold by beekeeping supply companies as Para Moth. (See the caution in my other answer in this article.) However, Para Moth is not suitable for use on comb which contains honey for human consumption. Another method beekeepers sometimes use is to stack stored honey supers in a room, kept well lit 24 hours a day, in a crisscross fashion which allows light to penetrate into all the boxes. Wax moths prefer to lay their *eggs in dark corners.*

The problem you have posed, that of storing frames of comb *with* honey, is more complicated, especially since you describe some of the honey as unharvestable. It sounds as though some of it might be uncapped, with a moisture content above 18%. One of the wonderful properties of honey is its long shelf life – we are talking

Small Hive Beetle larvae. (photo by Mary K. Parnell)

centuries – though after a time the flavor becomes too strong for the taste of most people. A high moisture content reduces the shelf life to a matter of weeks, at most, before the honey is at risk of fermenting. If, in fact, some of your honey is over 18%, your storage options are greatly limited.

I think the only possible storage method for comb containing nectar or high moisture honey is to freeze the frames, provided that you have enough available freezer space. Freezing not only kills wax moth and small hive beetle eggs and larvae, but also prevents the onset of fermentation. After thawing, the frames of comb can be placed back on the hive. If that is not an option, I suggest removing any high moisture honey prior to storage of the comb. You should extract and store it separately from your "ripe" honey. Though high moisture honey is not suitable for sale, it is safe (and delicious) to consume yourself, as long as you eat it up quickly. It will not ferment overnight; I think you would always have a week or two, and maybe longer depending on the percentage moisture and on storage conditions. And even fermented honey can be used in cooking and baking. If you have too much to use promptly, some of it could be frozen in jars for long term storage, and thawed in small quantities for immediate use.

I wish there were more options available for your situation. However, if your monitoring reveals a high mite count, it is better to lose part of your honey crop than to lose entire hives. Good luck.

A beekeeper in Maryland writes:

Love all the information on your website, it is very helpful. In the past I have had severe issues with wax moths getting to my spare frames. I would freeze the frames then store them and still end up with a horrible infestation. So, based on other beekeepers' advice, I placed my super frames in large bags with moth balls. Now it's time to put my supers on my hives, but I am wondering if the moth ball smell is going to harm or deter the bees. Do you know if they are safe to use at all, if so how long should I air them out? Or is there something I can do to quickly rid them of that smell?

Phil replies:

Freezing is an effective way to kill wax moth larvae, but it doesn't prevent re-infestation unless you are able to keep the frames in frozen storage until they are put back on the hive. That can monopolize a lot of freezer

area, all it takes is one or two moths attracted by the smell of wax to lay enough eggs to damage or destroy all your stored comb. One way to avoid such a waste is to use a chemical repellant.

The two chemicals commonly sold to the general public for the control of moths are paradichlorobenzene and naphthalene. The former is the one approved for use by beekeepers to prevent damage from wax moth larvae in stored comb. It is registered as, and sold by beekeeping suppliers under the name of, Para Moth. Products containing the same chemical are sold in non-beekeeping outlets (such as Walmart and other grocery stores), where they are usually labeled "moth crystals." Paradichlorobenzene is specified because it does not produce residues which will harm bees when equipment (hive bodies, supers, and comb) are placed back on the hive at a later date. Before reuse, it is only necessary to unstack the boxes and place them on their sides in order to expose the combs to the air. If it has been an extended period of time – at least a few weeks – since the Para Moth was applied, an overnight airing should be sufficient. If the chemical was used more recently and still has a

detectable odor, I would air them out several days.

A word of caution: the product commonly sold as "moth balls" has as its primary ingredient the chemical naphthalene. Naphthalene will ALWAYS leave residues which will later kill bees, no matter how thoroughly the supers are aired out. You need to make sure that it was not an ingredient in whatever product you used. While I was the state apiarist in Kentucky, I received a call one Spring from a new beekeeper who had recently installed a package of bees. Within a couple of weeks, most of them had died. The supplier of the package graciously replaced the bees since the cause of death was unexplained and there was a possibility that they had been harmed in shipping. However, when the bees from the second package also began dying, the beekeeper asked me to visit and investigate. Sometimes the job of state apiarist includes a little detective work. At first I was baffled by "The Case of the Dying Bees", but I received an important clue when the beekeeper showed me some foundation left over from fitting out frames for the new hive. It had the distinctive odor of naphthalene, the familiar smell which most people associate with moth balls. It turns out that the beekeeper had stored the foundation with moth balls containing naphthalene. Mystery solved. The irony of the situation was that undrawn foundation is of no interest to wax moths, and needs no protection from them. It is not until comb is drawn out that it is at any risk of damage.

If it turns out that the product you used contained naphthalene, let me know and I will advise you further.

The Maryland beekeeper writes back:

Thank you Phil for such a quick response. After reading your email and doing a little search around our garage, I located the moth ball box and unfortunately it is 99.95% Naphthalene. You mentioned the frames would kill the bees, are the boxes reusable then? I have 4 supers with brand new stamped comb frames heading to the fire pit on the next dry day. I guess I shouldn't take the advice of everyone on the internet. It's quite the expensive lesson learned.

Phil replies:

Scrub the boxes with a brush dipped in soapy water. After they dry, sand the insides with medium grit sandpaper. That should enable you to safely re-use them. The frames and comb are, unfortunately, a total loss.

Your experience illustrates the importance of using formulated products registered for use with honey bees and sold by beekeeping suppliers. Para Moth is specifically designed to be safe for use with frames and comb for bee hives. Even commercially available products such as moth crystals, which use paradichlorobenzene instead of naphthalene as a main ingredient, contain additives labeled as "inert ingredients" which have not been tested for their effect on honey bees.

You're not the first to make this mistake. At least, unlike the Kentucky beekeeper I mentioned, you caught your error before killing any bees, so your lesson was less expensive than it might have been. BC

Food Safety Modernization Act

'He was a bold man that first ate an oyster.'

–Jonathan Swift

Ann **Harman**

I suppose that that 'bold man' would have appreciated the food safety concerns and the resultant rules we have today. He would know that the oyster was edible. In the past people did understand food spoilage and how to care for food. However, the unscrupulous could devise ways of hiding spoilage. And the crafty devised ways of adulterating various foods for their own profit. Not only was food at times hazardous, but also cosmetics contained really poisonous chemicals. Inventors produced bizarre medical devices to cure real and imaginary ailments. Those devices looked impressive even if they were totally ineffective. Medicines containing cocaine and opium certainly gave you the sense of feeling better even if they were not a true cure. As our population grew, so did the problems with food and medicines.

Today we are familiar with the Food and Drug Administration (FDA). We find out about its activities through the various media we use. The FDA actually had its beginnings in the 1800s but did not acquire that name until 1930. Government reorganizations occurred throughout all those years until 1988 when FDA became part of the U.S. Government Department of Health, Education, and Welfare (HEW).

Perhaps an important milestone in the FDA's history was the original **Food and Drugs Act**, passed by Congress in 1906 and signed by President Theodore Roosevelt. That Act prohibited interstate commerce in misbranded and adulterated foods, drinks and drugs. The Meat Inspection Act was passed the same day. Now slaughter houses could be inspected for sanitary practices in the preparation of meat for sale. So the U.S. was now on its way to safer food and medicines. However problems were still evident. In 1933 the FDA recognized the need for updating the 1906 Act. That update took five years to revise, resulting in the **Federal Food, Drug, and Cosmetic (FDC) Act of 1938.**

Five years to revise! Why did it take that long? Well, squabbles in Congress were part of the delay. However in 1935 the Government began publication of the **Federal Register.** That name is not particularly descriptive of what it is and its purpose. Basically it gives the public a voice in the creation of various Acts that the government wishes to enact. The government proposes an Act and it is published in the Register. The public, particularly those affected by it, are asked to comment. A time limit is given for the comment period. The information is then assessed and any changes are made before the Act takes effect. So the public comment period and subsequent revisions were also responsible for the five-year time span.

Over the years various concerns have been addressed with the addition of an assortment of rules and acts. In 1990 the nutrition label was created and its terms, such as 'low fat,' were defined. All foods were required to have that label. Modifications to that label occurred just two years later in 1992. Since honey is a single ingredient it is allowed to have a modified label. In addition, anyone selling less than $50,000 of honey in a year is exempt from using the label. However, that label is excellent marketing strategy – 0% fat can mean a lot to a potential customer. By the way, use of the word 'organic' requires the official organic certification and label. The word 'natural' has not been defined yet by the FDA.

After 59 years with the 1938 Federal Food, Drug, and Cosmetic Act, in 1997 the FDA passed the **Food and Drug Administration Modernization Act**. Among the many other revisions was the one to regulate the health claims for foods. Any benefits to health must be substantiated. So unless you have the documented research you cannot make health claims when selling your honey or pollen.

Although the 1997 Act had many improvements, food safety seemed to remain a stubborn problem. The media reports of illnesses from foods concerned many people. Our desire for year-around supplies of various foods (strawberries in January) brought an incredible quantity of imported foods to our supermarkets. How do we know they are safe or will we find out when becoming ill? The food-illness problems also occurred in restaurants. After all, they are buying domestic and imported foods from the same suppliers as the supermarkets. Food safety became an important issue.

Thus, just 14 years later, in 2011, President Obama signed the **FDA Food Safety and Modernization Act (FSMA)**. One important part of this Act is that the FDA can require imported foods meet the same standards as our own domestic foods. In addition the national food safety system will partner with the state and local authorities.

Now this new FSMA is not just one rule. In 2013 the seven foundation rules were composed and were published in the Federal Register for comments. The rules went through several variations until they were considered final. Other rules were written. At this time some rules are just proposed. Let's see what the current final and proposed rules and their dates are. The dates of passage are important for the final date of compliance.

See the first web page for all of the explanations of these Rules, then the following for background and additional information.

http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm253380.htm
https://www.gpo.gov/fdsys/pkg/PLAW-111publ353/pdf/PLAW-111publ353.pdf
http://www.fda.gov/Food/GuidanceRegulation/FSMA/

Final Rule: **Sanitary Transportation of Human and Animal Food** April 2016

Final Rule: **Accredited Third-Party Certification** Docket Number: **FDA-2011-N-0146** November 2015

Final Rule: **Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption** Docket Number: **FDA-2011-N-0921** November 2015

Final Rule: **Food Supplier Verification Programs (FSVP) for Importers of Food for Humans and Animals** Docket Number: **FDA-2011-N-0143** November 2015

Final Rule: **Current Good Manufacturing Practice and Hazard Analysis and Risk-Based Preventive Controls for Human Food** Docket Number: **FDA-2011-N-0920** September 2015

- **Current Good Manufacturing Practice, Hazard Analysis, and Risk-Based Preventive Controls for Human Food;** *Clarification of Compliance Date for Certain Food Establishments* November 2015

Final Rule: **Current Good Manufacturing Practice and Hazard Analysis and Risk-Based Preventive Controls for Food for Animals** Docket Number: **FDA-2011-N-0922** September 2015

Proposed Rule: **User Fee Program to Provide for Accreditation of Third-Party Auditors/Certification Bodies to Conduct Food Safety Audits and to Issue Certifications** Docket Number: **FDA-2011-N-0146** **Correction Notice** July 2015

Proposed Rule: **Amendments to Registration of Food Facilities** Docket Number: **FDA-2002-N-0323** April 2015

Final Rule: **Record Availability Requirements: Establishment, Maintenance, and Availability of Records** Docket Number: **FDA-2002-N-0153** (Formerly Docket No. 2002N-0277) April 2014

Advance Notice of Proposed Rulemaking: **Implementation of the Food and Drug Administration Food Safety Modernization Act Amendments to the Reportable Food Registry Provisions of the Federal Food, Drug, and Cosmetic Act** Docket Number: **FDA-2013-N-0590** March 2014

Proposed Rule: **Focused Mitigation Strategies to Protect Food Against Intentional Adulteration** Docket Number: **FDA-2013-N-1425** December 2013

Final Rule: **Information Required in Prior Notice of Imported Food** Docket Number: **FDA-2011-N-0179** May 2013

Final Rule: **Criteria Used to Order Administrative Detention of Food for Human or Animal Consumption** Docket Number: **FDA-2011-N-0197** February 2013

Go ahead and explore the rules so that you can get an idea what information pertains to you and your particular business. To prepare you for the onslaught of the Governmentese Language I recommend a pot of coffee and soothing background music. Or stronger, as you wish. You will have to plow through quite a bit of information in your search for honey. Fortunately honey is considered a single item (a food, a substance) as is maple syrup and thus subject to some exceptions. Honey is considered a 'low-risk' food so this term can help you in searching through the rules. In addition the size of the beekeeper's operation influences how the rules apply. So you need to read as carefully as you can to determine how FSMA will affect you and even IF it affects you.

To help you plow your way through, here is something to keep in mind. Actually two words. Product and produce. Honey can be a product but it is not a produce. Produce, in these rules, means just what you see in the Produce Section of your supermarket – vegetables and fruits. So you can just skip reading anything that mentions produce, unless, of course, produce is part of your business.

In each rule you may see definitions for 'small farm' or 'small business' and even for 'very small farm' and 'very small business.' Some of the criteria may surprise you. For example a 'very small business' is defined in one rule as doing less than $1 million a year in business. As you read through the information it can be helpful to open up the FAQ (Frequently Asked Questions) part. Perhaps information there can help speed your way through trying to read and interpret a rule.

It had to happen. In order to help you through the maze of FSMA, businesses are ready and waiting to help you through that maze. These businesses do charge for their help. But first determine how much

you really need to do and whether other sources of information will be adequate for meeting your concerns.

When the act was passed back in 2011 the government did realize that many people would need help in interpreting the rules and in adhering to them. Education and training would be necessary. Congress passed both the FSMA and, at the same time, provided $4.7 million to establish a competitive grants program, the Food Safety Outreach Program (FSOP), to provide education and training. Funds first went to establish a National Coordination Center and four Regional Centers for training. Those encouraged to apply for grants to be trainers include community-based organizations, non-governmental organizations, food hubs, farm cooperatives, extension, as well as other local groups. Although information and training will be for all foods, produce (remember? vegetables and fruits) will probably be a large part of the training.

The **FDA FSMA Food Safety Technical Assistance Network** is already operational to provide a central source of information to support industry understanding and implementation of FSMA. Questions submitted online or by mail will be answered by information specialists or subject matter experts.

Farmers' newspapers have been reporting on FSMA from time to time. Extension offices will have information on the Act. And, of course, you can spend some time on the FDA website. To help you in your search for honey, look for 'low-risk' lists of foods that are exempt from certain parts of the rules. You will see honey listed both as 'raw' and 'pasteurized.' (Considering the dictionary definition of pasteurization it seems a bizarre word to apply to honey.)

Your honey is required to have a label when it is for sale. The information for labels is under the Federal Trade Commission and the FDA. The basic requirements are really quite simple. The label must identify the commodity, give the name and place of business and the net quantity in both English units and in metric. Honey is sold by weight. The National Honey Board website, **www.honey.com**, has labeling information.

Beekeepers of various sizes of operations will find that this particular Final Rule will provide a good amount of information.

Final Rule: **Current Good Manufacturing Practice and Hazard Analysis and Risk-Based Preventive Controls for Human Food**
Docket Number: **FDA-2011-N-0920**
September 2015
Current Good Manufacturing Practice, Hazard Analysis, and Risk-Based Preventive Controls for Human Food; *Clarification of Compliance Date for Certain Food Establishments*
November 2015

Yes, it is long. Yes, you will read a sentence several times to make sure you understood it. Yes, you will have questions. But this Rule does include honey as a 'low-risk' food. If you just get a few pounds of honey for your own use you don't even have to read this article. But when you sell even a few jars you do need to be aware of what is going on not only here in the U.S. but also need to realize that other countries have concerns about food safety. It's a global problem.

Each of the rules will have a Compliance Date – the deadline you must meet to have your records in order and have done everything necessary to meet the criteria set by the rule. As usual, there are exceptions, so pay attention to those. Most small-scale and sideliner beekeepers will fall into the 'very small scale' operations. Also keep in mind that certain words, such as 'facility' can apply to your operation even if you have only a few hives and use your garage for extracting.

Don't hesitate to ask questions. Your local extension agent is more used to dealing with the rules than you are. Although you may be confused and exasperated with the FSMA keep in mind that the food you buy at supermarkets and other markets is safer today because of that Act. BC

Ann Harman thoroughly enjoys reading FDA rules and regulations in her spare time at home in Flint Hill, Virginia.

Can Solar Sites Help Save The Bees?

Rapid growth of ground-mounted solar presents opportunity to establish hundreds of millions of native plants

Rob **Davis**

Across Minnesota workers are preparing dozens of sites in order to seed more than 30 million native, pollinator-friendly plants. These low-growing and shade-tolerant flowers and prairie grasses will be established where you might least expect — under and around ground-mounted solar panels.

Nationwide prices are plummeting for rooftop and ground-mounted solar panels, and large sites are popping up wherever there is low-cost land and access to an electrical substation. And with 25-year land leases frequently paying $700-$1,500 per acre, farmers and other land owners are increasingly interested in having solar on a portion of their property.

Recipient of the MacArthur Foundation's "Genius" award, Dr. Marla Spivak of the University of Minnesota Bee Lab, sees a promising opportunity. "It would be great to have pollinator habitat under and around solar panels and arrays."

The timing couldn't be better for commercial bees and wild pollinators, which have suffered massive population losses in our lifetimes in part because of dwindling access to food and habitat. For wild insects and managed bees these sites will be multi-acre buffets of nutritious, native plant pollen and nectar.

Energy policies vary state by state, but between just a handful of states — Florida, Georgia, Minnesota, Maryland, New York, North Carolina, and Oregon — more than 30,000 acres of solar sites are being built this year, and more than 19,000 acres are in development to be built next year. All together, solar projects could provide a world of good for pollinators — and landscape business including Prairie Restorations, Ernst Conservation Seeds, Prairie Moon, and American Native Plants have noticed.

"Within every habitat in North America there is a large variety of pollinator friendly plant species that can be used under solar panels. The panels do create a challenge of some height limitations which will slightly restrict the overall diversity of the plantings, but we can still provide a wide range of forbs and grasses that will be a delight to the pollinators and songbirds native to that area," said Ron Bowen, founder and CEO of Prairie Restorations, Inc. "The seasonal spectrum that can be planted beneath a solar array, and the fact that once it's installed, herbicides and pesticides aren't typically used, makes acreage near solar fields excellent locations for raising healthy bee colonies."

More Solar, More Privately Financed Pollinator Habitat

Beekeeper Oliver Collins has first-hand experience with colony collapse. "I probably own 20 percent of all the hives in the area — and lost around 65 percent of them this past winter. There's a strong watermelon industry here, but between the mites and native plants getting mowed or sprayed, my bees can't keep up." A roughly 150-acre solar site that includes abundant foraging habitat for pollinators was recently proposed for a county in Eastern Maryland where Mr. Collins lives and keeps his bees. If approved by local and state authorities,

***Figure 1**: cross section of solar with native plants*

Not to be mistaken with concentrated solar, which uses heat, photovoltaic (PV) solar panels get only as hot as a car parked in the sun. Original illustration by Heidi Natura, adapted with permission.

the project will provide pollinator habitat equivalent to every household in a 5-county area having a 6'x12' pollinator garden. The solar project developer, OneEnergy Renewables, a socially conscious B-Corporation, is evaluating use of a pollinator-friendly seed mix for a number of its projects currently under development. "It's a great opportunity for the solar industry as a whole, and we're excited that our projects will provide so many benefits to the communities in which they're located," said Project Manager Gia Clark.

Agriculture, Community Taking Leading Roles

"Pollinators are an irreplaceable public resource. Insect pollinators, such as bees, butterflies, wasps, flies, and beetles, are critical for the pollination and production of crops and the health of native flora and landscapes," wrote Dave Fredrickson, commissioner of the Minnesota Department of Agriculture, in an email announcing the State's pollinator summit this year.

In fact, one of the Midwest's largest solar projects is leading the way. The Aurora solar project, being built in Minnesota by Enel Green Power North America (EGP-NA), will provide pollinator habitat equivalent to more than 500,000 homes having 6'x12' pollinator gardens. EGP-NA worked hand in hand with the Minnesota Department of Natural Resources to create a robust solar site vegetation plan that creates a biodiverse habitat for pollinator species while preserving the soil for future farming, and channeling stormwater down into the aquifer.

Noting this collaborative process, during the 2016 legislative session, Minnesota's agricultural leaders worked closely with conservation, energy policy, and business leaders to establish the nation's first standard for pollinator-friendly solar sites. Authored by Representative Rod Hamilton (R–Mountain Lake) and Senator Dan Sparks (DFL–Austin), the bill establishes robust and flexible vegetation management requirements for any solar project that is promoted as providing benefits to pollinators, songbirds, or game birds. The bill received broad rural, suburban, and metro support, passing the Minnesota House by a vote of 126-0 and the Minnesota Senate by a vote of 62-2. Governor Dayton signed the bill in to law on May 31.

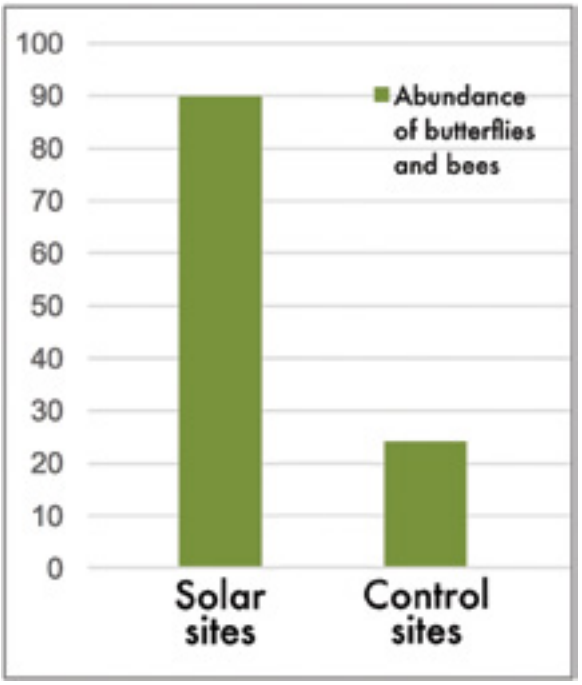

***Figure 2**: bar chart*

An 11-site observational study found that solar sites with pollinator habitat have a statistically significant increase in abundance of bees and butterflies (The Effects of Solar Farms on Local Biodiversity, Montag et. al., 2016).

Construction of the Aurora project and many others are underway and it will take time for the native plants to get established and bloom. Over the next several years, just about every state will build several thousand acres of solar sites that—based on collaboration with each community—may meet or exceed this new "pollinator-friendly solar" standard.

As you drive by these sites, don't just see them for the clean, fuel-free electricity they generate every day, but also notice the benefits provided by the vegetation under and around the panels. The United States has more than 280 million acres of rowcrops and just a tiny fraction will be used for solar sites, but these sites can provide a badly needed, and long-lasting, service in providing healthy food to the hardworking commercial and native bees that pollinate our crops. BC

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*Rob Davis is a director at Fresh Energy, an independent 501(c)3 energy nonprofit in St. Paul, Minnesota. Follow him **@robfargo** and **www.Fresh-Energy.org/author/rob**.*

INNER COVER ... Cont. From Pg. 19

pear tree doesn't belong in a pollinator garden, so we're trying to convince the city to have them removed.

So on August 10th, we'll have a day where all this is open to anybody that wants to come and visit. Everybody who's part of this will be there to show off their gardens and programs. It runs from 11 to 4, the weather promises to be perfect and we'll have representatives from all of the garden sponsors there to tell you more about their programs - folks from the Master Gardeners and The Ohio State University Pollinator Programs, the Monarch people, the Ohio State Beekeepers, Pollinator Partnership, Pollinator Stewardship, a few foodies will be there with honey ice cream, honey bakery items, honey popcorn (maybe), a couple of local CSA type farm folks with new-season apples and peaches for sale, Medina County Beekeepers and Medina County Soil and Water, seed companies selling pollinator seeds for gardens you can look at in bloom, and probably more. You're invited. It's free. There's lots of parking and lots of people who want to share what they know about all this. Take a day, make the trip. It'll be worth your time. Heck, it'll be fun! We hope to see you there.

•

I visited the Collin County, Texas, beekeepers recently. They're close to Dallas, and, to Josephine, where I got to spend an afternoon with John Talbert, who runs Sabine Creek Honey Farm. John and his crew, including his son John run about 800 colonies mostly for honey, but they send about 400 west to California for almond pollination, working with Denise Quayles and The Pollination Connection as their broker (we visited Denise a few years back when we did the Almond Odyssey). He works closely with Blake Shook, who you may have heard of, too. Sabine Creek sells about 600 nucs every year, and an ocean of honey, most of it retail. It's a pretty neat operation and they seem to do a bang up job of just about everything they undertake. I'll spend a lot more time with them next month, looking at management, harvesting, marketing and the rest, including the Texas State Fair, the Texas State Beekeeper's Association and even some about Honey Queens. In the meantime, John shared one of his operation's newest style hats with me. Thanks John. More in September.

•

We took some time over the 4th to catch up on yard and garden work neglected during the hectic month of June Travel. The garden is doing quite well for the first time in several years. The weather, the rain and the cardboard/straw mulch have all cooperated so you can count the weeds in there on one hand with fingers left over, and both the shallow and deep soil moisture are more than adequate. We cleared out the patch in front of the front porch so we actually have a porch you can see again, removing some decade's old and severely overgrown shrubs and put in roses and, would you believe, a sourwood and tupelo tree. Sourwood is hardy to zone 5 most folks say, and I'm in 6 so it should be OK. It's in a protected spot on the southwest corner of the house protected completely on the north and east side by house and garage and west side pretty much by a couple of evergreens. The Tupelo tree, planted a few feet away, is hardy to zone 4 so it should make it too, but neither of those trees are common this far north in Ohio. So I'll wait a few years, and when they finally bloom, I can put on my honey label that this Ohio honey is infused with the two best honeys in the world – Sourwood and Tupelo.

But then, it takes a lot to beat locust honey. In my opinion, a real lot. Because of the work I did with Marina on the *Honey Connoisseur* I've spent a lot of time tasting a lot of honeys. I'm not as good as the guy from Sioux Bee who could tell the difference between North Dakota clover and Montana clover honeys, and not nearly as good as Marina who has been trained by the world's best in Italy, but I think I can hold my own with most of the rest of 'em when it comes to telling what honey is what, and what's wrong with some of them. But what's the best honey?

Well, if it's still July when you are reading this, you may have a shot at finding out if yours is the best honey there is. The Good Food Awards entry window closes the end of July so maybe there's still time to enter. You don't have to send in any honey yet, but you have to enter by then. Go to www.goodfoodawards.org for the form, the rules, last year's winners and more. They have a honey category and I'm on the committee that sets up the rules (no, I'm not a judge…I'm not that good yet). I hope to get to the finals this year in San Francisco just to watch. Maybe one day I'll get to play with the big kids, but not yet. But you can…get entered. Get honey. Get going!

But that's not what I started to say, though I'm glad it came out. What I started to discuss was honey. And actually, honey work. Most of us don't do bees as a job though it often seems like it. No, most of us squeeze in honey work when daylight, weather, family, day job work, and the bees allow. So, like queens, mostly we do our bee work when we can, rather than when we want (most of us get the queens we can, not the queens we want, right?). That's what happened over the 4th. The garden work, the deck-cleaning work, the mowing, the mulching all needed doing, but so did honey harvesting. We have a couple of young men come out once in a while to help with the heavy and hard parts of yard work, and they could be here only then, and not later, so you do that work when you can, and not so much when you want, and the honey harvest got pushed back and pushed back until the actual 4th.

Cool, cloudy, a stitch of rain just once in a while, windy, cool, cloudy . . . not bee weather by a long stretch. Not bee weather at all, actually, but all the boxes are full, no more to put on, honey coming in from white sweet, red and dutch clovers, but winding down and entering the usual July kind-of dearth we have every year, which gives us a window to do any mite treatments we need when honey isn't on and none coming in, if you can get it off before it starts. It's also the best time there is for making splits for mite control, and getting things ready for next year, and getting a chance to take care of the bees that take care of the bees that go into winter. If you can only get all that wonderful locust honey off, dang it.

Most years, well, some years when it works, our hives will have two supers of capped on right now, early July, the bottom super is spring...light, mild and wonderful. The top though is mostly locust, wonderful, wonderful locust. We often get it off before now...there's been years when it came off on Memorial day no less, but most years it's sometime in June, and sometimes early July, like this year.

What's best is get the early spring off in May, the Locust off by mid-June and leave the early summer, all the clovers, tulip trees, catalpas, to cover the dearth so we don't have to feed when there's hardly anything coming in and still get two crops before the first of August – spring and locust. That's what it used to be.

Anymore, that doesn't work so much. Locust is later than it used to be, tulip is unpredictable as heck, clovers are all over the map and catalpas are sometimes, sometimes not. But the dearth is still there, but sometimes late, but lasting longer. And if you don't get rain in early, early July, you don't get goldenrod hardly at all in late August and September. But it's early, early July that you get the dearth...Jeeze, what's a beekeeper to do?

Well, the cool, cloudy weather is supposed to break and get warmer later this week...it is July after all... and since the 4th was a wash beewise, we went in to work on this issue, thinking that if indeed it did break, we'd take an afternoon and go get honey. Buzz is waiting to pick it up and get it extracted and I need the boxes for the fall flow that might or might not come...part of taking care of the bees is making sure there's honey, more honey than they'll need, way more. But they have to collect it first so I can leave it for later.

So, do we collect all that wonderful spring and locust honey and 'hope' there's more later? Do we bet on the weather, the goldenrod and the rest of the fall crop? Or do we leave some on now in case there's no more to come? I hate feeding bees. I really, really hate feeding bees. I'd much rather leave on a valuable crop of honey than have to feed late fall or early spring. And honey is so, so, so, so much better than sugar syrup for them. It's a gamble. I'm not a gambler. No matter the weather this week or next, I think we'll leave that extra, wonderful, wonderful super of spring honey for them...but I'll take the locust. It's a good trade. Have you ever tasted pure locust honey? If you have you know I'm right. If you haven't, you still have much to learn about honey.

It's August. Fall's here. It's time to take care of the bees that take care of the bees that go into winter. Keep your smoker lit, your hive tool handy and your veil tight. Enjoy the bees, and enjoy the life they give you.

GLEANINGS

AUGUST 2016 • ALL THE NEWS THAT FITS

OBITUARY

William James "Bill" Troup III, 69, of Williamsport, passed away Thursday, June 9, 2016, at his home.

Born June 10, 1946, in Hagerstown, he was the son of the late Calvin George and Anna Mary (Fuss) Troup.

Bill was a 1964 graduate of North Hagerstown High School and received his Bachelor of Science degree in animal science from the University of Maryland in 1973.

He retired, with 45 years of service, from the State of Maryland Department of Agriculture, with the last 15 years as an apiary inspector. In addition, he operated his own beekeeping business for 35 years.

Bill was a member of Benevola United Methodist Church, Boonsboro.

He was a member of the Eastern Apicultural Society, a certified master beekeeper and a member of the Maryland State Beekeepers Association.

He was an avid Civil War enthusiast, attending Civil War seminars, visiting Civil War battlefields, and belonging to the Hagerstown and Charles Town (W.Va.) Civil War roundtables.

He is survived by his loving wife of 42 years, Nancy A. (Nickel) Troup; two sons, William James Troup IV and wife, Rebecca, of Sherrills Ford, N.C. and Daniel Williamson Troup I of Hardy, Va.; two grandchildren, Andrew Jameson Troup and Matthew Benjamin Troup; one brother, Richard George Troup of Winchester, Va.; one sister, Jane G. Stone of Hagerstown; and his faithful black lab companion, Klinker, a certified bee-disease detection dog.

Contributions may be made in Bill's name to the Shenandoah Valley Battlefields Foundation, P.O. Box 897, New Market, VA 22844.

MARLA SPIVAK WINS SIEHL AWARD

The laureate in the knowledge category of the Siehl Prizes for Excellence in Agriculture from the University of MN has been awarded to Marla Spivak, Distinguished McKnight Univ Professor at the university. The citation reads: 'Her tireless advocacy for bees and what they do for the world's food supply has made her well-known speaker, but at its core her work is about understanding how bees behave, breeding new lines of disease-resistant bees and finding the causes behind colony collapse disorder and other threats to bees. She's been a University of MN faculty member since 1992 and, thanks to her leadership, a new bee and pollinator research center will open on the university's St Paul campus later this year.'

Professor Spivak is well known for her work on breeding hygienic bees. She is also studying the properties of propolis and students in her laboratory are investigating the effect of the surrounding landscape on the health and nutrition of both honey bees and native bees.

6TH LANGSTROTH HONEY FESTIVAL

Dr. George Langstroth Cowan, left and Marc Hoffman portraying Reverand Lorenzo Langstroth, right.

Rev. Lorenzo Lorraine Langstroth (1810-1895) inventor of the modern beehive, portrayed by Marc Hoffman, standing with his great-great-great grandson, Dr. George Langstroth Cowan. The occasion is the 6th Annual Langstroth Festival in Greenfield, Massachusetts, June 5 2016. They are standing on the front portico of the historic Coleman-Hollister House, former location of the Greenfield High School for Young Ladies, where Langstroth was principal. He continued living in this house while minister of the Second Congregational Church of Greenfield next door, and later, when the house was owned by his brother-in-law Almon Brainard, he wrote the classic book, Langstroth on the Hive and Honeybee here. Dr. George Cowan is a psychiatrist with the US Navy at Camp Lejeune, North Carolina and keeps bees on his farm.

AUSTRALIA VARROA FIND IS JACOBSONI

Australia imposes a regional quarantine after *Varroa* mites are found in northern Queensland and they may have been there for years.

Confirmation from the federal and Queensland governments and industry sources that the two mites in a feral Asian honey bee hive in Townsville, 830 miles north of Brisbane, were *jacobsoni* means Australia has again dodged the *Varroa* bullet.

Varroa jacobsoni parasitizes Asian honey bees (*Apis cerana*). The more damaging *Varroa destructor*, only identified as a separate species in 2000, is a parasitic mite that attacks both *Apis cerana* and *Apis mellifera*.

In an update, Biosecurity Queensland Chief Plant Health Manager Mike Ashton says the Commonwealth Scientific and Industrial Research Organization (CSIRO) has confirmed the mites were *Varroa jacobsoni*.

"Asian honey bees are the natural host of this species of *Varroa* mite," he says in a statement. "However, a recent report by the CSIRO has shown for the first time this species reproducing on European honey bee and it is this strain that we are most concerned about.

"This strain is known to be widespread in Papua New Guinea.

"Asian honey bee is not known to be established in Townsville and to date, no further feral Asian honey bee hives have been found in the area where this hive was located and then destroyed."

Ashton says Biosecurity Queensland's quarantine and surveillance program includes surveillance of managed and feral hives, and traps set to attract bees to check for the presence of *Varroa* mite.

"We are keen to examine a number of managed hives in the Townsville area to ensure they are not infested with *Varroa* mite," he says. "We are also asking the public to report feral hives so they can be sampled and destroyed to prevent any spread of the mite."

The Brisbane Department of Agriculture says that based on expert advice, the 5,000-strong colony of Asian honey bees where the *Varroa* mites were found was potentially up to two years old.

"During this time the bees could have swarmed and spread from the site of detection," a quarantine order signed by department Director General Elizabeth Woods states.

Australian Honey Bee Industry Council executive director Trevor Weatherhead posted a statement he said has been approved for circulation to all industry members.

"Scientific analysis of the bees has confirmed that two Varroa mites (Varroa jacobsoni) were present on two of the bees," it says.

"A check of the surrounding area has found no further Asian honey bees or their hives," it says.

"Traps and sentinel hives that are already in place around the port as part of the National Bee Pest Surveillance Program have not collected any exotic bees or mite pests over the past two years."

The council statement says testing will be done to see if these bees have any relationship to the Asian honey bee that is already present in areas of Far North Queensland, or bees that were associated with previous detections at the Townsville port – with the last detection in 2014.

"While Asian honey bees are established in areas of Far North Queensland, Varroa mites are not known to be present in that population," the statement says.

The national Consultative Committee on Emergency Plant Pests met July 1 to confirm the identification of the pests, and discuss the required response activities for Varroa jacobsoni.

It has previously been determined that Asian honey bees cannot be eradicated from Australia, so response activities are only focused on the Varroa mites.

"Australia has well established arrangements in place for responding to exotic pests, such as Varroa," the council says. "This is a nationally significant pest that will see all efforts put in place to prevent it from establishing in Australia."

Australia is, for now, the only major honey-producing country where the bee-killing Varroa has not established itself.

Woods says the Asian honey bee hive was detected in the Port of Townsville on June 27 and was immediately destroyed.

The dead bees and comb were sent to the department's Operational Science Program, in Brisbane that found Varroa.

Varroa jacobsoni was then confirmed morphologically three days later by the Commonwealth Scientific and Industrial Research Organization in Canberra.

Woods says surveillance work since June 27 has not resulted in further detections of Asian honey bees in the Townsville area/

The quarantine, or movement control order as the state government calls it, is intended to assist in the eradication of Varroa by restricting the movement of mite carriers and allow surveillance and control measures.

"I consider it necessary to make a movement control order as I am satisfied, on reasonable grounds, that Varroa mite (Varroa jacobsoni) poses a serious biosecurity risk," Woods said in the order.

The quarantine order covers 6.2 miles (10 kilometers) around the Port of Townsville.

Under the order, a person must not move a Varroa mite carrier out of the area without a biosecurity permit. People within the movement control area must allow an inspector or a person under the direction of an inspector to inspect or test any Varroa mite or a Varroa mite carrier, to treat or destroy any Varroa mite or Varroa mite carrier and to clean or disinfect any place, including any structure or thing at a place.

The movement control order will stay in effect for three months unless the earlier revoked.

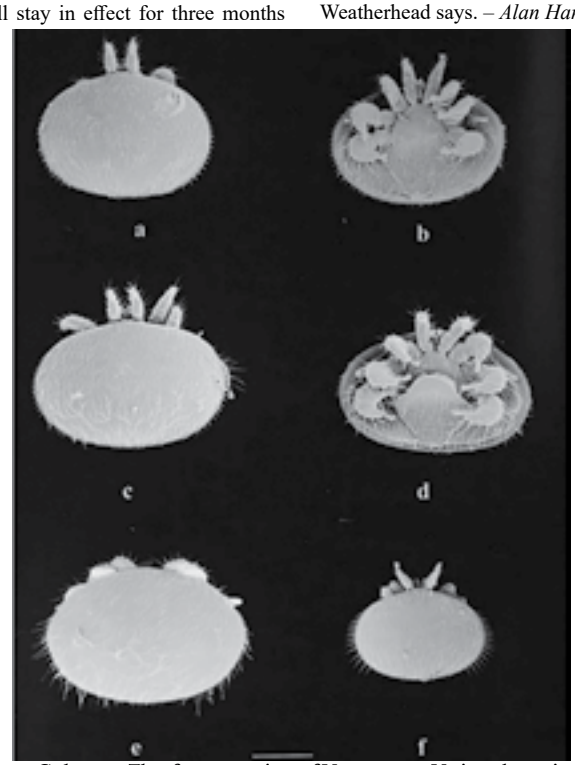
Meantime, the Australian Vegetable and Potato Growers Federation says with Varroa a nationally significant pest, all efforts will be put in place to prevent it from establishing in Australia.

"Professional and amateur bee keepers need to be vigilant in inspecting their hives for signs of Varroa mite and other exotic pests," federation scientific affairs national manager Jessica Lye says.

"It is vital that any suspected sightings of these pests are reported to state or territory's department of agriculture or biosecurity early so that all measures can be taken to ensure they are dealt with in a timely and effective manner."

The federation statement quotes Weatherhead as saying while there are no expected domestic or international trade issues at this time, it is important that all industry stakeholders work together to ensure rigorous surveillance of Varroa is maintained.

"It is currently believed that these forms of Varroa mites do not readily transfer between host species – that is, if the mite is found on Asian honey bees, it does not readily move to European honey bees," Weatherhead says. – *Alan Harman*



From Coloss – The four species of Varroa*: a.* V. jacobsoni *dorsal view; b.* V. jacobsoni *ventral view; c.* V. destructor *dorsal view; d.* V. destructor *ventral view; e.* V. rindereri; *f.* V underwoodi. (photo by Denis Anderson

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

♦ALABAMA♦

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

Speakers include Jerry Hayes, Jim Tew and Shane Gebauer.

Details can be found at www.alabamabeekeepers.com.

♦CONNECTICUT♦

Back Yard Beekeepers Association 2016 Speaker Schedule – September 27: Brenna Traver, Penn State, Honey Bee Pathogens; October 27: Anne Frey, TBD; November 17: Jennifer Tsuruda, Clemson TBD.

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

♦INDIANA♦

Instrumental Insemination August 5-6 at the Purdue Honey Bee Lab. Registration is $600 which includes taking an inseminated queen home with you. Classes are kept small, six students in order to receive detailed instruction.

Instructors is Krispn Given.

To register send email to kgiven@purdue.edu.

♦LOUISIANA♦

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

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

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

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♦NEW YORK♦

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

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

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

NY Bee Wellness Workshop will be held August 5-7 at Dyce Lab, Ithaca..

Randy Oliver will be the speaker..

For information contact Pat Bono, info@nybeewellness,org, 585.820.6619.

♦OHIO♦

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

♦VIRGINIA♦

Winter Preparation – September 3, 9:00 a.m. to 5:00 p.m. at Honeybee Sanctuary. The cost is $65. The workshop will look at what needs to be done to get ready for Winter.

For more information visit www.spikenardfarm.org or 540.745.2153 or info@spikenardfarm.org.

Summer 2016 – Floyd, VA - One-Week Intensive Biodynamic Beekeeping Program - For those who are prepared for the most in-depth and comprehensive training in beekeeping that we offer at Spikenard! With Gunther Hauk & Alex Tuchman. 540-745-2153 – www.spikenardfarm.org

September 3 – Floyd, VA – Winter Preparation - We will not only look at what needs to be done in the fall in order to let the colonies go into the winter as strong and healthy as possible, but we will also take a look at the winter and early spring months, probably the most difficult and treacherous time of the year for the bees. With Gunther Hauk & Alex Tuchman. 540-745-2153 – www.spikenardfarm.org

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In the wee hours, I turned to my gal Marilyn. "Can't sleep," I confided. "I have too many bees. I don't have enough honey supers. I don't have enough time. I'm still three years behind on taxes. I never should have bought that yard from Paul."

She said, "It's all going to work out, Ed. There was this astrophysicist on the radio today. He reported that the New Horizons space probe took ten years to get to Pluto, at 36,000 miles an hour. At this speed, to travel from one star to another in our galaxy would take a hundred centuries. The universe is really big!

"So interstellar travel isn't so practical at 36,000 miles an hour. But there are these worm holes that are related to black holes. Worm holes suck matter out of one part of the universe and spit it out in another. Slipping into a worm hole might be a way to get really far away.

"In black holes, gravity is so intense and matter is so compressed, they think that time and space switch, so that you can't move through space but you can move through time. However, if you fell into a black hole feet first, your feet would start falling faster than your head, so you would break apart, over and over, until you were infinitesimally smashed up.

"Last February space observers reported that two black holes got sucked into each other's gravitation fields and collided, sending ripples through the fabric of space-time. Einstein predicted this, but we'd never seen it before."

Lying there next to my very own amateur space expert at 3 a.m., I suddenly got goose bumps. "What does it all mean, Dearest?" I queried.

She likes to call me Lalo, a Mexican nickname for Ed. "Lalo, it means our earthly concerns really aren't that important, and that means everything is all right. Don't worry about those honey supers."

This is one way of looking at things. I closed my eyes and slept like a saint, but when our old red rooster crowed, the interstellar magic vanished.

I needed at least 100 supers and frames to go in them. I got some prices for supers, unassembled, assembled, painted, unpainted, pine, cedar, with and without foundation, budget and commercial grades. Don't forget shipping. It wasn't pretty.

Look, I didn't have time to nail together supers, but you do what you have to do. In a way, pre-assembled, pre-painted made sense, but there remained the issue of all that foundation. I needed to integrate it with my stockpile of drawn comb. If you pull three combs out of a super and replace them with foundation, bees on a good honey flow will generally draw that foundation, no problem. So if you already have 200 supers with nine frames of drawn comb in each, and you acquire 100 supers and 900 frames of foundation, you can fill 300 supers with six frames of drawn comb and three frames of foundation. That's the math, and that's the way I like to do it.

Except I didn't have 200 supers. I had 162 left in the barn, and some already had undrawn foundation. I was unhappy with my situation, my pathetically insignificant station in the universe notwithstanding. I kicked myself for poor planning.

There's a way around almost everything. If you don't see it, it's generally because you're trying too hard and missing what's under your nose.

I remembered that Tom in Boulder was downsizing his operation. When I called to inquire if he might have some supers for sale, he said, "About a hundred." With drawn comb. When he shot me a price, I said, "That's a steal."

All I had to do was pick them up in Boulder.

Today Marilyn takes the train to Granby for a family anniversary. The Colorado state bee meeting is in Silt, just down the road, tomorrow. The plan is for me to skip the afternoon bee talks and drive my 1983 one-ton flatbed Ford three hours to Granby to meet up with Marilyn and join in the festivities. Then, the next day, flash my senior National Parks pass, drive over Trail Ridge Road in Rocky Mountain Park, and head into Boulder from the north.

This is not a misprint. We're driving a 33-year-old truck over the Continental Divide to pick up those honey supers.

Yesterday I crawled under the beast and found a length of rotten fuel hose. It broke like a pretzel in my hand. I'm so glad I looked!

I'm not the only one working on vehicles around here. The other day a honey customer said he'd stop by on his Harley. I said, "If you see two legs sticking out from under a red Saturn, that's Marilyn pulling her starter. You can sit in the shade next to her, drink iced tea, and hand her tools."

He said, "Marilyn works on cars? Now that's my kind of woman!"

"Mine, too," I confided. I never told him she knows about worm holes, too.

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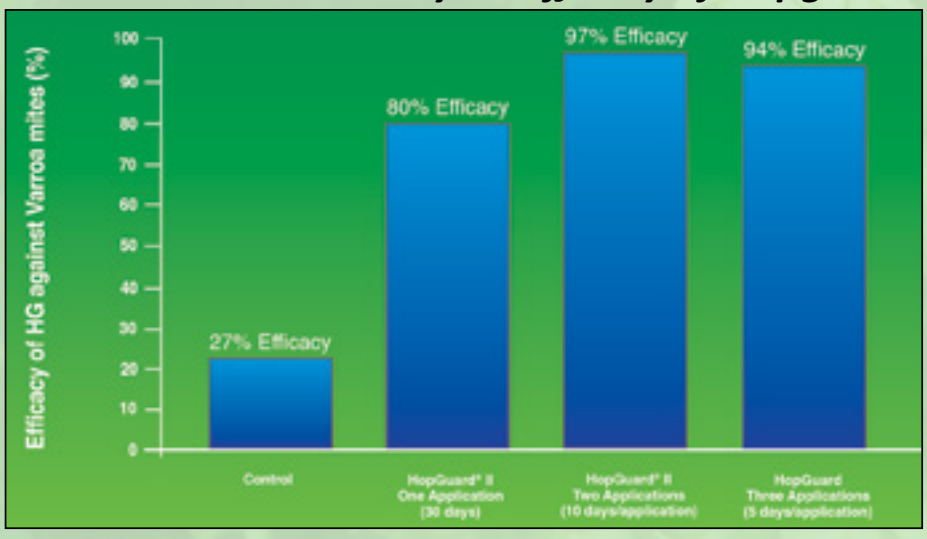

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