8TH EDITION - HBHC *VARROA* GUIDE

NOV 2022

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97% Efficacy
Apistan: 97% Efficacy *(2014, FNOSAD, France)*

93% Efficacy
Apistan: 93% Efficacy (2015, FNOSAD, France)

91% Efficacy
Apistan: 91% Efficacy (2016, FNOSAD, France)

95% Efficacy
Apistan: 95.22% (2017, FNOSAD, France)

Apistan should be used as part of an Integrated Pest Management Strategy

Pockets of resistance are possible, we recommend trialling Apistan on a couple of colonies before widespread use.

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Are Your Colonies Ready to Overwinter?

Successfully overwintering your colonies can be a complicated task. From large commercial operations to backyard hives, beekeepers need to prepare for wintering in the heat of the summer. Seasoned beekeeper, Tom Nolan shares his key steps to getting bees ready for winter—so you can be cracking into stronger, healthier colonies in the spring!

1. MONITOR MITE LEVELS

Determining your colonies' mite counts is critical to inform if you should treat before the winter brood is produced. Ideally, mite counts should be performed monthly. Use a simple alcohol wash, sampling from a frame with older larva (just before capping) to get the best example of a hive's mite count. The typical threshold to prompt treatment is 1-3% infestation—about 3 to 9 mites in a sample of 300 bees.

2. TREAT FOR VARROA MITES

Flexibility is key for fall treatment. *Mite Away Quick Strips™ (MAQS)* and *Formic Pro™* allow you to treat at the end of the honey flow (2-3 brood cycles before Queen goes off-lay), while the last super is still on. The ready-to-use strips make for easy application and quick treatment periods. *MAQS* and *Formic Pro* are all-natural products made with formic acid, killing Varroa mites in the dispersal phase (phoretic) that are found on adult bees and mites under the brood cap, where they reproduce.

3. ENSURE PROPER FEED

Providing your colonies with ample feed stores is essential to keep honey bees healthy over winter. You should commence feeding after your last honey pull, in late summer or early fall. There are a variety of feeders available, 2:1 liquid sucrose in a bucket top feeder is a tried-and-true method for overwintering. Remember: do not feed during *Formic Pro* or *MAQS* treatment period and ensure hives are well-fed before winter wrapping.

4. WRAP YOUR HIVES WELL

Bee Cozy™ Winter Hive Wraps prevent unnecessary heat loss, conserving feed stores over the winter and assisting your bees to brood up faster—so you can split earlier in the spring and be ready for the honey flow. Wrap once temperatures are consistently below cluster point (50°F/10°C), and remove when temperatures are consistently above cluster point and the possibility of snap freezes have passed.

Watch How-To Videos at youtube.com/NODApiaryProducts

Tom Nolan is the Founder and Past President of the *Urban Toronto Beekeepers Association* and lead Sales Representative for *NOD Apiary Products*. His personal mission: to ensure the sustainability of honey bee health. Tom shares his enthusiasm for honey bees by educating beekeepers on best management practices, Varroa control, swarm catching and by volunteering at an organic farm—all while running his successful beekeeping operation: *Hivetown Honey.*

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Contact us to book Tom as a guest speaker for your Bee Association:

info@nodglobal.com

Learn more about *Mite Away Quick Strips, Formic Pro & Bee Cozy Winter Hive Wraps* at www.nodglobal.com

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We would like to sincerely apologize for an unprinted photo credit in the January 2022 issue. One of the two cover images used was taken and submitted by Deborah Sasser. Our deepest apologies to Ms. Sasser.

Cover Photo Submitted by Greg Carey in our Image Contest.

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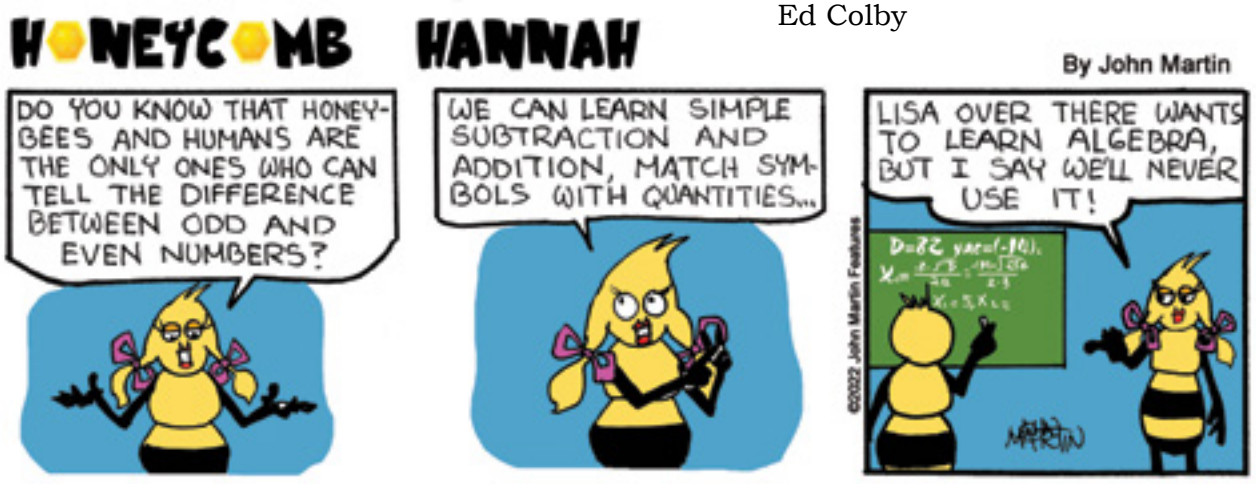

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Treatment Free?

The opinions in this article are mine, but are hardly original. To paraphrase Sir Isaac Newton, "we all stand on the shoulders of giants."

To judge by the views of the new beekeepers and seasoned ones in my local clubs the interest in treatment free beekeeping (TFB) is on the rise. What is TFB and how does it fit into my personal beekeeping philosophy? TFB is only one facet of a style of beekeeping sometimes called Natural, Bee-centric, Apis-centric, Preservationist or Conservationist Beekeeping.

When Rev. Langstroth invented the movable frame hive, he forever changed beekeeping and large scale commercial beekeeping as we know it was born. Large scale commercial beekeepers have two primary goals – to maximize income from pollination and minimize the effort to maintain the hives and extract the honey. We were all taught to keep bees just like the big boys, but, on a smaller scale.

I ask my mentees, "Why do you want to keep bees?" Few want to become commercial beekeepers schelpping bees from the almonds to cherries to buckwheat to apples. Most want to keep bees because we are fascinated by them and love them. Having honey for ourselves, family and friends is a bonus. Sitting in the bee yard on a lovely day is a bonus. Our goals are different than the commercial pollinators and honey producers.

Bees have two goals – to survive and to reproduce. Left to their own devices, they have survived and reproduced for millennia. When we say they would not survive without us, it is because we have completely upended and changed the way they live. One of the scourges of *varroa* is the diseases they harbor and spread. The spread of disease is encouraged by the way we keep bees.

Bees are arboreal insects evolved to live in trees and forests, not open fields. Bees in tree cavities are in perpetual shade. Bees in forests space their hives perhaps 100 feet apart. We cram them close together, and commercial beekeepers palletize them. Bees in such close quarters tend to have more diseases and spread them to other hives. Langstroth hives have thin walls and tree cavities have thick wooden walls to insulate their nest spaces. We keep our smooth walled hives clean and bees in tree cavities completely cover their rough walls with propolis. Tree nests have a thick layer of debris in the bottom of the nest which creates a microbiome with thousands of bits of flora and fauna which have evolved with the bees and help keep the bees healthy. In many places, like East Texas, a tiny little arachnid commonly called book scorpions live in this debris and eat *varroa*. Taking the bees out of their normal habitats and dousing them with chemicals have caused them to be weaker and more vulnerable to diseases and pests. By treating with chemicals, we are breeding stronger mites which are increasingly resistant to the chemicals.

TFB is one aspect of getting bees back to their natural way of living. We have been treatment free for more than a decade and are moving into being more bee-centric. Paraphrasing from "What Bees Want" and adding a few comments our answer to how we keep bees without treating is:

- We tend bees in small hives spaced several feet apart.
- We don't discourage swarming, except to do splits if the bees seem to be getting too crowded.
- We don't harvest honey and replace it with sugar. We leave plenty of honey to overwinter our bees. We keep in mind that here our bees fly nearly all year and need extra honey to see them through. We can always extract any leftover honey in the Spring.
- We keep our bees warm, dry and off the ground.
- We provide eco-floors and insulation. We are in the process of transitioning to insulated hives. My husband is making a variation of a Layens hive called a Long Langstroth hive. It is insulated with wool between double walls. Plans are free online.
- We keep out of the hives. Other than an occasional quick peek at the honey supers we only truly go into the hives twice a year.
- We provide as much organic forage as our gardens can grow.
- We trust natural selection to decide which hives are fit and which are not.
- If we are going to acquire bees, we buy local!

Each beekeeper must find their own path. Exploring various methods helps in the search to find that path. We must respect fellow beekeepers and be kind if their path is different than ours.

Kaye Brouse

• • • • • • • • • • • • • • •

J Miller

I do not normally respond to articles in any magazine, but I just had to respond to Mr. Miller's article about treatment free beekeeping in the October *Bee Culture*. I have heard it said that ignorance and arrogance go together. I see both in Mr. Miller's article. I call what I do 'alternate treatments' based upon the approach of Mother Nature and natural selection. I focus on interrupting brood cycles, smaller colonies and allowing swarms as the treatments that have been shown to be effective in overwintering colonies without any kind of commercial treatments. The cost is higher rates of failure initially and smaller honey and wax yields.

When I mentor newbees, I explain that I am an outlier within the community trying to be more in harmony with the natural approach, but I recommend they follow mainstream practices until they have a couple of years under their belts and then make up their own minds. I am not, as you say, a TF missionary. There are costs, but it can be tough. I was ridiculed initially by a few of my colleagues, but now, mostly people are interested in how I am doing. There are a couple of other members that treat with alternate methods but they mostly keep quiet.

One of the things that frustrated me the most when I read an article like that of Mr. Miller, is that he ignores the fact that beekeepers have different objectives. The big boys need to treat the bees like livestock

and keep all the colonies alive and the honey production high because it impacts their profits. Not necessarily good for the bees. The medium guys that are also looking to maximize returns also need to do the current livestock approach of treatments and manipulation. This is all good and understandable. No arrogant criticism and disagreement. Then there is the third group of beekeepers, two or three colonies that just want to enjoy the experience of sharing with their girls as their girls make honey and prepare for the next year. I love sitting in a chair outside of my apiary and watching the bees going up and down, left and right all the while bringing me to a deep meditative state.

I think there is a very strong argument that those that are treating the bees like livestock are, in reality, the ones that are keeping the bee genome inappropriate for the current environment. It can be argued that the corporate and business beekeepers are keeping the bee genetics from responding to the current environment, thus weakening the bees. Since our queens are mating with your drones, you are retarding the success of our program at great cost to us.

Respectfully,
Jeffrey Wrisley

• • • • • • • • • • • • • • •

New Product

Humanity has had a long relationship with honey bees and products of the hive. The oldest existing beeswax candles date to the sixth-seventh century AD. Many modern day beekeepers are processing small bits of scrap wax comb in the same way the ancients did – heated with water and strained. The internet is full of beekeepers demonstrating this method, but always fail to mention the mess it can make. While scraping melted bees wax off my kitchen floor with a plastic spoon, I decided there had to be a better way.

My name is Sue Hulsmann and I relocate honey bees from structures, owl boxes, garden benches, shed floors and wine barrels in California. I have the privilege of observing beautiful, free form comb built for the perfect airflow and temperature control of each individual colony. While foundationless comb is really beautiful, not all of it is flat enough to rubber band into frames. In my professional experience, all beekeepers can be divided into four categories:

1. Beekeepers who never save scrap comb for any reason
2. Beekeepers who do save scrap comb for rendering but it is _____ (fill in the blank) beforehand and thrown away (Ex: eaten by waxmoths, trampled on by children, "accidentally" thrown away by a family member, buried in the garden by the dog)
3. Beekeepers who save scrap comb, render it and complain about every aspect of the process
4. Beekeepers who save scrap comb, render it, profit from the process and never complain

I designed the California Clarifier so that more beekeepers would find themselves in category four. The Clarifier uses steam to efficiently heat and filter small batches of scrap comb

to render gorgeous beeswax. No fire extinguisher required.

When young house bees build new comb, it is soft and white and produces a light colored wax. As the bees use comb, it becomes dark and hard. Old comb is more difficult to render and produces a darker wax. The California Clarifier is capable of producing bright yellow wax from the darkest comb leaving only cocoon casings in the filter bag.

With inflation skyrocketing, I think many families are concerned about money. The clarifier is a great way for beekeepers to make a little extra income selling beeswax or beeswax products using scraps of comb that might otherwise be thrown away, eaten by waxmoths or buried in the garden by the dog.

To learn more, head to **Caclarifier.com** for purchasing details and an informational video.

To see pictures of crazy comb formation, head to Sue's relocation business page at **Suziandthequeenteam.com**

NEXT MONTH

Region 1
- Mite treatment (one time vapor)
- Honey stores / weight – is it enough?
- Winter wrap
- Relax, read *Bee Culture*
- Pre-order queens for 2023
- Fondant if needed
- Repair equipment / build frames
- Check windbreaks
- Sleep in on vacation

Region 2
- Apple mite treatment if necessary
- Check honey stores
- Feed
- Install mouse guards
- Begin equipment repair, building
- Make a beekeepers Christmas present list
- Check for skunk visits
- Combine weak hives
- Take a break

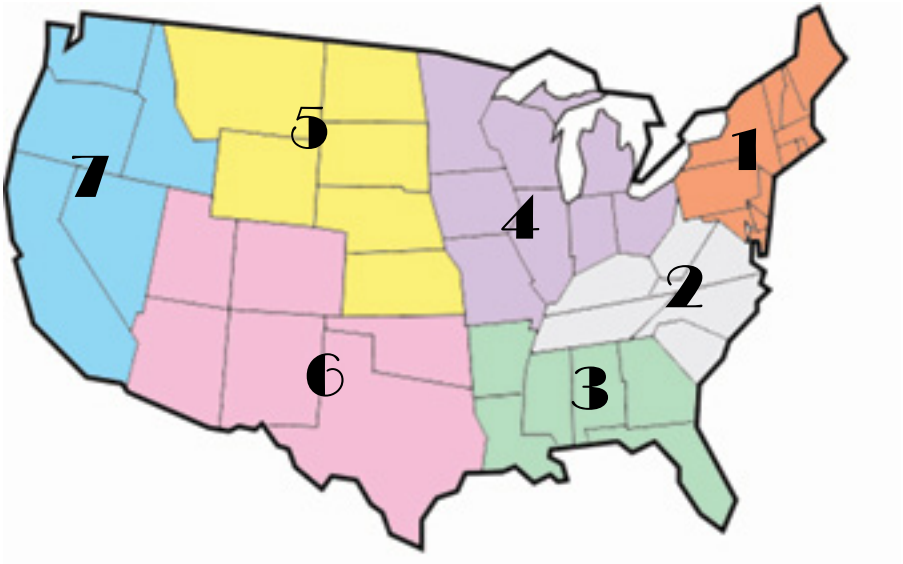
Region 3
- Treat for mites if broodless
- Feed if needed
- Remove deadouts
- Check windbreaks
- Remove mite strips
- Build new boxes and frames
- Order new equipment
- Read *Bee Culture* and Catch the Buzz

Region 4
- Broodless period... treat
- Candy boards on
- Clear entrances of dead bees
- Feed if light
- Replace inner cover with one inch Styrofoam board
- Bees are tucked in bed for Winter
- Winter wrap the hives
- Combine weak hives add frames of honey
- Leave alone if you have done your job
- Start repairing equipment

Region 5
- Check for late brood and queenright
- Make sure lids are wind tight
- Bees in California now
- Mouse guards on
- Feed as needed
- Oxalic drip if broodless
- Moving bees to Texas
- Say a prayer

Region 6
- Already sampled, treated and sampled again in September
- Feed if colonies are light
- On a warm day, check cluster size
- Fondant on now
- Check for dead hives
- Sold all my honey already
- Mite treatments done

Region 7
- If you are a good beekeeper... you are done
- Start feeding to build up for almonds
- Check size of colonies
- Oxalic acid drip time
- Winterize colonies (wrap)
- Check food stores
- Feed if needed
- Read *ABC and XYZ of Bee Culture* book



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NOVEMBER – REGIONAL HONEY PRICE REPORT

	REPORTING REGIONS 1	2	3	4	5	6	7	SUMMARY Range	Avg.	$/lb	History Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS												
55 Gal. Drum, Light	2.73	2.22	3.33	2.94	2.95	2.88	3.68	2.00-4.50	2.95	2.95	2.75	2.20
55 Gal. Drum, Ambr	2.60	2.21	2.96	2.94	3.00	2.83	3.25	2.00-4.50	2.83	2.83	2.60	2.03
60# Light (retail)	265.99	253.33	242.00	222.25	225.00	194.74	291.67	120.00-600.00	249.55	4.16	211.88	197.62
60# Amber (retail)	257.34	241.67	211.33	234.50	260.00	211.49	253.33	120.00-600.00	242.64	4.04	218.12	197.19
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	118.25	114.60	114.00	90.48	133.20	96.00	-	64.80-201.60	112.74	9.39	106.17	89.37
1# 24/case	175.89	183.27	150.67	135.47	173.91	121.92	144.00	96.00-325.00	160.87	6.70	162.53	131.19
2# 12/case	166.64	188.00	135.33	113.38	123.84	123.00	156.00	84.00-300.00	149.36	6.22	152.44	121.38
12.oz. Plas. 24/cs	138.24	156.80	123.00	102.56	98.48	93.48	117.60	72.00-240.00	122.83	6.82	124.25	104.27
5# 6/case	170.07	239.40	164.41	129.68	126.87	136.50	-	96.00-330.00	158.99	5.30	164.41	133.84
Quarts 12/case	234.50	219.75	176.25	162.90	174.09	131.88	201.00	120.00-330.00	195.85	5.44	192.37	154.65
Pints 12/case	137.50	146.00	110.20	100.60	112.10	96.00	123.60	82.00-180.00	119.96	6.66	121.54	97.81
RETAIL SHELF PRICES												
1/2#	6.59	6.66	5.82	5.68	4.00	7.00	-	2.49-12.00	6.31	12.61	6.25	5.48
12 oz. Plastic	7.93	8.02	7.78	7.47	6.59	8.33	6.38	3.25-12.00	7.71	10.28	7.52	6.94
1# Glass/Plastic	10.75	10.20	10.32	8.83	9.47	9.83	9.00	5.69-18.00	10.03	10.03	10.00	8.65
2# Glass/Plastic	19.52	18.14	19.13	16.31	15.40	12.00	15.00	7.99-35.00	18.09	9.05	17.25	15.78
Pint	13.25	13.98	12.02	11.85	11.10	11.25	13.25	4.00-22.00	12.43	8.29	11.84	10.94
Quart	27.32	23.83	21.07	21.67	20.80	22.00	23.38	12.00-50.00	23.09	7.70	21.54	18.75
5# Glass/Plastic	36.96	39.85	46.75	33.78	19.13	32.67	-	5.00-60.00	35.36	7.07	34.91	30.50
1# Cream	13.45	13.08	10.65	12.11	11.00	10.00	16.00	8.00-24.00	12.72	12.72	11.35	10.10
1# Cut Comb	17.00	13.46	11.67	16.00	11.00	-	-	6.00-35.00	15.46	15.46	14.86	13.97
Ross Round	14.14	10.92	-	12.00	-	-	14.83	8.00-20.00	13.35	17.80	13.82	10.98
Wholesale Wax (Lt)	11.24	9.08	6.63	7.94	6.67	4.50	5.39	3.00-20.00	8.58	-	8.41	7.21
Wholesale Wax (Dk)	9.28	7.32	5.75	7.40	7.00	5.33	5.75	2.00-16.00	7.54	-	6.69	6.21
Pollination Fee/Col.	98.00	77.40	-	181.00	200.00	-	49.50	49.00-250.00	111.78	-	94.57	93.10

Please note: anywhere within each region that there is a '-' it is because no information was sent to us for that specific item in that region.

Many Hands Make Light Work
A plea for support!

Dear Friends,

My father always told me that "many hands make light work". That statement has resonated throughout my life, but perhaps more now than ever before. I sincerely thank those of you who have stepped up over the past year to support our campaign to bring fairness to the American honey market. Anti-dumping suits are not cheap, but the results are undeniable. For those who have not yet contributed, or who feel they can do more, it is not too late. And trust me, we NEED your help!

Our industry is under constant assault on multiple fronts: bee health declines, rising input costs, unfair and criminal trade practices, declining labor forces and adverse weather conditions. These are only a few of the challenges we are accustomed to. As farmers, we are resilient, in part because we were raised that way. For generations, this industry has generally been the self-sufficient kind and when we couldn't do it alone, we did it together as a community. We had little need for the kind of government support other agricultural industries had long come to rely upon.

That has changed. In recent decades, business has gotten more complicated. And so too has our work as industry leaders. Putting it bluntly, without significant support from the government and without complex and costly litigation, many in our industry wouldn't still be in business. The AHPA Executive Committee is thankful that you have entrusted us to represent you and the interests in the American beekeeping industry in Washington, DC and in the courts. Because this work matters to all of us.

Most recently, AHPA led the anti-dumping suit against India, Vietnam, Indonesia, Argentina and Brazil. Together, with Sioux Honey and others in the industry, we committed to nearly *$3 million* in legal fees, including the costs of appeals. The AHPA has agreed to *fund a full 50%* of that cost – funding that comes exclusively from members and friends of the industry like you. These costs cannot be accounted for in the regular operating budget of the association. They are simply too large but (hopefully) only come along every decade or two.

The good news? We have collected over $1 million of our commitment. The bad news? *That*

Continued on page 62...

Thoughts on the 47th Apimondia Congress in Turkey

Rod Scarlett, Canadian Honey Council

On August 22nd I traveled to Istanbul to attend Apimondia. Events started with the opening ceremonies in the evening of August 24th. It was followed by a supper hosted by Chile for a select number of voting delegates. The program started on the 25th and the morning stream was on honey fraud. Being involved with the drafting of APIMONDIA's definition for honey, I know first hand that Apimondia is taking the issue of honey fraud very seriously and the presentations focused on the economic impacts, technological advances and aspects of the honey trade. The first session, "Protecting Honey Purity: The USP Identity Standard," presented by Gina Clapper and Norberto García, set the stage. It provided the data outlining the severity of the problem and the definitions needed to address the problem. Subsequent presentations on mitigation measures, supply chain relationships, testing criteria and honey purity programs added to the complexity of the problem. I was particularly struck by the presentation of Etienne Bruneau on "Economic Anomalies" where he illustrated the rapid expansion in honey exports from countries that in no way, shape or form can produce the exported amount of honey. While the USA has addressed some of the problem with the introduction of honey tariffs, it was important to note that not all the countries identified as exporting amounts greater than production are included in the tariffs. For me, I thought this was a very worthwhile session providing information that will prove valuable in discussions with the Canadian Food Inspection Agency. A separate roundtable on honey fraud occurred a couple of days later with panelist fielded questions from convention attendees. As a bonus, having the opportunity to have detailed discussions with Prof. Norberto Garcia and Jodie Goldsworthy of Australia will be useful on the international level. It should be noted that a proposed meeting with the Apimondia honey fraud committee was canceled as too many members were unable to attend. It will be rescheduled to later this Fall.

Later in the week, a second session on climate change caught my eye. Again, a complex issue that beekeepers are going to have to pay increasing attention to as the effects on stock and the environment will have lasting implications. The presentations focused on extreme weather changes, biological resilience and beekeeper management practices.

The closing ceremonies were highlighted by the awarding of the Apimondia Congress in 2025 to a joint bid from the Danish, Norwegian and Swedish Beekeeping Associations. As far as attendance is concerned, I will say that I was pleasantly surprised. My guess is that about over four thousand people showed up over the course of four days. There was good representation from Eastern Europe and the Middle East, and of course Turkey, but the rest of the world (with the exception of Chile, which is hosting the next Apimondia Congress on September 4-8, 2023), not so much. There were about 10 or so Canadians and the same number of Americans in attendance. In conclusion, the 47th International Congress was well run and proved to have a number of sessions that engaged beekeepers as well as academics.

Winter Feeding submitted by Greg Carey

Winter Feeding submitted by Greg Carey

Image Gallery

Hive Insulation & Winter Feeding

Hive Insulation submitted by Greg Carey

Hive Insulation submitted by Greg Carey

FROM JERRY

I live in Ohio now. And what I am about to say pertains to most of the states I have heard from. Honey bees are not appreciated and they are undervalued simply because honey bee biology and good beekeepers always have a supply of honey bees to pollinate most everything in a 2.5 mile radius of their colony. As you all know, if managed honey bees ceased to exist today, pollinator dependent agriculture would fail. 'Other' bees are great but they cannot be managed to provide the numbers needed. So, since the only thing that matters to most businesses and government is money, I took some time to research the dollar value of honey bees in Ohio.

I think you all need to do this for your state. Do it and we'll publish it in *Bee Culture*.

VALUE OF HONEY BEES TO OHIO AGRICULTURE

To date, Ohio has 51,252 colonies for three square miles of foraging per colony = 153,756 square miles of pollination service to 14 million acres of farmland and wild plants (which in turn provide food, harborage and nesting sites for wildlife).

Pollinators are the means by which 70% of plants can reproduce or provide food. According to the United Nations Environment Program, of the 100 crop varieties that provide 90% of the world's food, 71 are pollinated by bees. In North America, honey bees alone pollinate nearly 95 kinds of fruits, such as almonds, avocados, cranberries and apples, in addition to commodity crops like soybean, canola and sunflower and seed crops.

The health of pollinators is directly linked to food security. Pollination services are a core component of global agricultural production, valued at over $125 billion annually. In the U.S., the value of pollination services is estimated to be $20-30 billion annually. In Ohio, the value of honey bees' pollination of the crops below can be estimated as of data collected in 2019-2020 census. Take a look. And this is just from Ohio.

Fruit

Apples – $20.6 million on 3,400 acres of farmland
Peaches – $1.8 million on 640 acres
Strawberries – $3.9 million on 600 acres
Total $26.3 million on 4,640 acres

STUDY HALL

Vegetables

Cucurbits – $7 million cucumbers on 5,000 acres
Squash – $12.9 million on 1,800 acres
Pumpkins- $14.3 million on 438,000 acres
Total $34.2 million on 444,800 acres

Total Fruits + Vegetables alone= $60.5 million on 449,440 acres

Soybeans – $3 billion on 4.9 million acres

Hay and forage – $812 million on 1.720 million acres
Honey sales – $3,477,000 (2019)

Plus pollination of seed and oil crops, floriculture, backyard gardens, woods and fields, parks and preserves.

https://www.centerforfoodsafety.org/issues/304/pollinators-and-pesticides/impacts-on-the-food-supply

WHO IS AT FAULT?

QUESTION

Hello,

I read your article about how the number of beehives are not dwindling. That is good to know. Thank you for the hard work you and the others do and continue to do pollinating our food.

I'm hoping you can help answer a "simple" question I'm researching to help save bees. I recently watched "The Pollinators" on the WaterBear Network.

There was a part in the film where some of the bees died because a neighboring farm (knowingly or not) used pesticides while bees were pollinating a farm nearby.

I'm wondering if there is a system in place for commercial bee pollination that allows farmers to know when and where bees will be pollinating so that they know not to use pesticides before or while the bees are there?

Or is it simply word of mouth and a code of honor that farmers do not use pesticides while bees are in the area?

Any information would help. Thank you for your time and energy in advance.

Blake

ANSWER

First thing is for applicators, both agricultural and beekeepers, to follow **LABEL Directions,** then to be honest, ethical and truthful.

Next is the State Dept. of Agriculture as overseer and regulator, which includes the State Apiary Inspection program, **https://apiaryinspectors.org/**

Then the organization below is trying to help and fill in the gaps. It has several different segments.

https://fieldwatch.com/

All that to say it takes all of us working together.

I hope this helps.

WHERE ARE THEY COMING FROM?

QUESTION

Varroa Mites.

I live in the Pacific Northwest, Woodway Washington to be exact, and have been beekeeping for 16 years. My hives have ranged from about five to 15 over the years, depending on oh so many factors. This year, I began treating my hives with Formic Pro in early August. I had not seen any mites on my bees, no deformed wings and very little mite activity in the brood chamber (I test all hives by removing brood and looking at the developing brood and brood cell, mainly drones but also worker brood). I wanted to get ahead of Fall as all my honey is mostly off. To my surprise and horror, I started to see a massive amount of mite drop in the first 24 hours, hundreds in all the hives! I was shocked and had not seen this much drop while not seeing any signs of mites in the hive. I continue to see mite drop, though slowing down considerably.

Question: where are all the mites coming from? Am I missing signs of mites in some other way?

Thank you for all you do in answering questions and contributing to *Bee Culture.*

Mike Quinn

ANSWER

Those *Varroa* mites are coming from your bees predominately. Not to appear as not supportive or grumpy, but your 'sampling' method for ascertaining the percentage of *Varroa* mites in your colony is simply poor. But, don't feel alone, you are not. ALL colonies have *Varroa.* But just looking at developing drone or worker brood tells you little at this time of the year as brood production slows as Winter approaches. With less brood to reproduce on, the adult *Varroa* will be exposed called phoretic on adult bees in the colony. The standard 'best' method to sample for *Varroa* is an alcohol wash, which means collecting a small number of bees in a designed container with rubbing alcohol and 'washing the sample' (really just a biopsy of the colony). The alcohol removes the mites riding on and around the adult honey bees so you can then count the number of mites per the 300 bees or so in the sample, and come up with a number. Currently, if there are more than three mites per 100 bees after your count and calculation that colony is dead, it just doesn't know it yet.

And this sampling should be done multiple times per year so as to gauge the *Varroa* population throughout the seasons. Sampling in and around the first of August will give you an idea of *Varroa* numbers as the colony prepares for Winter. Winter honey bees live longer than Summer bees and their health is very important because they are not being replaced as often as Summer bees. With the *Varroa* and *Varroa* Virus Legacy, having healthy Winter bees produced is the goal. That means less *Varroa.*

Please Google up (or use the QR code to the right) 'Tools for *Varroa* Management Guide' from the HBHC (Honey Bee Health Coalition). Read and memorize the whole document, but take a look starting at page seven for 'Sampling' options.

Hang in there. If it were easy, everybody would be a beekeeper.

CAN I USE HONEY?

QUESTION

Good Morning Jerry,

I generate enough honey during the year to mix some in my home made pollen patties. The honey is always from my own apiary. Do you see any risks of spreading pathogens, virus and/or other diseases by adding honey to my patties? So that you have perspective, each patty contains a pint of honey and a pint of Mann-lake's Prosweet 77 high fructose corn syrup with Ultra Bee pollen mixed to desired consistency.

Thank you,

Erich

ANSWER

Let me be a bit of a pain here.

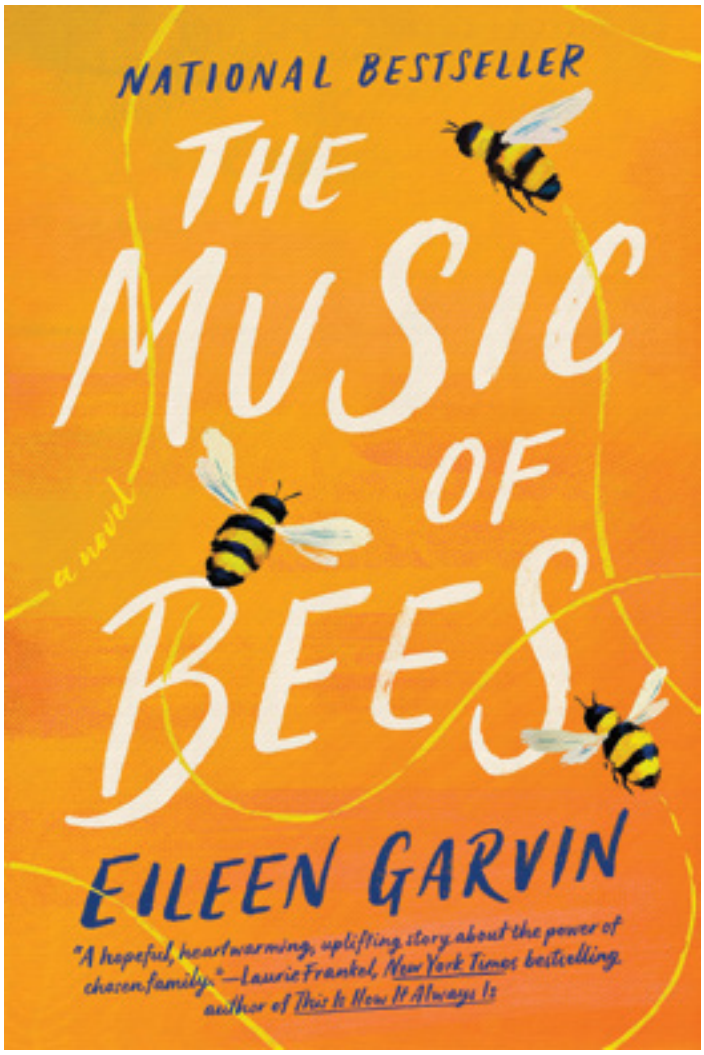
Are your colonies completely sterile and free of bacteria, bacterial spores, fungal/mold spore, viruses and who knows what else? Healthy honey bee colonies can be exposed to disease causing organisms if they are 'healthy'. Just like us, we are exposed to a plethora of viruses, bacteria and fungus/mold each and every minute at home, work and the Big Box store. If you are rested, have proper nutrition and your immune system is functioning properly, we can deal with these without showing disease symptoms. But if we aren't, we can get COVID, Flu, Tetanus, wound infections etc.

All that to say, if you do not have any recognizable disease issues in the colony you are sharing honey from, and the colony you are putting this material in is healthy, you should be okay. But if not… it's a gamble… isn't it? Your call.

From the Editor, Jerry Hayes

Book Review

Dewey Caron



The Music of Bees is a fictitious novel involving three diverse characters bonding together through the magic of honey bees. The author, Eileen Garvin, is an Oregon Apprentice level Master Beekeeper. An eight-year beekeeper, she currently maintains three colonies in Hood River, Oregon, the setting of the novel.

If you want to get "hooked" into reading a novel, the first chapter is masterful. It begins, as all chapters do, with a quote from none other than L. L. Langstroth. Author Garvin provides a rich, deep introduction to wheelchair bound teenager Jake Stevenson, paralyzed from the waist down in a freak accident. The accident dashed his dream of a music future and exasperates an unhealthy home family dynamic. He is rudderless until Jake accidentally meets beekeeper Alice Holtzman.

Author Eileen Garvin introduces 44-year-old hobbyist beekeeper Alice in Chapter 2. Alice is working in a Hood County Planning Commission job where she is overworked and under-appreciated. She is unsettled from the unexpected death of her husband. Her path crosses Jakes as she is rushing to get home before dark with a dozen Russian nucs to install in new hives.

When she faces a crossroads at her Planning Commission day job, Alice begins to seriously consider what she really wants to do – which is to keep honey bees as a full-time pursuit along with a fruit orchard business. But her parents sold the family orchard a few years back and 24 colonies won't pay the bills. After she takes Jake in, he proves handy, caring for the new nucs and Alice's overwintered colonies. Both of their destinies change. Jake turns out to have knack for "listening" to the bees and gains bee care skills rapidly.

There is a third party in the story. Twenty-four-year-old Harry Stokes responds to Alice's employee wanted post. He is a lost soul with acute social anxiety and an inferiority complex and wants little to do with the bees. Alice helps him sort out his life. Columbia River kite surfer Yogi helps draw him out and provides Harry with a purpose.

The bees themselves become almost a fourth character in this warm story about three strangers in a rural Oregon town, each working through grief, brought together by honey bees. The book is rich in details of how bees live and their care. Along the way, we have a nice description of the Hood River area, a valley in the shadow of Mt. Hood, famed for fruit production. (For a look at fruit production and bee pollination in the Hood River Valley see the National Honey Board's YouTube Channel: **https://www.youtube.com/watch?v=7T011wa2W1c)**

This novel is about fighting for what is right. Alice, again by accident, gets involved in a campaign to halt use of a neonicotinoid bee-killing chemical pesticide, being introduced to the orchard farmers, after first-hand experience of them killing her bees. She enlists neighbors and local beekeepers and is joined by Jake and Harry to stage a protest, which ends in a couple of unexpected twists. I won't spoil the ending but it is one of hope and future, not past and poor circumstances.

The Music of Bees, Eileen's first novel was an ABC TV *Good Morning America's* Buzz pick, billed as a heartwarming and uplifting story. It also was a *Good Housekeeping* Book Club Pick, *People* Magazine Best New Book, *Washington Post* Best Summer Read, Indie Next Pick, Library Reads Pick, a Christian Science Monitor Pick and was named a Most Anticipated Book of 2021. It was released as a paperback in 2022 and is available in audiobook and Kindle. (Eileen would consider doing a Zoom presentation to a bee club or book reading on The *Music of Bees*).

In addition to the story, you are sure to enjoy the great beekeeping information supplied by author Eileen.

The Music of Bees by Eileen Garvin. Dutton hardback April 2021, paperback April 2022. 336 pages. ISBN-13 978-0503183922

FOUND IN TRANSLATION

Climate Control

Jay Evans, USDA Beltsville Bee Lab

Listen along here!

Honey bees control the temperature in the core of their colonies to a degree you can only dream of for your home. By humming muscles (burning sugary carbs) and ventilating, they stabilize both temperature and humidity across a wide range of outside conditions. How they do this and the causes of major shifts from normal hive conditions are topics of great interest for colony health. Running too hot in the Winter can stress the cells of bees, or at least reflect the wasteful use of honey. Running too cold also stresses bees, especially brood, and can put colonies at greater risk from parasites and pathogens (which tend to come from lineages that exploit less hot-blooded insects).

Beekeepers and scientists have developed and adopted numerous technologies for monitoring hive conditions. Superfans can find hours of videos by experts in this realm from the most recent International Bee and Hive Monitoring Conference, held at the University of Montana (**https://www.youtube.com/playlist?list=PLK1L4YyuyoO1WxuH-1Dg4sxhM-FOEDYhW_**). Highly accurate thermocouples are inexpensive and depend on minimal energy. Similarly, monitors for humidity are readily available, as are monitors for sound. Slightly more complex probes can determine relative levels of oxygen or CO_2 in the hive environment. All of these measurements can be reported out to the wider world via antennae aimed at cell phone towers or satellites, joining the cacophony of the 'Internet of Things'.

Scientists using this technology receive unprecedented insights into how colony conditions, management and hive materials impact the bubble in which colonies live. In total, the results have some bearing on management and diagnoses of when things are going poorly. They also might change how you manage, feed and house your bees. The concept of indoor weather reports from beehives is not new, of course. Hive temperature values gathered by James Simpson for his 1961 paper *Nest Climate Regulation in Honey Bee Colonies* (**https://www.science.org/doi/10.1126/science.133.3461.1327**) are still accepted as truth for colonies in Winter and Summer and within and outside the cluster of bees. Namely, the cluster itself is HOT, and stable, fluctuating only slightly from 34°C (93°F). This cluster temperature trends lower and becomes a bit less stable in the absence of brood, but Winter bees from Texas to Toronto keep things amazingly hot and stable through the coldest Winter.

So how do beekeepers help their colonies control temperatures efficiently? I have written before about the resurgence in storing colonies in buffered buildings, or underground, during Winter as a means of decreasing stress and honey consumption. What about hive-centered fixes? Working from the outside in, what is it about the hive environment that helps honey bees regulate their inner selves? For any given climate, bees and beekeepers have some say about the building materials and integrity of colony homes. Some beekeepers feel that natural hive cavities and managed hive bodies that most closely match the ancestral homes of honey bees will lead to healthier bees. Groups such as *Apis arborea* (**https://www.apisarborea.org**) are leaning into this idea with naturalistic beekeeping. Others have focused on mass-produced and marketed options. My USDA colleagues Mohamed Alburaki and Miguel Corona have compared the well-used wooden Langstroth hive body to one of the available synthetic hive options. Using bee-free boxes and cold stretches of the Maryland Winter, they showed that synthetic boxes absorbed and maintained solar energy more effectively and (counter-intuitively to me) also kept the hive environment at lower humidity at a range of temperatures (*Polyurethane honey bee hives provide better Winter insulation than wooden hives*, 2022, open-access in *Journal of Apicultural Research,* **https://doi.org/10.1080/00218839.2021.1999578**). These are both desirable traits for a hive structure. Similarly, Daniel Cook and colleagues from Brisbane, Australia, showed in *Thermal impacts of apicultural practice and products on the honey bee colony* (2021, *Journal of Economic Entomology,* **doi: 10.1093/jee/toab023**) that polystyrene hives maintained heat far better than wooden hives, while also showing that stored honey, while costly to heat initially, acted as wonderful insulation for bees trying to keep warm. In prior work, Yasar Erdogran from Turkey did a similar study but with bee-filled colonies (*Comparison of colony performances of honey bee (*Apis mellifera *L.) housed in hives made of different materials,* 2019, in the obscure but accessible *Italian Journal of Science,* **https://doi.org/10.1080/1828051X.2019.1604088**). Here, polyurethane colonies had higher brood production and honey yields than wooden hives, but wooden hives with an exterior sandwich of insulation were significantly better than both, even during the Summer.

Other studies suggest that bees themselves, and their behaviors, are predominant in maintaining a cozy home. Using longterm and precise reporting of temperature and levels

of CO_2, William Meikle and colleagues showed how bees can make different houses work for them in *Honey bee colonies maintain CO_2 and temperature regimes in spite of change in hive ventilation characteristics*, 2022, *Apidologie*, **https://doi.org/ 10.1007/s13592-022-00954-1**). Bees showed a narrow core temperature band in both standard hives and hives with a screen bottom board, and strong daily cycles in CO_2. Colonies had higher CO_2 levels when housed with screen bottom boards but this difference was not as large as the natural daily cycling of CO_2. Dashing a good story, colonies did not show any sort of group-level 'breathing,' whereby gas levels changed on a cycle from seconds to hours. Building on the complexity and seasonal nature of all this, Ugoline Godeau and French colleagues monitored the temperatures of different parts of dozens of hives for two years (!), giving the best view yet of energy loss and heat production within bee homes. In their 2022 pre-print study *Stability in numbers: a positive link between honey bee colony size and thermoregulatory efficiency around the brood* (**https://ecoevorxiv.org/9mwye/**) they reinforce how remarkably stable hive temperatures remain, while showing minor changes with colony size, namely that worker bee population, and not brood numbers, *per se*, is positively tied to temperature stability. This is only true when brood is present and when probes are in areas containing brood. When brood is absent, as observed 60 years ago by Simpson, hive temperatures fluctuate madly.

So how can this information be used to improve beekeeping? It is evident that hive sensors can help determine optimal bee houses for any given climate, and perhaps these sensors will help beekeepers decide when and how to remove honey and swap out drawn frames for foundation with the least impact on the bubble their bees prefer. It is possible that multiple hive temperature sensors can tell beekeepers when brood is absent or retracting, but bees seem to be quite good at showing heat when even small patches of brood are present. Hive sensors that measure CO_2 and other hive gases (oxygen, nitrogen, etc.) are more costly but give unique insights into bee activity, and perhaps the efficient use by bees of incoming energy. How these physical measures mesh with continuous monitoring of hive weight, and sound for that matter, remains to be seen. For now, for most of us, we can get general insights from studies that use accurate and constant probes, but our most useful insights (and satisfaction) will come from lifting hive covers.

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FOR IMMEDIATE RELEASE

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Honey Bee Health Coalition Releases 8th Edition of the Tools for Varroa Management Guide

New Edition includes extensive revisions, treatment tables updates

Keystone, Colo., August 22, 2022— The Honey Bee Health Coalition unveiled the 8th Edition of the Tools for Varroa Management Guide today. The guide provides information on the latest tools and options for beekeepers in the USA and Canada to keep bees healthy and manage varroa mites, which spread disease within and among honey bee colonies.

"As an Apiculture Extension Educator, I often hear from devastated beekeepers who struggle to keep their honey bee colonies healthy and alive. The successful management of varroa mites is critical to keeping honey bees healthy. This guide provides comprehensive information about management options for one the most serious threats to honey bee health," said Ana Heck, Apiculture Extension Educator at Michigan State University.

An expert team of beekeepers, entomologists, Extension agents, apiary inspectors and federal regulators spent more than six months editing the document to bring it up-to-date with changes in best practices and treatment options. The guide details new information on varroa control products including new products that have been approved for release since the 7th edition was released in 2018.

"The Varroa Management Guide is the most valuable tool to include in your varroa management toolbox," said Dewey Caron, Emeritus Professor of Entomology & Wildlife Ecology at the University of Delaware, and a principal author of the guide. "It has what you need to know in one streamlined and concise package. It should help improve overwintering success by helping you flatten the varroa growth curve and reduce bee colony viral epidemics."

Varroa mites represents one of the greatest threats to honey bee health, honey production, and pollination services. Untreated or ineffectively treated colonies can fail, causing economic losses to beekeepers, potentially impacting agricultural food production. Colonies infested with varroa are also a potential source of mites and diseases that can spread to other colonies and apiaries.

Effective varroa control will reduce colony losses and avoid potential spread of infectious disease among honey bee colonies. The Tools for Varroa Management Guide explains practical, effective

methods that beekeepers can employ to measure varroa infestations in their hives and select appropriate control methods.

The full guide is offered free of charge at the Honey Bee Health Coalition's Website: https://honeybeehealthcoalition.org/resources/varroa-management/

About the Honey Bee Health Coalition

The Honey Bee Health Coalition brings together beekeepers, growers, researchers, government agencies, agribusinesses, conservation groups, manufacturers, brands and other key partners to improve the health of honey bees and other pollinators. Its mission is to collaboratively implement solutions that help achieve a healthy population of honey bees while also supporting populations of native and managed pollinators in the context of productive agricultural systems and thriving ecosystems. The Coalition focuses on accelerating the collective impact of efforts in four key areas: forage and nutrition; hive management; crop pest management; and communications, outreach and education.

The Honey Bee Health Coalition is a project of the Keystone Policy Center, a nationally recognized nonprofit that brings together diverse stakeholders to find collaborative, actionable solutions to public policy challenges.

Honey Bee Health Coalition | HoneyBeeHealthCoalition.org | Healthy Bees, Healthy People, Healthy Planet

A Closer LOOK

Requeening

Clarence Collison

The honey bee queen, mother of all individuals in the colony, determines the inherited characteristics of the colony. Periodic replacement of old queens by young and high quality ones is an important management practice in the commercial beekeeping industry. Virgin queens' introduction is independent of weight at emergence and genetic relatedness of their receptor worker bees. A total of 243 queens from three genotypes of *Apis mellifera lamarckii*, *A. m. carnica* and *A. m. ligustica* (81 queens of each genotype) were weighed at emergence and allocated into three groups as: light (110-130 mg) 45 queens, medium (140-160 mg) 68 queens, heavy (over 160 mg) 130 queens and introduced into mating nuclei. The weight at emergence significantly affected the introduction success. Queens with heavy weight at emergence had the highest number of introduction successes with 103 queens (79.23%). The medium weight at emergence of virgin queens has the highest number of failed queens with 26 queens (38.23%). The number of drone laying queens was approximately the same for all groups. Genotype of introduced queens was highly significant and influenced their acceptance success. Introducing *A. m. carnica* and *A. m. lamarckii* to nuclei with workers from the same genotype had the highest introduction success (Masry et al., 2015).

The survival of honey bee queens to 14 days and 15 weeks after introduction into an established bee colony increases with increasing age of the queen at introduction. Survival rates increased strongly to high levels for queen bees introduced between seven and 24 days of age and at a slower rate for queens introduced at ages up to 35 days. The survival rates were similar for sister queens introduced into two unrelated apiaries suggesting that apiary site and beekeeper management differences had minimal effect on survival rates. A year effect was found but the response to increasing age was similar for the three years (Rhodes et al., 2004).

In two experiments with queenright honey-producing colonies, 17% (46 of 276) and 31% (nine of 29) of the old queens were replaced by queens emerging from queen cells introduced with little or no isolation from the original queen. Few old queens were replaced by young virgin queens introduced to colonies with either smoke or vanilla-honey-water sprays (Jay, 1981).

When ripe queen cells (nine to 10 days after grafting) were placed into queenright colonies, only 15% (zero to 39%) of the resident queens were replaced by a new queen. New queens reared in the queenless half of a temporarily divided colony replaced 50% of the resident queens when the colonies were reunited. Of the queenless control colonies, 90% were successfully requeened by the queen cell method (Boch and Avitabile, 1979).

Little is known about the development of the overwintering population of honey bee colonies in temperate climates. Colonies were subjected to one of four requeening treatments: requeened in mid-Summer with a mated, virgin or colony-reared queen, or left with the original queen (control). Worker survival in cohorts of newly emerged bees introduced to colonies in late Summer and Fall was followed until all marked bees had died. Winter bees were reared over a relatively similar length of time in all treatments, but they appeared earlier in control colonies compared to requeened colonies. The gradual increase in proportion of Winter bees over time was similar among treatments, but requeened colonies lagged behind control colonies. The bulk of Winter bees appeared much earlier in control colonies than in colonies that were requeened. This response demonstrates that cues within the colony (i.e., differences due to requeening) are perceived by workers as part of the conditions that influence Summer bee or Winter bee status (Mattila et al., 2001).

In a test of replacement of queens in queenright colonies, mature queen cells (within about a day of queen emergence) were introduced into honey supers during the nectar flow. In the period 1977-1979, a queen cell was introduced into each of the 919 colonies. An examination made five days after cell introduction showed that queens had successfully emerged from 70.3% of the cells, while 11.1% of the cells had been destroyed, 5.7% contained dead queens, and 12.9% were not found. In a comparison of overwintered and package colonies in 1978, in overwintered colonies significantly more queens (61% vs 44%) and significantly fewer cells were destroyed (8.9% vs 25%). Of 474 introductions in 1978-1979, only 12.7% resulted in successful requeening, whereas 53% of the resident queens were retained and 24% were replaced by new queens reared in the colonies (Szabo, 1982).

Honey bee colonies were requeened in the last week of July with newly mated queens, mature queen cells or

supersedure cells. The effects of requeening on sealed brood, adult worker bee populations and colony population demographics were assessed at twelve-day intervals until early December. Requeening altered brood rearing patterns, adult worker bee populations and colony demographics. Requeened colonies contained populations with higher proportions of young bees. By early December, colony population sizes converged amongst treatments and were not statistically different (Harris, 2008).

Honey bee colonies confined to Winter quarters were monitored from December 5 until March 11 to assess changes in sealed brood production, colony demographics and adult populations during Winter confinement. Small amounts of sealed brood were observed to be continuously present in colonies throughout the Winter. Enough brood was reared during the Winter to produce a small but temporary increase in the adult bee population and to replace most of the adults that died during the Winter. Requeened colonies produced slightly more sealed brood during Winter than colonies that had retained their original package queen. Approximately 34–50% of the adults in colonies in March had been reared during the Winter. In March, the average adult colony was composed of workers that ranged from a few days old to 192 days of age. Average Spring adult populations were 13,274 ± 1,078 (range 5,000 to 20,746) (Harris, 2009).

The effect of late Summer requeening on the subsequent development of honey bee colonies during Autumn (Harris, 2008) and when confined in an indoor wintering facility (Harris, 2009) was extended with observations on sealed brood production, colony size and colony demographics every twelve days from March 11 until August 14 after they were removed from their Winter quarters. Average adult populations declined for the first 48 days, and then recovered over the next 24 to 36 days once adult emergence consistently exceeded worker mortality. Rates of mortality for wintered workers were similar to those recorded for bees emerging in April, May, June, July and most of August. The last surviving bees from worker cohorts marked in September and October 1976 died between June 3 and June 15, 1977. Requeening treatment effects were quite variable and not statistically different. Requeened colonies were, however, generally larger than those headed by older queens when the experiment was terminated on August 14 and these colonies were killed and counted. The nine largest colonies belonged to the requeened treatments and contained on average 8,637 more bees (range 85 to 17,735) than the largest colony that had not been requeened. One of the requeened colonies was estimated to have contained slightly more than 80,000 adult bees at its peak population on July 9 (Harris, 2010).

Forty colonies of *Apis mellifera macedonica* were established in Greece with naturally-mated sister queens, two frames of sealed brood and two kilograms of bees, and requeened either every year (A), every two years (B), every three years (C) or left to replace their queens through supersedure (D). All colonies were managed in the same way during the seven-year experiment. Brood area was significantly higher in groups A and B than in C or D, except for the first two years. During the first three years, there were no significant differences in honey production between any of the groups, but group D subsequently produced significantly less honey than all other groups. There were generally no significant differences in each year's honey production between colonies in groups A, B or C, suggesting that requeening every two or three years is adequate (Kostarelou-Damianidou et al., 1995).

Forster (1969) found a highly significant increase in honey production from colonies with first-year queens as opposed to second-year queens, Spring queens as opposed to Autumn queens and queens raised by the colonies themselves as opposed to introduced queens. Furthermore, colonies headed by Spring-raised, first-year queens made no attempt to swarm, so allowing successful management with a minimum of labor and expense.

Two-storied colonies can be successfully requeened by raising the original queen and the brood nest above a division board, rearing a young queen from an introduced cell in the bottom box, and then reuniting both levels when most advantageous. There is no need to find queens, and colony manipulation is reduced to a minimum (Forster, 1972).

These studies were conducted at Beekeeping and Hill Fruits Pests Research Substation, Murrcc, Pakistan during 1998-1999 and 1999-2000. Acceptance and performance or requeening was recorded in honey bee colonies. Four methods of queen introduction were used: standard (with queen introducing cage), standard + perfume, standard + queen killing and standard + vanilla essence, were compared. The highest rate of queen acceptance was observed in standard, yielding 83.33 percent successful introductions. It resulted in better brood rearing, pollen and honey collection activities per hive with 401.81, 101.71 and 183.39 square inch, respectively (Sabir et al., 2002).

The acceptance and survival of queens in honey bee colonies located in a tropical region of Mexico were recorded. Four methods of queen introduction were compared: the traditional (Benton mailing-cage), the traditional plus smearing hexadecane on the cage, the traditional plus rubbing the old queen on the cage screen and the traditional plus smearing vanilla essence on the cage. The highest rate of queen acceptance was obtained with the traditional method, which yielded 80.4% successful introductions. This method differed from the traditional plus hexadecane and from the traditional plus old queen rubbing methods but was not different from the traditional plus vanilla essence method. Of the original experimental queens, 60.8, 39.6 and 28.1% were still in their hives, six, nine and 12 months after being introduced and accepted in colonies. Queen replacement and queen loss increased over time. Six, nine and 12 months after queen introduction, 28.8, 46.2 and 56.5% of the experimental colonies had new queens, whereas in 10.4, 14.2 and 15.4% of them, no queens were found for the same periods, respectively. These results do not support the use of chemicals and queen substances to increase queen acceptance by workers in honey bee colonies. Therefore, it is suggested

that beekeepers continue using the traditional methods of queen introduction, until more reliable methods are developed and tested. Results on queen survival suggest that colonies should be requeened every six to nine months in tropical, Africanized regions (Guzmán-Novoa et al., 1998).

Mated European honey bee queens were introduced into Africanized and European colonies to determine if acceptance rates differed. Prior to introduction, volatile compounds emitted by queens were collected. More queens were accepted by European colonies compared with Africanized. The highest supersedure rate occurred in Africanized colonies during Summer introductions. Queen acceptance did not differ between European and Africanized colonies during Spring or Fall introductions. E-ß-ocimene was the only compound consistently detected in queens prior to their introduction and was present in lower amounts in queens that were rejected within the first week of their introduction. The best time to introduce European queens appears to be in the Fall when overall rejection rates are the lowest (DeGrandi-Hoffman et al., 2007).

Honey bee colonies that have become queenless and develop laying workers are considered lost by beekeepers since they can rarely be requeened by introducing an adult queen. Cargel and Rinderer (2006) tested the hypothesis that such colonies could be successfully requeened with queen cells. The results showed that both Russian and Italian colonies could be requeened with queen cells. Overall, about 60% of colonies were successfully requeened with equal success for Russian and Italian colonies.

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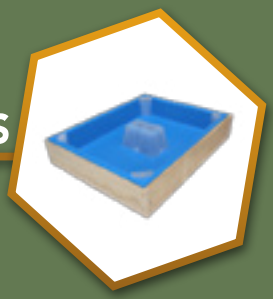

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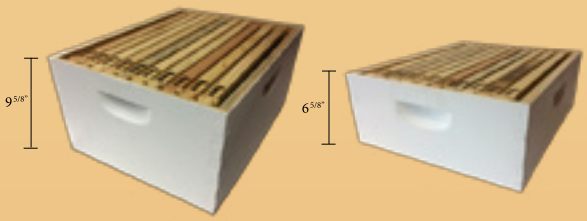

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CIBER
Center for Integrative Bee Research

John Miller

The Center for Integrative Bee Research (CIBER) is located at University of California, Riverside (UCR). On September 10 & 11, 2022, a Bee Health Conference addressed a range of hive health related topics.

I was fortunate to attend, along with invited presenters, a few local beekeepers, local club representatives and a big dose of university researchers, advisors and their students.

The ideas expressed pointed to hive health improvements – and looming threats everyone who likes to eat should think about. I'm serious.

The first CIBER event was in 2018. It was then a new idea led by Dr. Boris Baer & his wife Dr. Barbara Baer-Imhoof. After that 2018 meeting, much deliberation occurred, as is the case in academia. In a bee world of snap judgments; it isn't wrong to have a deliberative time out.

Commercial beekeepers seldom take deliberate time outs – because our world constantly changes. Weather changes large and small, pest control measures on crops where bees are located or under contract can come out of nowhere. A Bee Informed report with disturbing information – commercial beekeepers live in a world convulsed by constant change. Sometimes we flee to the beeyard isolation to escape the constant interruptions.

In 2018 the CIBER priorities were:
- Communication.
- Parasites.
- Pesticides.
- Pasture (including nutrition).

In 2022 the CIBER priorities are:
- Communications
- Parasites
- Pesticides
- Pasture (including nutrition).

But these priorities, though unchanged, have in some cases, significantly different focus than four years ago.

Here are three examples.

At the University of California, Riverside – Dr. Boris Baer's students investigate *Nosema ceranae*.

Jessica Webb shared new *Nosema* insights such as: *Nosema* measurably changes the odor of a honey bee, a key finding in developing metabolomics (a new word for me). Through the lab metabolomics studies, an effective vaccine is in development. *Nosema* spores are a sexually transmitted disease found in the seminal fluid of a queen bee spermatheca. Ms. Webb's presentation was lucid and informative. Currently, in the lab, vaccinations are above 30% effective and approaching 40%.

Deliberate for a moment the benefit to beekeeping if an effective, available *Nosema* vaccine becomes available. In the future, queen rearing operations will be able to vaccinate queen cells, prior to emergence; and if queen mating yards are stocked with drone hives populated with *Nosema*-vaccinated drones, queens and her progeny will be healthier. Queens may live longer, more productive lives. In 2023, queen breeders will graft millions of queen cells. In a few years, queen breeders will vaccinate their stock against *Nosema*.

This innovative approach to a honey bee parasite – this original thinking – rewards beekeepers attending bee meetings. Preventative measures are always more productive than redemptive measures. Project *Apis m.*, among others, funds this research.

Beekeeping has a long, uneasy, destructive, effective relationship with pesticides. During the conference, we were divided into work groups. One of the groups circled back on a several decades old idea. Include a honey bee repellent in pesticide formulations to reduce pesticide kills.

Pesticides are not going away. Americans who like to eat demand safe food. Taste is important. Appearance is important. Flawless is important. Thus, production agriculture uses pesticides to attract customers; literally. Pesticides are with us. The several decades old idea is to craft pesticides that repel honey bees from treated fields… at least repel the non-target insect from the target insect long enough to kill the target insect, and save the non-target

beneficial insects. It's a good idea. Pesticide chemistry has changed in the past 40 years. It might be a good time to re-investigate a repellent action in a pesticide – to save the very good bugs, and still kill the terrible, horrible, very bad bugs bugging us.

We heard an excellent presentation from Samuel Ramsey, Ph.D., the American with deepest Tropilaelaps mercedesae (T.m.) experience. I grabbed a few chilling ideas from his presentation. When T.m. recently expanded its range into Pakistan, it killed every single hive in Pakistan. T.m.'s expanded range now includes Iran. The range expansion of T.m. is eerily similar to that of *Varroa destructor*. At the most, we have 15 years to prepare for T.m. arrival.

Or maybe we have six years to prepare. Or maybe we have three years.

The most disturbing thought for me is this: we, American beekeepers – and all the production agriculture dependent on beneficial pollinators, our bees – currently have one set of eyes on this existential threat. I can think of no better ambassador than Dr. Ramsey to sound the T.m. alarm. Bee research is tragically underfunded. This industry should re-fund additional missions to the existing range of T.m. with a cross-discipline approach. What I mean is – *Varroa* is bad; Tropilaelaps is Ten Times Worse. We must fund additional research and develop materials ten times better to prevent the arrival of T.m. Take the fight to T.m. with the intellectual curiosity shown by Dr. Ramsey; now add ten post-doctoral students. Cross discipline means scientists with experience with different, yet similar parasite/host relationships. We must find a vulnerability. We must find effective treatments. We must invest in the future of food security. Things are different in Thailand than America. Thailand has more species of bees than America. I know that our honey bee, our western honey bee, is arguably the most beneficial insect on earth. I know that our bee, the western honey bee, is the global champion of honey production and managed pollination services. I know Thai beekeepers prefer our bee to any other bee.

Project Apis m. funds Dr. Ramsey's research.

I know making the decision to attend a meeting; get on a plane from North Dakota to California – the motel rooms, the meals and the chaos of air travel is not improved. I know the decision to step away from the computer and our homes – go for four days – to absorb eight hours of compelling content is – for me – a no-brainer decision. I came away from the CIBER meeting inspired and alarmed. A bee meeting adds value for beekeepers large and small when the meeting content inspires and alarms.

A meeting planner's heavy responsibility is to deliver the content. Deliver the ideas. Deliver the solutions, sound the alarms, identify the threats to our businesses, large and small – to make this passion we are all in together – succeed.

Pick out a good meeting. Go. Make a donation to bee research.

"Make something about your life more than about your life."

–Pat Heitkam

New(ish) Beekeeper Column

Off the Wahl Beekeeping

RESOURCES FOR THE NEW BEEKEEPER

Richard Wahl

There Are Many Options

It took me some time after my first swarm catch, which was my introduction to beekeeping, to find reliable sources of information for my beekeeping efforts as I had virtually no knowledge of how to manage a box full of potentially stinging insects. I initially started out by purchasing a book or two and watching YouTube videos. In my second year with bees, I became aware of a local beekeeping club. After about ten years' experience and assisting several other area new beekeepers, I was asked to teach a beginner beekeeping class as part of a local, after school community enrichment program. Only then did I discover larger scale beginner classes offered by the Southeast Michigan Beekeepers Association (SEMBA). This past year I was invited to become a part of that instructor staff and have since assisted in mentoring beginning beekeepers within that organization. This article is devoted to the advantages of taking a class or joining a club that can provide answers for many of the 'how to" questions of the newer beekeeper. There are also many books available on the subject and I will point out a few of my favorites near the end of this article.

Take a Beekeeping Class

SEMBA instructors have at least four to five years of beekeeping experience with most in the ten years plus range. With the assistance and support of the Michigan State University (MSU) entomology department, which devotes some of its time to honey bee research, these mentors are able to utilize space on two MSU off campus farm research facilities, Tollgate Farm and Bowers Farm, where beginning beekeepers can keep their first hives throughout the late Spring and Summer. Classes meet in person at each facility on Sunday afternoons, starting once a month in January until July and August when meetings occur twice a month and once a month thereafter until twelve sessions have been completed. Unfortunately, the 2020 and 2021 sessions could only meet virtually due to the COVID restrictions. This greatly diminished any "hands-on" experience that students would otherwise receive. But this past Spring and Summer, around fifty students took advantage of the hands-on benefits of the class with instructors and students split between the two locations. After their first few months of class participation, students are encouraged, but not required, to purchase a nucleus (nuc) hive and the necessary bee equipment from a seller of their choice. Most students purchase nucleus hives from the instructors and then set them up at one of the two farm locations. A few students simply take the class without purchasing a hive to learn before jumping in as an active beekeeper and observe others' hives for their first year, which is also acceptable. A list of the topics covered in each of the two-hour classes this past year can be found on the internet at "2022 SEMBA Beginner Bee School" under class schedule. One of the unique benefits of the class is that class coordinators bring in well-known guest speakers that have done bee research or have written extensively about beekeeping. This past year's guest speakers have included Dr. Meghan Milbrath, assistant professor in the department of entomology at MSU, Ana Heck, an apiculture extension educator from MSU and Dewey M. Caron, an emeritus professor of entomology and author of the book, *Honey Bee Biology and Beekeeping*. This book was used as the core class text for outside reading and was included as part the class tuition fee.

Additionally, many of Dr. Meghan Milbrath's published articles were used as valuable resource information. Both Meghan (at Bowers) and Ana (at Tollgate) gave some hands-on assistance to students during their guest speaker visits at either location. Since the classes at both locations occur at the same time, a Zoom connection allowed the other half to watch their presentations during subsequent class sessions. An interesting aside is that at Meghan's visit to the Bower site, while she assisted a student with their first hive inspection, they found evidence of European Foulbrood in the hive. This served as an excellent hands-on learning opportunity for all of the Bowers students to actually see and discuss how to handle this disease in real time. The hive was removed shortly thereafter and quarantined with appropriate treatment actions and a replacement provided to the student beekeeper.

Tollgate guest speaker Ana Heck.

The Adventures in Beekeeping

To provide a basis for this article, I interviewed nearly all of the staff of the 2022 SEMBA beginner beekeeping schools. In each interview I asked each staff member three simple questions (or so I thought):

1. What is the most unusual, unique, challenging or exciting thing that has happened to you as a beekeeper?
2. What do you see as the greatest benefit of joining a club or taking a class?
3. What one, most valuable, piece of advice would you give any beekeeper, new or experienced?

The response to question number two in my interviews was the most consistent and near unanimous. Most instructors cited the vast exchange of ideas, resources, expertise and information that is available in a class setting. Michelle Kinney, who handles all the administrative duties for the SEMBA bee school's staff stated that, "Networking with others and learning all the different choices and options that are available to make beekeeping work for your own particular situation and environment is crucial to being successful." She quoted the age-old axiom among beekeepers that, "If you ask ten different beekeepers a question you will get ten different responses or solutions as an answer." Having a variety of choices is not necessarily a bad thing as each beekeeper will have different environmental constraints and desired outcomes and therefore must choose what works best for them. There are hive style and equipment choices along with many mite treatment options as well as the ability to recognize a myriad of different activities that go on in the hive. Becoming aware of the large number of options and differences will only aid in the new beekeepers' potential for success. Rich Wieske, president of MBA and the SEMBA bee school director, with twenty-four years of beekeeping experience, went on to say that, "Having the support of other beekeepers as well as being able to ask questions and get relevant answers from those with prior experience is a needed asset in order to be successful." Mohammed Cherri, a Tollgate instructor, stated that, "Beekeeping seems like an individual endeavor, but it takes a community of knowledge to learn needed skills and to be able to recognize the pitfalls."

The Tollgate Instructors in the beeyard (from left to right): John Dechart, Cecilia Infante, Rich Wieske, Michelle Kinney and Mohammed Cherri

While the response to my second question was quite consistent and similar across the entire staff, the responses to my first question had a much greater variety as would be expected. Two of the instructors stated that their first harvest of honey was the most exciting event of their beekeeping careers to date. John Dechart, with a mere five years beekeeping experience among the Tollgate instructors stated such, after jokingly revealing "I have never made any mistakes, haha". Mark Spencer, a Bowers instructor with eleven beekeeping years, stated his first honey harvest was a big event with about twenty family and friends present to sample his bees' honey in the very first year of his beekeeping efforts. Lisa Stinson, also with the Bowers instructor staff, stated that her most unique aspect, "Is that I am amazed that I even am a beekeeper," and that she really appreciated being able to spend time in her hives during the COVID shut-downs when nearly all other activities were curtailed. Preston Zale, the Bowers school coordinator and lead instructor with about ten years' experience, told about the time he purchased some queens from a dealer in another state. The draw to go out of state was that they came with a thirty day warranty. Going out of state to pick them up involved a day trip and back. He soon learned in his early beekeeping venture that thirty days is not enough to determine any long-term outcome. The hives in which he placed those queens became quite aggressive and none of them made it through the following Winter, even though he took no honey from them, by which time the warranty had long expired. Meanwhile the Tollgate lead instructor, Cecilia Infante, stated that her biggest surprise was that after being stung a few times in her first efforts, her arthritis problems went away for nearly a year. I can also attest to that and although I prefer not to get stung, my own arthritis issues seem to go away for a period of time after receiving a sting.

Instructor Preston Zale explaining mite treatments to the Bowers class. Mark Spencer is seated to the farthest right.

It seems the more one delves into the art of beekeeping, the greater number of medical benefits that can be found with use of hive by-products, as well as the honey. Rich Wieske said his most memorable

Bowers students inspecting their hives, some a bit braver than others.

experience was the first time he pulled a frame from a hive; he thought it was capped honey where it turned out to be capped brood and he hastily returned it to the hive. He also stated that when recently setting up a hive while getting a nuc ready to be moved in, watching bee foragers from another hive checking it out was quite interesting. Another interesting observation occurred while he watched a swarm move into a hive. I also once watched in amazement as a massive bee swarm army that dropped outside the hive, marched across the grass to go into the new hive. I can also say that watching a swarm exit a hive, circle in a thirty-to-fifty-foot area outside the hive, and after only ten to fifteen minutes coagulate into about a five foot diameter circle and fly off causes a flush of conflicting emotions. It was exhilarating and exciting to witness one of nature's reproduction phenomena and at the same time, disappointing to realize probably half of that hive of mine just flew away as happened in my apiary several years ago. I have learned it is better to split a populous hive early, which seems to negate most of the swarming tendency. Another interesting response to my first question came from Mohammed Cherri, who explained his most unusual experience with bees as follows: doing a check of a hive, he found the queen with intentions to mark her. However, during handling, the queen appeared to be dead, or so he thought. Setting the dead queen aside he bought a new queen to replace her. But upon going to replace the aforementioned comatose queen, she was alive and well, moving around the hive as normal. The explanation being that for some reason, during handling, the queen had fainted and had since recovered. Although this is not a common occurrence, I have found other instances and referenced sources that discuss the phenomena of fainting queens along the same lines as fainting goats. Although fainting queens was an area I had never heard of before, and proved to be an interesting response to my first question, I think Kerry Wysocki, an experienced Bowers instructor, had the most interesting, if not somewhat amusing tale to tell. Kerry related that she had been asked to assist a fellow beekeeper do some hive inspections. The requesting individual had some recent health issues and was moving about in a wheelchair with his dedication to beekeeping unwavering. During a running commentary about the frames in the hives they were inspecting, they realized they had pulled a frame with an emerging queen. They had previously spotted another queen in the hive and knew one or the other would most likely get killed if they were both left in the hive together. Not being totally prepared to find a second emerging queen they had to quickly find a container in which to catch this second queen. A quick search occurred and all they could find was a zip-lock baggie. The second queen was placed in the zip-lock inflated bag to take home to be inserted in a nuc. So while Kerry drove them to the location with the nuc, her friend would open the bag every so often to let in a bit of cooler fresh air from the car's air conditioning vent with the concern to not overheat or asphyxiate the new queen. Arriving at the home of her friend, a nuc with brood frames was quickly assembled, while she and the wheelchair bound beekeeper listened to his wife berate them on the hazards of becoming overly stressed while working the bees and possibly exacerbating his health condition. All ended well however, with brood and a new queen in a nuc which was then successfully overwintered. I can only imagine what type of explanation would have been given if they had been pulled over by a cop.

These memories and conversations are but a few of the socially driven lessons and experiences I have been witness to with others in a classroom/teaching type setting. They may seem a bit off the target of what the class offers, but more specifics can be learned about our particular school by going to "2022 SEMBA, Beginning Bee School" on an internet website search engine. With the recent uptick interest in beekeeping, there are many agencies available that offer classes in beekeeping.

Join a Club

According to the Michigan Beekeepers Association (MBA) there are about thirty-two bee clubs in the state of Michigan. I suspect there are like numbers in many of the more bee colony populated states and other countries. Club membership is the first organization where I began to learn much more in-depth knowledge about beekeeping. The cost of becoming a bee club or association member is in most cases a minimal amount per year and well worth the money spent. The MBA, SEMBA or any area club can provide an opportunity to exchange information with other beekeepers with various degrees of experience and knowledge and many organizations have websites that can be found by typing the name or acronym into a search engine. As Kerry Wysocki, current president of the Oakland Beekeepers club states, "It is a great way to exchange ideas and share experiences while learning about beekeeping." And Seven Ponds board member at large, Lisa Stinson, states "When I got involved with the club my bees started surviving." I am sure that my own joining of the local Seven Ponds Bee Club had a lot to do with my continuation in beekeeping. In the case of the Seven Ponds Bee Club, meetings are held once a month at a rural county nature center where three to four bee hives are maintained on site for teaching purposes.

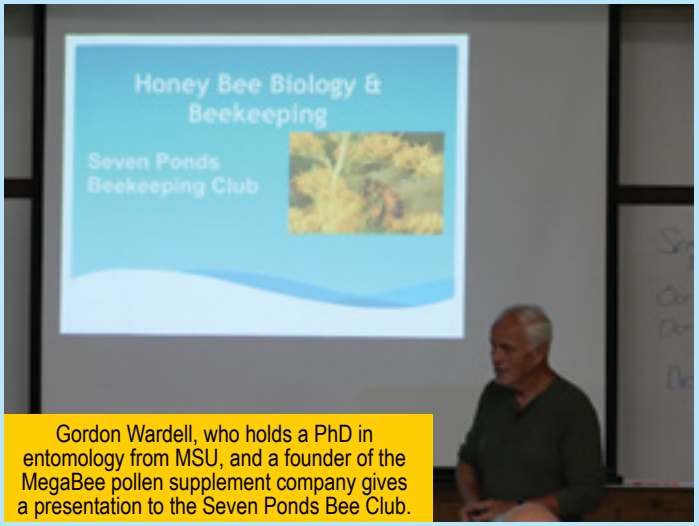
When weather permits, club members can arrive early on meeting nights to go through hive inspections with the club hive maintainers, in our case club president, Preston Zale, or club vice president, Mark Spencer. Yearly membership dues are kept at a nominal $10.00 per year by way of holding a quick raffle prior to each meeting. Members donate bee related

Club president, Preston Zale, explaining hive elements to Seven Ponds Bee Club members out in the bee club demonstration yard.

items, tickets are purchased and just before the meeting starts, a drawing is held to choose winners. The first drawn winning ticket gets to choose any of the evening's donated items on the table with each subsequent drawn ticket winner choosing from what remains until all items are removed. Enough funding is attained through the raffles such that facility use costs are covered, the club can bring in guest speakers such as those mentioned above for the Tollgate and Bowers classes and the raffles or Summer picnic smoker challenge contest can field prizes as big as nuc hives, queen bees or hive tools such as refractometers or hot knives.

At a Sevens Ponds club meeting; board member at large, Dawn Gialanella sits at the raffle table as vice president Mark Spencer pulls the next ticket and president Preston Zale, looks on.

But best of all as Mohammed Cherri states, "Join a club or take a course, nothing beats local knowledge." I believe that Dawn Gialanella, a SEMBA bee school student and at large board member of the Seven Ponds Bee Club summed it up the best when she stated that, "Bee clubs help you keep bees while bee schools teach you how to keep bees."



Gordon Wardell, who holds a PhD in entomology from MSU, and a founder of the MegaBee pollen supplement company gives a presentation to the Seven Ponds Bee Club.

Sage Advice from Experience

The interviewees had a variety of answers for my third question about providing advice. Several noted the need to stay ahead of *varroa* mite loads with John Dechart stating, "What you don't spend in *varroa* treatment you'll be spending in replacing your hives." While Kerry Wysocki put it more bluntly stating, "Have a plan for *varroa* mites and execute that plan or your bees will die." Michelle Kinney feels, "It is important to stay on top of bee news and the latest treatment options as the environment of beekeeping is continually changing." Preston Zale suggests, "Always light your smoker and have it at the ready. When something needs to be done, do it regardless of the weather." Along those same lines Lisa Stinson stated, "Go with your gut intuition when making decisions on what to do since waiting may only expand the problem." Rich Wieske however lends a degree of caution saying, "When you get a new idea, try it on only one hive first; and get comfortable opening your hives for checks on a regular basis." I feel Mark Spencer summed it up by saying, "Enjoy the experience, listen to your bees, it's a lot of work, but remember why you did it."

Read Some Books, Subscribe to a Magazine (like *Bee Culture!*)

Lastly, I said I would say a few things about books. I would have to say my favorite book so far is the *ABC and XYZ of Bee Culture* by A. I. Root because of a bit of nostalgia. The 1929, third edition of this 800-page, hard cover book was owned by my grandfather who for a time kept bees on the family farm. Upon the passing several years ago of a 95-year-old aunt of mine, this book that I never even knew my grandfather had, was inherited by me as the only family member currently interested in beekeeping. I have read this book several times and it surprises me how much nearly one hundred-year-old techniques are still used today while the current edition (the 42nd edition) incorporates many recent changes to the management of bees. (Get it here: **https://store.beeculture.com/42nd-edition-of-abc-xyz/**)

Another book that has proved most useful and as mentioned before as being used as our class text, is *Honey Bee Biology and Beekeeping* by Dewey M. Caron. This book not only covers many aspects of how to be a successful beekeeper but gets into much of the underlying bee anatomy and why bees are as successful as they are in what they do. Both of the current editions of these books run in the $75.00 price range. If looking for something less expensive that still covers the basics quite well, I would suggest the paperback *The New Starting Right with Bees* by Kim Flottum and Kathy Summers (Get it here: **https://store.beeculture.com/the-new-starting-right-with-bees/**) or *The Backyard Beekeeper* by Kim Flottum (Get it here: **https://store.beeculture.com/the-backyard-beekeeper-4th-edition/**). Both can be found as used copies for as little as $5.00. To get off on the right foot in beekeeping Cecilia Infante recommends, "Spend your first year learning and reading from everyone before buying bees or any one item of beekeeping gear." These books and many others would be a good place to start. Naturally there are also monthly beekeeping magazines to which one can subscribe. Of course, I am biased toward *"Bee Culture The Magazine of American Beekeeping"* which has been publishing my articles this past year. Whichever direction you choose to take with your beekeeping education, there are seemingly unlimited resources available. Choose learning as a partner condition with your beekeeping and I do not think you will be disappointed with the potential rewards of working with this fascinating insect.

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Some of Oregon's major pollination crops include seed crops (vegetable, cover crop and clover), blueberry, blackberry, raspberry, cranberry, cherry and pear.

While Oregon does not have an official state apiary program or apiary inspector, several organizations are actively involved with the State's honey bees. All owners of five or more colonies of honey bees within the State must register their hives with the Oregon Department of Agriculture. In 2019, 201 beekeepers registered a total of 75,918 hives. Hive Registration fees are transferred to Oregon State University's Honey Bee Lab which focuses on honey bee health, nutrition and pollination with the goal of servicing commercial beekeepers, backyard beekeepers, producers and all interested citizens. The lab also provides beekeepers with diagnostic services, including parasite and pathogen levels, colony nutritional status assessments and pesticide analyses. In addition, the lab hosts the Bee Informed Partnership's PNW Tech Transfer Team that serves commercial beekeepers in the Pacific Northwest by inspecting/sampling their colonies at specified intervals and providing timely test results.

The Oregon Master Beekeeper program (a collaborative effort between OSU and Oregon State Beekeepers Association) provides education and training to new beekeepers and all interested stakeholders in the State.

The APHIS National Honey Bee Survey has historically been conducted as a joint effort between OSU and ODA.

"The Oregon Bee Project" is Oregon's Pollinator Protection Plan, consisting of ODA, Oregon Department of Forestry (ODF) and the OSU Extension working together to: 1) decrease pesticide exposure, 2) increase pollinator habitat, 3) reduce honey bee losses to pests and diseases and 4) expand our understanding of the State's native bee biodiversity. The Oregon Bee Project has a number of initiatives to promote these goals including: training through pesticide recertification, outreach to the public through OSU Master certificate programs (Oregon Master Gardeners, Master Beekeepers and Master Melittologist programs), showcasing land managers who exemplify pollinator protection and a statewide native bee survey (Oregon Bee Atlas).

The Aha Moment

Lucy Winn,
2022 American Honey Queen

Houston Livestock Show

2022 American Honey Queen Lucy Winn

Moravian Academy

NJ State Fair

I always enjoy spending time in Bethlehem, Pennsylvania. My visit this past May was particularly sweet. I spent the day at Nitchmann Middle School and offered cooking demonstrations to seven classes of family and consumer science students. I called on the sixth, seventh and eighth graders to measure, mix and flip. Together, we made delicious honey french toast with local Pennsylvania honey. As we cooked, I explained the process of honey production, discussed the importance of supporting local beekeepers and showed the students a few varieties of honey extracted in the surrounding region. Knowing my audience, I tried to make my presentation feel less like a class lecture and more like a conversation. I made sure that everybody participated in making the recipe and I always invited questions. When our plates were full and it was time to dig in, I saw it: the "aha moment."

The aha moment is a nonverbal confirmation that I have successfully done my job, and it is what I look for every time I am giving a presentation or speaking publicly about the honey industry. Head tilt, with eyes lit up, typically followed by an exclamation or another question – the aha moment is a moment of realization and affirmation that the audience is "getting it." At Nichmann Middle School, I saw the aha moment when the food science students realized the quality of local honey and understood its importance within the culinary and agriculture industries. Aha!

What can we do to see that aha moment more often? How do we emphasize the true importance of honey bees to the general public?

In my travels as the 2022 American Honey Queen, I have found that most people are open to learning about honey bees. I love sharing information on this topic, yet I suspect most of us experience the same initial questions – where do I start? Bee biology? Honey production? Hive care? Honey and its importance are rich and pressing topics of discussion, especially helping audiences to know where their honey comes from; however, the correct answer to our question is simple. We should start with the topic we enjoy most. Through speaking about an aspect of the honey industry that most piques our interest, the audience is sure to find it interesting and worthwhile. Sometimes, there is no greater teacher than enthusiasm.

Regardless of topic, I always avoid overly technical jargon – even with students as smart as those at Nitchmann Middle School. Getting lost in technical terms and language of the industry can muddy the presentation. Cut through the noise, highlight important details and get to the main point. Our goal as educators is always to inspire questions and make connections regarding beekeeping.

To this end, I have found it useful to build a relationship with my audience by asking them questions, inviting participation and tying the presentation back to the audience and their area of interest. For food science students, discussing honey production while executing a recipe was engaging, but for a group of young Girl Scouts, an interactive craft explaining the anatomy of honey bees with colorful pom-poms and pipe cleaners might be more welcome.

My tips and tricks for presentations are straightforward and I have found that they are effective. Encourage questions. Speak clearly. Use simple terms everyone can understand and keep your presentation brief. Don't be afraid to show your own enthusiasm. Finally, keep your eyes open for those aha moments (and know that some honey samples for the audience never hurts)!

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Dead bees on the ground.

Speak Out

Jennifer Bryan-Goforth

For commercial beekeepers, pesticide damage to bees is hugely impactful, with losses in the hundreds or even thousands of colonies. But for hobbyist beekeepers like Charles and Lisa Jacks, the loss of a few colonies can also feel like a major disaster.

In a typical year, the Jacks keep three to four hives. In the early Spring of 2021, their bee compound had increased to ten colonies after splitting and capturing additional swarms. Residents of a community outside of Snellville, GA known as the "Promised Land," the Jacks have about a half-acre of property around their home and were busily caring for the bees during the active Spring season. Their hives are placed facing the house in the backyard, and the loud buzzing sound as they walk out of their backdoor has been a source of pleasure for years. "It's a nice feeling, hearing the bees at their work," Lisa recalled.

In May 2021, a pest control company representative campaigned door to door in the neighborhood with the hopes of drumming up some business, promoting services with their company sales pitch of "We can kill anything!" The rep approached Charles and Lisa, who firmly declined the services, explaining that their property was maintained as a wildlife habitat and included multiple beehives. They asked that no pesticides be applied near their home as they were concerned about damage to pollinators and other wildlife. The company rep assured them that all of their products were "environmentally friendly pesticides," and the Jacks took a bit of time to explain that this was a misnomer, that applying a pesticide always has an impact on the environment and that bees were particularly susceptible to damage from pesticides. Charles requested that he receive notification from the company if any product was applied to the surrounding properties. He did not receive notification, but the pest control company truck was visible in the neighborhood over the next several days, seen applying their "environmentally friendly" pesticide to other homes on their street.

A couple of days after first seeing the truck, Lisa walked outside into the warm sunshine to complete silence. No hum of bees. She walked around the corner to the hive compound to find the ground completely

Dead bees in the hive.

littered with dead bees. Charles joined her and as they were viewing the damage, there were bees literally dropping from the air in front of them. They immediately identified the possibility that the bees had been exposed to toxic chemicals sprayed by the pest control company. Reaching out to local bee groups to share their experience and ask for advice, they were provided contacts for the University of Georgia and the state agriculture department to address their concern and losses.

The references proved to be invaluable. The department of agriculture sent out an agent who took samples of bees, wax and honey. Testing revealed the presence of the broad-spectrum insecticide fipronil in the bee samples. Fipronil is a widely used pesticide, applied around homes to kill fleas, ants, ticks and cockroaches. It is highly toxic to many creatures including rabbits, many types of fish and birds, lizards and bees. Fipronil is a systemic pesticide, prone to drift and runoff, and often found in residential settings (Gan, 2012). It is also extremely toxic in much lower doses than many other systemic pesticides. Studies show that fipronil is present in groundwater samples even in countries where agricultural or outdoor residential use is banned, likely from the use of pet flea treatment products such as Frontline. Agricultural use of fipronil in the EU was banned in 2017, but applications of this toxic pesticide continue in the U.S. primarily for use in granular turf products, seed treatments, topical pet care products, termiticides and agricultural uses. For the past several years, there has been increasing concern over groundwater contamination, one study states “In the Southeast, where fipronil was detected more frequently than in the other four regions, 52% of streams sampled had fipronil compound concentrations that exceeded the benign level.” (Miller, 2020).

When Charles and Lisa’s bees were killed, they were most likely impacted by drift or direct exposure during the application process. Although fipronil was found in the bodies of the dead bees, it was not found in the wax or honey which would indicate acute rather than chronic exposure. After analyzing testing results, the state agency requested documentation and records from the pest

control company and found multiple violations including a lack of proper training for pesticide applicators and inaccuracies in legally required record keeping. The state agriculture department cited the infraction and levied a penalty fee against the pest control company. The Jacks lost seven of their ten hives from exposure to fipronil. One neighbor reported the loss of chickens, and others found dead songbirds in their yards.

Two months after the bee kill, the pesticide company trucks returned to the neighborhood. This time, Charles and Lisa Jacks began the process of reporting and testing yet another bee kill. This time, the state agency revoked the pest control company's permit.

Although reporting did not help Charles and Lisa recover their losses, their experience highlights the importance of reporting bee kills and pesticide incidents to state agencies. Hobbyist beekeepers often refrain from reporting pesticide incidents as they compare their losses with those at the commercial level. But a 70% loss in colonies due to pesticide exposure feels catastrophic to any beekeeper. Reporting suspected pesticide damage to bees is a critical step in data collection and can play a major role in the permitting and regulatory process. Without this data, regulatory agencies rely on studies funded by pesticide manufacturers, who have been accused of downplaying risk factors and including biased information. Dr. Delena Norris-Tull from the University of Montana Western writes, "The U.S. EPA is responsible for approving herbicides and pesticides for use in the United States. In order for a product to be approved, and thus registered for use, the EPA has to conclude that the product, when used according to the label instructions, is not likely to cause unreasonable adverse effects to humans or the environment. The chemical company is required to provide data on the product related to potential toxicity to mammals, soil residues, potential exposure in food and drinking water, any cumulative effects of the product, its safety for infants, children and adults and its potential impacts on immune and endocrine systems. In my 2017 interview with Slade Franklin, Wyoming Department of Agriculture Weed and Pest Coordinator, he told me, 'The EPA requires the agrochemical companies to conduct their own research to prove the safety of their chemicals. The companies give grants to university scientists to conduct the research.'" (Norris-Tull, 2020)

Using incident reports, regulatory agencies can have a better understanding of the consequences and adverse effects of pesticide use. With this information, regulations including application directions and use restrictions can change and may result in the removal of a pesticide from the marketplace. Unfortunately, states are not legally obligated to share reports of bee kills/pesticide incidents with federal regulatory agencies. While some states do take the important step of sharing their pesticide incident data with the EPA, many do not. The Pollinator Stewardship Council provides a free service to submit state-level reports with the EPA for members residing in states who do not report at the federal level.

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Minding Your Bees And Cues

The Fascinating World of Ditch Management

Becky Masterman & Bridget Mendel

Do you remember *Ms. Rumphius*, the children's book by Barbara Cooney? In it, a little girl in Maine is charged by her grandfather to do something to make the world a more beautiful place. Spoiler alert: what she ends up doing is scattering lupine seeds all over her neighborhood, beside roads, in ditches and on hillsides. She becomes known as "that crazy old lady" who rides her bike around the neighborhood throwing handfuls of seeds. In the Spring, the whole town is covered with beautiful blue and purple and rose colored lupines.

An even more popular seed thrower is the legendary Johnny Appleseed (**https://en.wikipedia.org/wiki/Johnny_Appleseed**), who in folklore traipsed across the country slinging apple seeds (and wearing a tin pot on his head). The real man behind the legend, John Chapman, did in fact plant apples in the early 1800's, but not strictly helter-skelter. He planted and tended nurseries, introducing apples across North America.

He also apparently sowed dog fennel seeds (*Eupatorium capillifolium*), which are now considered a noxious invasive weed in some parts of the country.

Which brings us to our thesis: roadsides and the plants that grow in them are complicated; attempts to improve them are usually imperfect and will make someone mad; but efforts are still worth making because they will make a bee happy.

We all know that planting seeds is the number one action we need to take to help pollinators. Because we don't all have the same access to land on which to put those seeds, planting gets perplexing. Public or publicly-used lands become of interest for many of us, as a significant acreage of potentially pollinator-friendly geography. But of course, not everyone has the same goals when planting for pollinators.

Johnny's invasive dog fennel has an equivalent in the aggressively-cheery yellow colored birdsfoot trefoil, loved by honey bees but despised by native plant ecologists. **Articles such as this one (https://www.honeybeesuite.com/what-is-ethical-beekeeping/)** dig (with questionable success) into the ethics of beekeepers throwing clover seed along roadsides that subsequently may require more maintenance (and taxpayer dollars) to control their spread. Since honey bees need food, beekeepers are primo candidates to engage with the roadside authorities-that-be to find ways to add flowers to management plans.

Now and again, one sees a berm of goldenrod or a length of purple asters or joe-pye-weed along a highway, but it's certainly not consistent. Many competing factors go into roadside management, such as the need for clear sight lines for drivers, and safe spaces to pull over along the roadways. Roadside managers juggle competing (but potentially complementary) environmental concerns as well: erosion control, stormwater

Roadside managed by the Minnesota Department of Transportation. While this strip of land is not planted specifically for pollinators, when nutritional opportunities emerge, bees find them.
Photo Credit: Rebecca Masterman

This roadside is planted for pollinators and managed for sight lines.
Photo Credit: Rebecca Masterman

management, invasive weed control, and pest control.

Traffic is of course, dangerous for all living things that collide with it, so attracting birds, butterflies and bees to busy roadsides is a double edged sword. In our northern climates, salt, used on ice and snow in Winter, also has an impact on the adjacent habitat. In a fascinating paper (**https://www.pnas.org/doi/10.1073/pnas.1323607111**) researcher Emily Snell-Rood discusses the impact that high levels of sodium have on trait selection in monarch and cabbage white butterflies: while there are positive effects for butterflies reared on sodium-rich roadside milkweed, their survivorship levels are significantly lower than non-roadside-reared butterflies.

Your brain brimming with knowledge about the perils of roadside plantings, you might be tempted to give up. But bees can't be choosy these days, and need every inch of habitat they can get, and roadsides, by definition connective, can help create corridors of connective (if imperfect) habitat.

In our state, the Minnesota Department of Transportation directly manages about 10% of roadways, equaling about 175,000 acres of greenspace along 12,000 miles of Interstate, State and U.S. Highways. One method they use to increase pollinator (and bird) habitat on roadways is to engage external partners: communities can "adopt" a roadway and help to maintain it (**https://www.dnr.state.mn.us/roadsides-forwildlife/index.html**) or "sponsor" a roadway and fund restoration and maintenance efforts (**https://www.dot.state.mn.us/highway-sponsorship/about.html**). Why not ask Siri who your local road authorities are, and what they are doing to promote habitat when possible? Then ask yourself what *you* can do to make your highways more habitable—and the world a more beautiful place.

Becky Masterman led the UMN Bee Squad from 2013-2019. Bridget Mendel joined the Bee Squad in 2013 and has led the program since 2020. Photos of Becky (left) and Bridget (right) looking for their respective hives. Please share any thoughts about roadside and ditch flowers or your beekeeping superstitions via email to mindingyourbeesandcues@gmail.com

Acknowledgement

The authors would like to thank Dr. Marla Spivak for helpful edits and suggestions.

So, You Want to be a Beekeeper

Stephen Bishop

Earlier this year, the leadership of my local bee club unleashed me onto our newest crop of initiates. I'm proud to say I quickly winnowed the proverbial wheat from the chaff. In fact, only a few of those thirty-three bright and shining faces, who hours earlier were eager to learn the mysteries of the hive and do their own little part to help save the bees, withstood the thoroughness of my after-lunch presentation. The strongest of the bunch were able to hold their eyelids open for a good 45 minutes without yawning. The weakest quickly dropped into slumber five minutes in.

Alas, these days you have to teach to the test—and the test, in this case, was a multiple-choice examination of the human brain's ability to memorize a bevy of beekeeping facts. But as we all know, beekeeping is more than rote memorization. It's a journey into some of the deepest moral quandaries of human existence—for instance, when faced with an overzealous guard bee that is determined to implant its stinger in your forehead, is it better to swat and flail or to never have swatted at all? It's conundrums like this that really encapsulate what it means to keep bees, so the sooner we start teaching the advanced problem solving needed to face such dilemmas, the better off our fledgling beekeepers will fare.

So, if any beginning beekeepers happen to be reading this and would like a true test of what it means to be a beekeeper, you can practice your problem-solving skills on the following questions.

Question 1: Ye Gads! A runaway grizzly bear is barreling toward your apiary. Because of your poor fence-building abilities, your electric fence is somehow cross wired and only has a enough voltage to protect one section of the apiary. In section one are fifteen hives—fifteen swarmy hives that have produced a pitiful pittance of honey. In section two are five hives—your crowning achievements, stacked high with honey supers. These five hives produce more honey than the other fifteen combined. Which section of fence do you electrify? Do you save the five or fifteen?

Question 2: At 1:30 P.M. on March 25th, you are required to attend a mandatory meeting at your soul-crushing workplace. However, at 1:10 P.M. on March 25th, you get a text message from your neighbor who informs you that one of your hives has swarmed. The swarm is currently hanging on a little cherry tree, about chest high, and is bigger than a July watermelon. What do you do?

Question 3: As an up-and-coming wealthy beekeeping bachelorette, you have attracted the attention of many suitors. However, two stand out from the crowd. One is charming and handsome, with an infectious smile that brightens even the darkest bee veil. The other is kind of annoying, though handsome enough, and comes from a wealthy family that owns large tracts of land, specifically forestland filled with gnarly old sourwood trees. You are currently trying to expand your beekeeping empire and need new apiary sites. Whose proposal do you accept?

Question 4: A *varroa* mite, wax moth and small hive beetle walk into a bar. You, as a barkeeper and owner of the establishment, have the power to treat them to a free round on the house. Do you treat? If so, what do you treat them with? What are the label requirements for said treatment? What are the repercussions for not treating?

If you answer one out of four questions correctly, you are likely a master beekeeper. If you answer all four correctly, you are wise beyond all comprehension and well on your way to founding a beekeeping cult.

Stephen Bishop is an enlightened beekeeper in Shelby, NC. You can read more of his humor writing at ***misfitfarmer.com*** *or follow him on Twitter @themisfitfarmer.*

BEE VET

Emerging Diseases in Honey Bees

Dr. Tracy Farone

As a Pennsylvania girl, I grew up with rabies. Clearly, I do not mean I had the disease rabies, but that this deadly disease was all around me – endemic in our mammalian wildlife population. We, Pennsylvanians, knew how to handle it. We took our dogs and the cats we could catch to the rabies clinic, and at a young age, we were pulled aside for "the talk." The talk went something like this: "If you see a weird raccoon or groundhog in the yard, do not touch it, but call mom or dad to come shoot it." End of talk and end of report. You can imagine my surprise (and several of my PA classmates' surprise) when during our freshmen year in veterinary school, Ohio was freaking out about rabies, like it was a new thing. Well, it was new to them. In the mid-1990's Ohio had their first reported case of rabies in terrestrial (non-bat) wildlife. Us Pennsylvanians just blinked, shrugged and were like, "Wow, they didn't have rabies in the State, at all? I suppose they'll have to learn the talk." To this day, government programs distribute rabies vaccine baits by throwing them out of airplanes and trucks along the Ohio Pennsylvania border, in hopes of vaccinating rogue raccoons that may enter the State from the Commonwealth. However, rabies is now considered endemic in wildlife populations in Eastern Ohio.

There are countless case studies and lessons about the emergence and spread of different diseases in humans and animals throughout the world over time. Honey bees are no exception. Consider what is currently going on in Australia with emerging parasites, *Varroa* and the Braula fly. We naturally want to do anything we can do to eradicate diseases from the face of the Earth, however actual eradication is almost never a true reality. In previous Bee Vet articles, I defined emerging diseases and explained **three levels** of disease management. I provide a couple of summary reviews here, especially since I have seen incorrect use of the words in the literature and news reports.

Review
(From BC September 2020 issue, Bee Vet: Tropilaelosis)

"Emerging infectious diseases are infections that have recently and newly appeared in a population of humans or animals. Emerging diseases often arise when they are brought into new geographical ranges and/or species. Some causes of emerging disease may not have been previously known, while others may already be known, and pose a serious threat, if they are able to increase their geographic range… Many emerging diseases often originate from "foreign" or "exotic" diseases (or newly named "transboundary diseases"). Foreign, exotic, or transboundary diseases are diseases that naturally exist in a certain country, continent or areas of the world, but may cross borders, continents and/or oceans to infect new regions. If allowed to move into new geographical areas, foreign diseases can emerge in a population with little natural immunity against the disease agent. Therefore, these diseases can cause high morbidity and/or mortality when introduced to the new population of animals or humans. In our modern world, international trade, migrations and travel often accommodates hitch-hiking diseases and pests."

Braula fly

(From BC March 2022 issue, Bee Vet: Immunity, Vaccines & Honey Bees: Part 1)

"1. Eradication of disease: This means there is no active disease left in the population on Earth! This is an extremely rare accomplishment, which has only occurred twice in the history of man or beast out of the thousands of known diseases that inflict us… (Smallpox and Rinderpest)
2. Elimination of disease: Elimination means a previously existing disease is no longer present in a population in a certain geographical area, but it's still present in other parts of the world. Examples of diseases eliminated from the United States include yellow fever, polio and malaria. This does not mean that the disease cannot reemerge in the area if precautionary measures are ignored…
3. Control of disease: Control of a disease means that the disease is still present in a population, but it is reduced and manageable within the health care system, has a relatively low mortality rate, and/or has become endemic. This is the typical expectation and usually what happens with most diseases and vaccine use."

Now for some new learning…

Considerations in population medicine

Population medicine or herd medicine are terms that we use to describe the concepts of looking at disease management from a group perspective. Sometimes this group is a single herd, yard or flock of animals, sometimes it could be the entire human population of a country or even the world. There are certain fundamental principles that should be applied in population medicine challenges.

1. **Understand the methods of spread of the disease:** To effectively develop controls for the spread of disease, we must fully understand the way(s) the disease is transmitted. For example: Managing sexually transmitted diseases verses managing aerosol transmitted diseases would demand different protocols and recommendations.
2. **Understanding origin and scope:** The origin (geography and species) of a disease can clarify the natural epidemiology of the disease, so we may be better able to recognize symptoms, transmission methods and expected morbidity and mortality of the disease. Knowing the existing geographical scope and incidence within human or animal populations is important to evaluate, as managing isolated verses global cases is very different.
3. **Understand we are limited by our diagnostics:** Surveillance testing is a key component to monitoring possible emerging diseases or changes in diseases' incidence and is appropriate before and at the beginning of an outbreak. If you do not test for something you will not find it, but if you do test for something you are likely to find it… sooner or later. This can be a double-edged sword. How much information is necessary to switch surveillance to management? "Contact-tracing" may be helpful in the initial stages of an outbreak but over time, the lines on the map just merge into one big blob.

No testing methods are perfect. All diagnostics are subject to sensitivity (positive results are truly positive cases) and specificity (negative results are truly negative cases) percentages. We also know that the "first" positive case we find of a disease in an area is actually an indication that the disease is already there…maybe for a while.

Varroa mother mite. Photo credit: Alex Wild

4. **Geography and weather may play a role.** In considering geography, islands often have the unique benefit of isolation that can make disease-free areas more possible. Many islands, like Australia and Hawaii, may have very strict biosecurity laws at ports of entry to keep diseases at bay, for good reason. After the land is breeched however, oceans no longer serve as a barrier. With the globalization of our world, natural and man-made geographical barriers to disease are becoming less and less effective in keeping pathogens in-place.

Australia

Natural weather patterns can encourage disease emergence or not. For example, many diseases thrive in warm, humid conditions, while cold Winters may limit the scope of a disease.

5. **Does it matter?** Sometimes finding something may be incidental. Is it worth doing something about it? For example, during my tick studies we identified a tick species that had not been clearly identified (at least in the official literature) in Pennsylvania before. This was an interesting finding but of little significance to our study because the tick we found is not considered a vector of disease in humans.
6. **Is it even possible to eliminate?** We know that true "eradication" is almost impossible for diseases in general. Elimination has been achieved before for certain diseases, but it often requires a non or mildly contagious disease with the employment of intense measures, including: isolation of infected populations, culling of (animal) infected populations and highly effective vaccinations. Expecting the disease to become endemic may be the most realistic and best hope. Expecting, equipping and employing "control" measures early within a vulnerable population may lessen the impact of the disease as it moves through a population from an epidemic to endemic stage.
7. **Above all else, do no harm**. The "cure" should never be worse than the disease. The morbidity (rate of illness) and mortality (rate of death) should be considered when applying disease management protocols and making recommendations. Social, emotional and economic impacts of a disease response should also be weighed in any decision making.

Present Australian emergence examples: *Varroa* and Braula fly

My heart goes out to Australian beekeepers who are currently attempting to stop the spread of *Varroa* mites, which were detected on the island continent for the first time at the Port of New Castle, New South Wales in June 2022. Australia has admirable biosecurity guidelines for honey bees and up until this point, have amazingly, enjoyed a *Varroa*-free industry. However, I am afraid the Australians are about to join the rest of the world and will have to learn to manage *Varroa* mite infestations within their hives.

Currently, the Australian government is trying to prevent further spread of the mites into the coun-

Controls must be employed in the management of *Varroa*.

try by issuing lockdowns of hives, restricting sale of honey, tracing possible contacts and euthanizing/burning of all hives within designated and increasing geographical radiuses. The result is the loss of thousands of hives, millions in economic losses in hive, honey and pollination resources, conflict within the industry and a devastating emotional toll on bee farmers, all with the Australian Spring just starting. Despite these efforts, each of the latest news reports I read only convey further spread. Given the facts that *Varroa* has made landfall in Australia, mites reproduce exponentially, honey bees fly and swarm and the history of *Varroa* spread around the globe, I do not see elimination as a realistic outcome. (Given that the lead time on BC articles is about two months, I suppose we will see how prophetic this article may or may not become.) Time for the employment of the control and management phase of *Varroa* mites has come to the continent.

In the U.S., we know that *Varroa* is a major **contributor** to the 40%-45% annual loss of our hives. However, a closer look at the data will show that commercial beekeepers experience at least half the annual loss of hives compared to the average of all beekeepers. Given that burning hives has a 100% mortality and 100% economic loss, one must consider that accepting *Varroa* as a portion of a 20-30% annual loss, at some point, becomes a better alternative.

Here's some good news for Australian beekeepers. The rest of us have been managing *Varroa* for decades, we have learned a lot and have many tools in the toolbox. It has not been easy, but American and European (largely commercial) beekeepers have maintained our total colony numbers over the last several decades despite *Varroa*. Our beekeepers and honey bees are still able to support the top agricultural and honey producing countries in the world. We can and should come alongside Australian beekeepers with empathy in learning how to detect, manage and treat *Varroa* mites within their colonies. I believe the Australian government is aiding beekeepers with financial support for their losses. Mental and emotional health support should also be part of the recovery plan.

Another interesting development is the additional new finding of the Braula fly during surveillance for *Varroa* mites in Victoria. Remember, when you look for something, you may find it and maybe even find something else. While Braula is certainly less of a threat to honey bees than *Varroa*, they can damage honey and comb. Because Braula tends to hang out on the queen, this wingless fly could be transmitted through queen trade.

What's next?!

I wish I could tell you there are no more diseases that will emerge in honey bees. The Asian giant hornets, large hive beetles, Tropilaelaps are all on the horizon. My best advice… Do not give up on biosecurity. You may not be able to control what everybody else does or everything the bees do, but you can at least control what you bring in and out of your own yard. And remember, do not play with weird raccoons.

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Randy Oliver's take: **https://scientificbeekeeping.com/the-Varroa-incursion-in-australia-4-july-2022/** Accessed 7-4-2022.

Australia map: **https://duckduckgo.com/?q=tasmania&t=newext&atb=v255-1&ia=web&iaxm=about** Accessed 9-7-2022.

Disease management expectations differ for flying animals. Photo Credit: Alex Wild

Bees and Women

Sara Jane Wellman Axtell

Nina Bagley

Mrs. Sara Jane Wellman Axtell was born December 19, 1839 in Monmouth County, Illinois, which was founded in 1831. She married Linus Condit Axtell on December 1, 1862, who was a farmer living in Roseville, Warren County, IL. She and her husband were childless but they were very religious and felt greatly blessed, so they devoted their income to missions both foreign and domestic.

Mrs. Axtell purchased her first colony of bees in 1871. "As those increased Mrs. Axtell's interest in them increased and with increase in interest came increase in health." (*Gleanings,* February 1888.) She wrote articles for the Farmers Review and *Gleanings in Bee Culture* about selling honey, what to wear in the bee yard, how to light a smoker and many more interesting articles. Mrs. Axtell is recognized in the *ABC of Bee Culture*, published by A.I. Root in 1891, among the accomplished men in bee culture, such as Langstroth, Doolittle, Adams, Cook and many others. Mrs. Axtell is also listed along with Mrs. Harrison, as the only two notable women listed under "Biographies of Noted Bee-Keepers."

Mrs. Axtell wrote in the Ladies Department of *Gleanings in Bee Culture* 1879, "I had been an invalid for 21 years; have been to water cures and medical institutions five different times and have spent hundreds of dollars upon doctors bills but have never been benefited so much as I have been by the care of bees during the past few years." If not on her feet working the bees, she would lay down to rest on a couch nearby where she could watch the bees swarming. She suffered from rheumatism making her right arm and hand lame.

The *ABC of Bee Culture* describes Mrs. Axtell as the following: "Mrs. A. with the help of a hired girl, takes care of the home apiary, puts starters in sections and does other light work pertaining to the business. By harvest time, swarming is nearly over and the work is reversed. Mrs. A. going daily to the out apiary, while Mr. A. takes care of the home apiary and helps harvest the farm crops. Their success has been varied, the yield per colony ranging from almost nothing to more than 216 pounds, per colony in 1882, when from 180 colonies were taking thirty nine thousand pounds, of extracted honey. An additional reason for the beneficial effects of bee-work upon her health is the fact that she has constantly with her the delightful stimulus of the thought that every pound of honey secured allows her to devote an additional amount to the cause so dear to her heart being deeply interested in the work for the missions. Although she was not a polite writer. Mrs. Axtell is practical and interesting."

Mrs. Axtell hired a housekeeper to do the cleaning and cooking so she could devote her whole time to bees. Mrs. Axtell would work in a reclining position while busy with her sewing and taxidermy work, but her specialty was raising bees and fruit. Not much is written about Mrs. Axtell's education as a young girl, but her writings to *Gleanings* show that she believed in reading books and educating one's mind. She felt that owning books gave one wisdom, and if you couldn't afford a book for your family you could go without a third meal for the day, so that you can save to buy the book for the family. She said that she could look at a family's books and tell what kind of people they were. Her writings indicate that she was intuitive and yes, practical. She was a religious and hard working woman despite her health issues and persevered through many problems. Mrs. Axtell wrote an article for the Farmers Review, which can pertain to today's beekeeping:

"One colony is enough to begin with. All of my operations I consult a book; I would learn at least the one book by heart. As my colonies increased and perseverance held out, I would subscribe for a bee paper and add other books. I would not advise to go into business the first year. At least try two years to see if you have the stick-to-itiveness enough to succeed. As I know of no other occupation that has had too many "back sliders" as the bee business. If one already has his hands full in business, better let bees only."

This was good advice back then, and it still applies today. It's interesting that not much has changed in beekeeping from a hundred plus years ago; we still come across the same issues. Mrs. Axtell thought that beekeeping was women's work. And if she had it her way she would rather work over hundred hives than tend to housework. Without hesitating she would choose the bee work. I thought Mrs. Axtell to be candid and funny in her articles, in one particular article she writes about a farmer, which again, could apply to the beekeepers today:

"Above all, you can not convince the old farmer who has succeeded in keeping bees alive for a term of years, is sure he knows all about bees, you cannot convince him that the queen is not a "King," he "has seen him lots of times," and the bees wax, is gathered by the bees upon their legs in little yellow pellets! He "has seen it and knows it so." She added, "One is apt to succeed if you read bee books and get experienced help and work with an experience beekeeper."

As I was researching more about Mrs. Axtell, I ran across articles about Mrs. Harrison and Mrs. Chaddock who appear to have been friends for over fourteen years, and did visit one another once a year. It appears Mrs.

Axtell stopped writing in *Bee Culture* during the 1890s. Some time between 1910 and 1920 the Condits and Axtell families started moving to Iowa. Mr. Axtell had twelve siblings. His mother's maiden name was Condit. The Axtells and the Condits were religious people from England and helped start the Congregational Church in 1850, in Roseville, Warren County, IL. It's not clear when the Axtells moved to Boon County, Iowa, but it seems that they gave up beekeeping and sold their farm and followed the rest of their family to Iowa. The reason they moved was a religious mission to build churches. The entire family was involved in religion and the giving of donations to the mission was dear to their hearts. Mrs. Axtell passed away on September 14, 1924 at 84 years of age; her husband Linus passed away at 94, in a biblical nursing home in 1930. Mr. and Mrs. Axtell are buried in Linwood Park Cemetery in Boon County, Iowa. ("Remembered with the precious blood of Christ")

Mr. and Mrs. Axtell lived a good life and had a nice farm in Roseville County, IL. They didn't have a mortgage and lived within their means. They had to have been kind hearted and God-fearing people to give so much of their honey money and time to their mission. Mrs. Axtell, despite being an invalid lived a long life! And I would agree with her that being outdoors with the bee's increases ones health, mind and spirit.

Ohio Queen Bee
Nina M. Bagley
Columbus, Ohio

Winter Insulation Revisited

With a Healthy Serving of Crow

Listen along here!

The September 2022 issue of *Bee Culture* contained an article about Winter insulation where I theorized that the difference in insulation value of the wood making up a hollow tree and a standard Langstroth hive is not so significant that it would make much difference to a colony of bees overwintering inside. Then I read an article published in the August 2022 issue of the *American Bee Journal* written by Robin Radcliffe and Thomas Seeley titled, *Thinking outside the box: Temperature dynamics in a tree cavity, wooden box and Langstroth hives with or without insulation.* The article described the results of trials that measured temperature fluctuations inside various cavities observed between November 2019 and May 2021.

Radcliffe and Seeley compared the ambient outside temperature with the temperatures inside a living hollowed out maple tree, and a plain wooden box, both with cavities that matched in size and shape. They also looked at the temperature fluctuations in two Langstroth hives occupied by colonies of bees: one hive protected with a wool blanket that provided an insulation value of R-30 and the other without insulation. Ambient temperatures were taken inside of each hive studied as opposed to the temperatures inside the Winter cluster. The data collected during these trials showed that a cavity in a living tree insulated with 13 inches of wood on both sides, 20 inches in the back and six inches in the front was extremely stable, maintaining a temperature right around freezing during outside temperature fluctuations that ranged between 16°F and 36°F (-9°C to 2°C). The cavity that performed closest to the living tree during the trials was the occupied insulated hive that saw temperatures that ranged from about 39°F to 45°F (4°C to 7°C) during the same 24-hour period. Meanwhile, the temperature range in the uninsulated hive fluctuated between approximately 22°F to 54°F (-5.5°C to 12°C). What I failed to account for when I postulated that the insulation value of a hollow tree would not be much different from a standard Langstroth hive was the thermal mass of the cavity.

Thermal mass refers to the ability of a material to absorb and store heat which provides inertia against temperature fluctuations. For example, as the outside temperature fluctuates throughout the day, the large thermal mass of the concrete floor and walls located within the insulated portion of a house helps to flatten out the daily temperature swings, since the thermal mass absorbs heat when the temperature inside is warm, and releases its stored heat when the temperature drops. While complementary, thermal mass is different from insulation that prevents heat from entering or escaping.

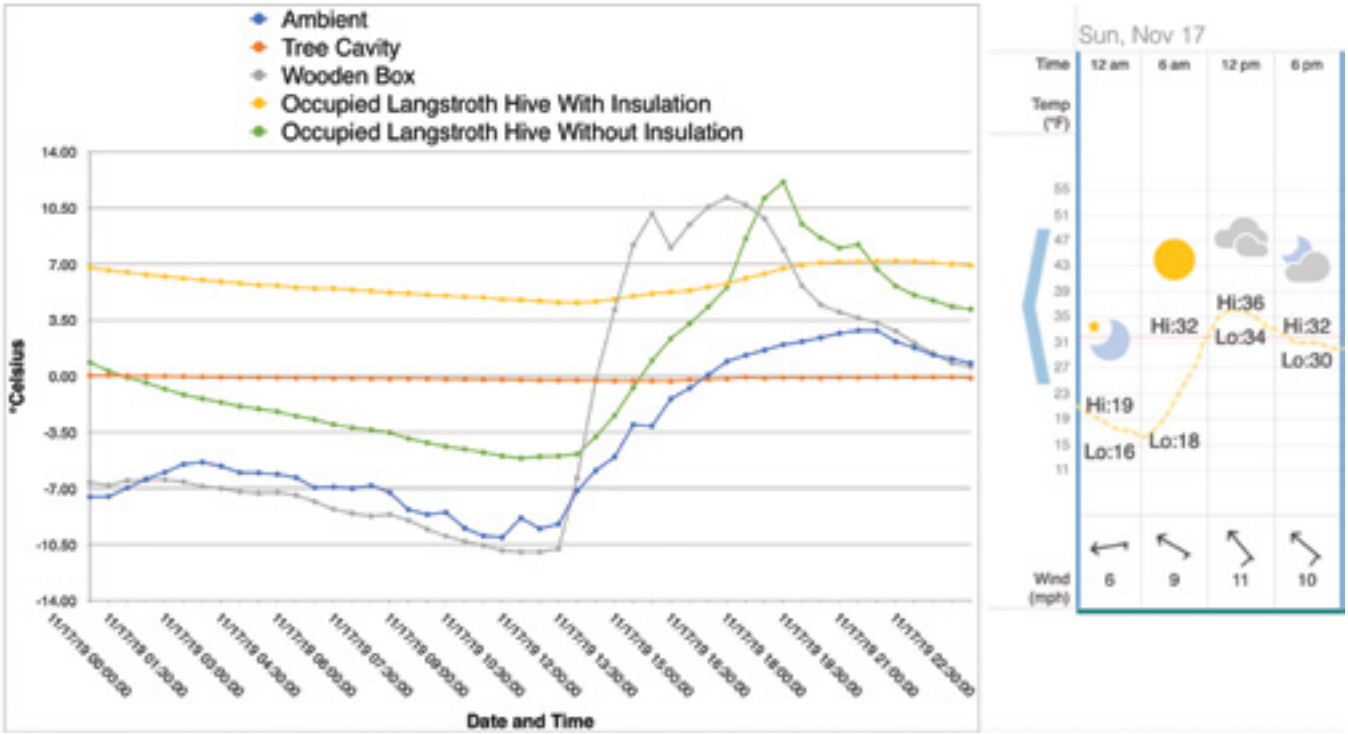
All materials have thermal mass; however, the more dense a material, the greater its thermal mass potential. As a result, concrete and earth have a high thermal mass while air has very little. While wood is considered to have a relatively low thermal mass, relatively dense hardwood will have a slightly greater thermal mass than softwood, and a living tree is going to have a much higher thermal mass than the lumber that makes up a hive due to the moisture content of the wood. It is estimated that water stores three to four times as many BTU's per pound as rock or masonry. Additionally, the fact that a living tree pulls up relatively warm moisture from deep beneath the ground is likely to further augment the heat storage capacity of a tree compared to a colony living in a dead tree or a hive made of kiln-dried milled lumber.

The data collected during the Radcliffe and Seeley study clearly shows that the hives we provide our bees can be made to perform fairly similarly to a colony's natural home (a hollow living tree) if the hive walls "are built with, or wrapped in, good insulation." While I was wrong about the difference between the temperatures within a cavity inside a hollow tree compared to a standard hive, I believe the final conclusions of the September *Bee Culture* article (To Insulate, or not to Insulate) still stand. The fact that thousands of cold climate beekeepers have successfully overwintered bees in standard Langstroth-style hives without the use of insulation of any kind, indicates that the need to insulate colonies during Winter is of secondary importance except perhaps in the most extreme locations.

It is of primary importance for Winter survival to ensure bees are healthy, have plenty of honey and pollen and stay dry. I would amend my original article by acknowledging that in cases where colony health or food stores are marginal, the Radcliffe and Seeley trials suggest that insulation may mean the difference between survival and death.

It is typically believed that colonies of honey bees use the least amount of honey to maintain themselves when temperatures are at or about 40°F (4.5°C). If the amount of honey available to a wintering colony is a little shy, the ability of insulation to keep the internal temperature closer to this temperature sweet spot could allow a colony to survive on honey stores that would otherwise be insufficient without insulation surrounding the hive.

The same is true for a colony that has mite or pathogen issues that have not been adequately addressed by the beekeeper. When colonies are stressed by pest and disease pressure, the increased rate of honey bee population decline can adversely affect that ability of the cluster to maintain adequate temperatures



Comparisons of temperatures inside a pair of occupied Langstroth hives over a 24-hour period on November 17, 2019. One hive (yellow line) was outfitted with a wool hive blanket (Beehive Cozy Cover) and the other hive (green line) was not. Thanks to the *American Bee Journal* for the use of this image.

within the brood area. The bees simply don't have enough bodies to keep themselves warm. If the cavity they are occupying is insulated, such as in the hollow of a living tree, or a well insulated hive, then the moderation of temperature extremes provided by the insulation value of the cavity along with its thermal mass could mean the difference between life and death.

Decisions on apiary management need to be considered in a holistic manner and each beekeeper's unique situation is going to affect which management decisions are going to be highly beneficial and which are not worth the time and effort. A backyard beekeeper with a few hives and who may not have the knowledge, time or resources to ensure colonies are entirely healthy and well stocked for Winter are likely to benefit from the addition of hive insulation. Meanwhile, those with a couple dozen hives or more are unlikely to want to take on the additional cost, work and required storage space to purchase, install and then during the Summer, store insulation for all their hives. Simply ensuring that good nutrition is plentiful, the bees are healthy and colonies stay dry will result in the desired outcome.

The reality is that all beekeeping is hyper-local and should be holistically based upon each beekeepers management style, goals, hive type, the strain of honey bee being managed and the local climate. This is the reason I am always weary of "Best Management Practices" which attempt to place all beekeepers into a one-size-fits-all mold.

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Propolis is a resinous substance with varying colors and consistencies created by the *Apis mellifera* from several vegetal sources. Salivary enzymes and wax are added to plant exudate to produce the resinous substance. The main sources of this plant exudate are from poplar, willow, birch, elm, alder, beech, conifer and horse chestnut trees (Martinetti, 2015). In this article, I will discuss how propolis benefits bees, how it was discovered and used in ancient society, and lastly how its antimicrobial, anti-inflammatory, anti-oxidant and immunomodulatory properties make it an important alternative treatment for wound care management today (Braakhuis, 2019).

Propolis is an important contributor in maintaining a hemostatic environment in the honey bee hive. It is a natural adhesive and resin like substance produced and used by bees to construct and repair their hives (Sarfaroj, 2022). The chemical composition of propolis is highly dependent on the geographical location, vegetation and seasons. Studies have determined that there are over 300 compounds in propolis. Propolis consists of resin, oil, wax, pollen and other chemicals including minerals, vitamin B, vitamin C, vitamin E and a variety of other components (Braakhuis, 2019). The bioactive components of propolis are polyphenols, terpenes and steroids as well as, sugars and amino acids. The major polyphenols are flavonoids and phenolic acids which make up the pharmacological active constituents in propolis. Propolis serve the honey bees by making their hive stronger structurally, provides insulation, smooths out internal walls, blocks entrances from intruders, for thermal isolation of the hive, covers over carcasses of intruders (avoiding their decomposition) and fills unwanted cracks. Research has also determined that propolis has numerous health benefits to the honey bee. Propolis acts as a bee's external immune system. It aids honey bees in fighting disease/infection (American Foul Brood, *Varroa destructor*), the bees use it as an all-purpose cleaning agent, and it also inhibits the growth of any bacteria within the hive (Finstrom-Simone and Spivak, 2010).

Honey bees have been making propolis for millions of years and ancient humans after having learned of its benefits, have been using it for thousands (Bioregulatory Medicine Institute, 2020). The ancient Greeks, Egyptians and Romans were aware of the healing properties of propolis and made extensive use of it in medicine (Krol, 2013). The Greek physician Hippocrates (who was considered the father of medicine) recognized the healing properties of propolis.

In more modern times, 1967-1973, Dr. Karl Lund Aaggaard (also known as Dr. Propolis) studied the effects of propolis on over 50,000 patients. He concluded that the propolis can be used for many health aliments such as open wounds, sinus congestion, ulcers, eczema, pneumonia, arthritis, lung disease, stomach virus, headache, circulation deficiencies, warts, conjunctivitis, periodontal disease, intestinal infection, bronchitis, colds, disease of the ears, gout and swelling of the throat (Honey bee propolis, Feb 2020).

For my purposes, I have decided to focus on propolis and how it is used in wound care management. Wound health is a complex phenomenon characterized by a sequence of independent and overlapping events (Noha, 2013). The complicated mechanism of wound healing occurs in four stages homeostasis, inflammation, proliferation and re-modeling (Vohra, 2020). Propolis has many biological and pharmacological properties that aid in all four stages of wound healing. It has been confirmed that propolis has antimicrobials, anti-inflammatory, anti-oxidant, immunomodulatory properties that are beneficial in the four stages of wound care management (Sarfaroj, June 2022).

The first benefit of propolis to wound care management is through its antimicrobial properties (Martinetti and Ranzato, 2015). Antimicrobials share the common interest of reducing the possibility of infection and sepsis in a wound. Antimicrobials can be broken down into several agents such as antibiotics, antiseptics, antivirals, antiparasitics and antifungals (WHO, 2021). Propolis gains its antimicrobial properties due to its high flavonoid content (Grange and Davey, 1990). Honey bee's collect flavonoids by collecting nectar, pollen and plant resins. Flavonoids are well known as antimicrobial agents which provide defense against a wide range of pathogenic microorganisms. One of the most common wound management tasks is controlling/

Propolis and Wound

Dr. Karen Cross MD, PhD, FRCSC (Plastic and Reconstructive surgeon). Dr. Cross uses bee products (honey and propolis) when treating patients wounds.

limiting infections (Wound Source, 2021). A wound may become infected when there is a break in the skin which allows pathogenic microorganisms to enter. Applying propolis to the infected wound would be beneficial due to its antimicrobial properties. The antimicrobial properties of propolis enable it to successfully fight against different microorganisms (bacteria, virus, fungus, parasites). In addition, propolis has also been used on patients' wounds when the microorganisms become resistant to common medicines (WHO, 2021). This is often referred to as antimicrobial resistance (AMR). Propolis has helped in modulating the antimicrobial resistance of highly resistant bacteria. Propolis can be beneficial in wound management by limiting or inhibiting the growth of pathogenic microorganisms and also by being very potent to these pathogenic organisms which may have grown resistant to "conventional antibiotics" (WHO, 2021).

The anti-inflammatory properties of propolis also make it very effective in treating wounds (Johnson, 2021). The second phase of wound healing is the inflammatory phase. Inflammation is the body's natural response by which the body repairs damaged tissue. Inflammation has been shown to delay wound healing and may result in increased scarring. Furthermore, chronic inflammation is a hallmark for the non-healing wound (Eming, 2007). Propolis's anti-inflammatory properties are associated with polyphenols, which would be the flavonoid component (Martinotti and Ranzato, 2015). The flavonoids regulate the enzymes needed to cause inflammation. They reduce the production of these enzymes, this reduces inflammation. By decreasing the inflammation in a wound, it allows it to heal quicker. When using propolis for wound management, it is applied directly to the open wound. Propolis has been shown to reduce the inflammatory response. As a result, the healing process was faster and the level of pain and discomfort to the patient was lessened (Martinotti and Ranzato, 2015).

The third property of propolis that benefits wound management is that it has antioxidant properties. Propolis contains a high percentage of polyphenols (flavonoids and phenolic acids) which provides propolis with its powerful antioxidants (Adham and Hassan, 2022). Antioxidants are compounds that inhibit oxidation, a chemical reaction that can produce free radicals and chain reactions that may damage cells of organisms (Wikipedia, 2022). Free radicals damage contributes to the etiology of many chronic health problems such as cardiovascular disease, inflammatory disease, cataract cancer and tissue damage (wounds). Wound healing depends on low levels of reactive oxygen species and oxidative stress. A wound over-exposed to oxidative stress leads to impaired wound healing. Antioxidants are postulated to help control wound oxidative stress and thereby accelerate wound healing. The patient can receive the antioxidant benefits by applying propolis (as an ointment or cream) directly to the wound (as a dressing) (Fitmauruce et al., 2011). Propolis can also be taken by mouth (refined capsule) which would also allow the patient to gain antioxidant properties, aid in wound management and increase healing time.

The last medicinal property of propolis that I will discuss in relation to wound care management is its immunomodulatory properties. Immunomodulatory properties mean that propolis can modify the response of the immune system by increasing (immunostimulants) or decreasing (immunosuppressives) which will help the body's wound healing. Propolis is a complementary and alternative agent that promises to achieve a more effective immune system when the immune response is not sufficient to control a specific infection (Hariri, 2019). Propolis gains this medicinal property due to the flavonoids and some of the phenolic acids. In sum-

Care Management

Raylynn White

Raylynn White

mary, the healing process of the immunomodulatory in propolis is that it can assist in healing by either empowering or suppressing the actual immune system. As a result, the wound heals faster. A healthy immune system is important for good wound healing.

In closing, the use of propolis is slowly gaining popularity in the medical system. Unfortunately, there are some misbelievers. I interviewed a dermatologist/surgeon from St. Michaels Hospital in Toronto, Ontario. She explained "the use of propolis for wound care is real. People laughed at me when I started using it, until wounds healed and the patients stopped complaining of pain." The other benefits of using propolis in wound care management is that it is less expensive to our medical system, there are no known severe or serious interactions with other drugs, it is safe for most people to use (with no known severe interaction with other drugs), it is readily available, has very few side effects and a person cannot overdose on it. With more education for the general public and our medical community, propolis could be used more frequently in wound care management.

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Author Bio

Raylynn White is from Torbay, Newfoundland, Canada, and her passion in bees blossomed three years ago. By profession she is a social worker, but in her spare time you can find her working away in her apiary. Raylynn recently graduated from the University of Montana's Masters of Beekeeping program. She intends on using her knowledge to educate people about the importance of the honey bee.

BUILD A DOUBLE SCREEN BOARD

Ed Simon

Snellgrove[1]

Eventually, you will wish you had a double screen board available. It is a versatile device that allows you to manipulate your hive in multiple ways.

The double screen board was originally developed by L.E. Snellgrove as a swarm control mechanism. It has been found useful in solving additional problems. It can:

- Help when you split a hive
- Help when you combine hives
- Act as a ventilated top when transporting bees

The eight entrances (four on top and four on the bottom) can be opened or closed individually to allow for easy manipulation of the hive.

Two Designs

Two versions of this device are shown. They both work equally well.

- **Two-hole version**: This version has a larger screened area. The top and bottom screens need to cover the entire base out to and under the edges. This allows for the doors to swing without catching the edges of the screen. The entrances are offset from the middle of the sides in this design to allow for easier construction of the entrances.
- **One-hole version**: With this version, the screen edges are covered with a thin lath so the screen edges will not loosen and allow the bees to get caught between the screens. The doors are positioned close to the center of the sides. This version is easier to make.

Parts

1. ⅜" x 16¼" x 19⅞" – Plywood base
2. ¾" x ½" x 19" – Side edge (4)
3. ¾" x ½" x 16" – End edge (4)
4. ¾" x ½" x 3" – Plywood doors (8)
5. ¼" x ??" – Lath (8) – Used only with the one-hole version.
6. 16" x 19" – Metal window screen or hardware cloth (8 holes per inch) (2)

Note: ¾" x ¾" parts 2, 3 and 4 will work equally well.

Construction

The base of the double screen board will be cut and then both sides are covered with hardware cloth or window screen. Edging is then added with pivoting doors.

Please reference the drawings on the next page for any questions.

Decision Time

Two versions of this device are shown. They both work. Choose one. Drawings for both versions are in the drawing section.

Step 1

Cut the base (part 1) and smooth the edges, top and bottom. Smoothing the wood will allow the doors to swing easier.

Step 2

Staple the window screen or hardware cloth on the top and the bottom of the base.

Step 2a

For the single hole version, the screen just covers the hole with enough extra to staple it to the base.

Then glue and staple or nail the lath (part 5) over the screen edges.

Step 2b

For the double hole version, the screen should cover the entire base.

Step 3

Cut eight doors (part 4) from plywood. Cut the doors with a 45-degree angle on each end. See the drawing for the angle alignment. Drill a small hole in the center of each door. Counter sink the top of each hole so the head of the attaching screw (pivot) will not catch on the hive body.

Note: Plywood is used for the doors because of the tendency of regular wood to split when the screw is inserted.

Step 4

Cut the edge pieces to position the doors.

The location of this cut is dependent on where you want the door to be positioned. Two inches works for an off-center door.

About two inches from the end of each of the edge pieces (parts 2 and 3), cut a 45-degree angle. Save the matching edge pieces as pairs.

You will eventually insert the door between these pieces. Please reference the drawing for any questions about the intended outcome of this step.

Step 5

On the top of the base, start with one corner and add the shortest of the pair of edgings cut in the previous step. Glue and tack this in place. Now, use one of the doors and place it next to the piece you just finished adding. Screw this in place. Finish the side by adding the remaining edging from the pair that you started with.

Work your way around the base while adding a short piece, then a door, then a long piece. When you finish you will have the tails of the long pieces sticking out. Cut these tails off.

[1]Originally published in *Bee Equipment Essentials* – Wicwas Press 2011

Note: The last piece added will have to be individually fitted.

Step 6

Turn the double screen board over and perform Step 5 on the bottom of the board.

Important

When starting the bottom, be sure that the doors are not, and I repeat, are NOT positioned directly below the door on the top. By offsetting the doors, you can use longer screws as door pivots.

Step 7

Paint the double screen boards a unique color. This will allow you to identify them from a distance.

Usage

Depending on its use, the doors can be opened or closed as needed.

In addition to the swarm control usage envisioned by L.E. Snellgrove, the following uses have been found for his board:

- Making splits in which the new hive is piggybacked on top of the parent.
- Wintering a weaker hive over a stronger hive.
- Queen raising – cell builder.
- Help keep a smaller colony warm until it gets started.
- The double screened board can be used as a top when you are transporting a hive in hot weather. All you need to do is close all the doors and be sure it is strapped down tight.

Reference

For a YouTube example, watch this video: **https://www.youtube.com/watch?v=MaR-IJJ14j-D4&t=21s&ab_channel=msbrunell**

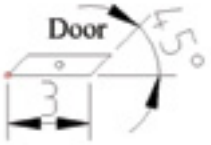
Recommended Design

Between the two designs, I prefer the one-hole design with the doors shifted a little off center. The doors are shifted enough to allow the top and bottom doors on the same side to function without longer pivoting screws interfering with each other.

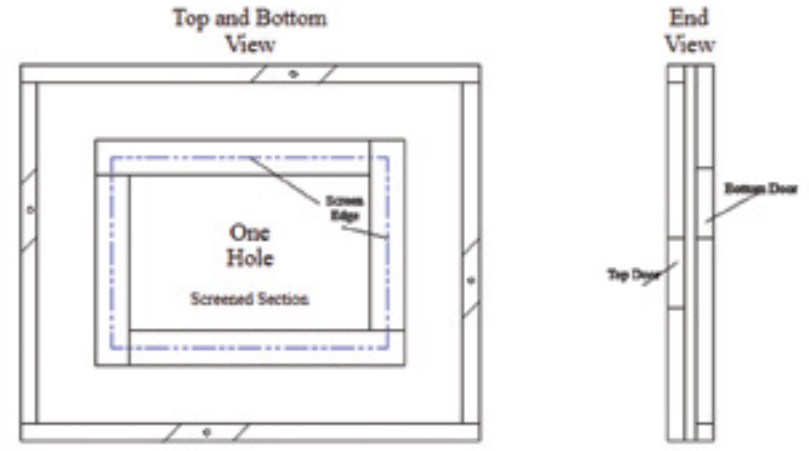
Get a copy of Ed Simon's book *Bee Equipment Essentials* with detailed drawings, construction hints and how-to-use instructions for dozens of beekeeping tools and equipment from **www.wicwas.com**. Ed can be contacted through **SimonEdwin41@gmail.com.**

Drawings

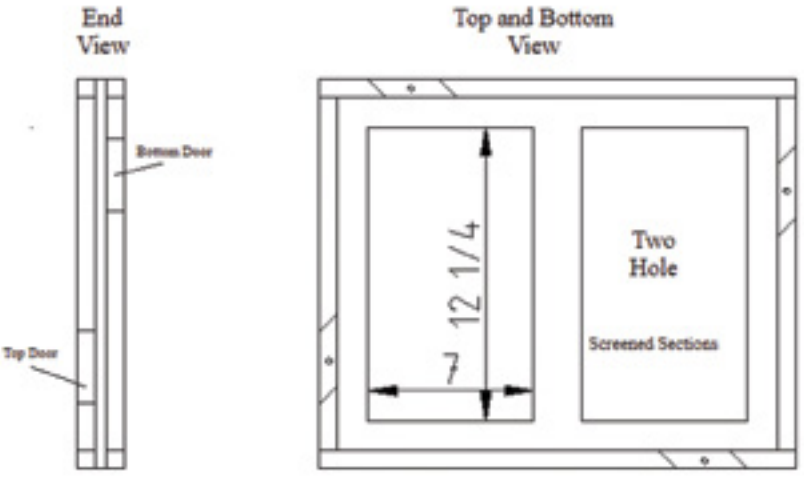
Double Screen Board (Snellgrove)



One Hole



Two Hole



Continued from page 11...

leaves us significantly short of our anti-dumping fundraising goals – $500,000 short.

We still need your help to raise the additional $500,000. But what's a plea for support without a justification? So, here goes. Since we filed this case, honey prices are up over $1.00/lb from where they were prior to the suit, and we now have nearly 70% of imports under tariffs. *That translates to a $125 to $150 million benefit to the industry this year alone.* And as we learned from the last suit, increased prices will likely stick around for years to come. Put very simply, the benefit far outweighs the cost. But that's only true if many hands make the work light!

It would be negligent of me to suggest that higher honey prices are the only benefit of supporting AHPA. While our association runs lean on expenses (yes, we even pay our own travel costs and buy our own meals), it still costs a considerable amount of money to effectively operate across the country and in Washington. But again, the good news is that the costs of operating AHPA pale in comparison to the benefits the entire industry receives annually from the likes of federal research, disaster payments, reduced regulation and improved enforcement.

In the past two decades alone, AHPA has delivered hundreds of millions of dollars in direct benefits to the beekeeping industry. We secured Byrd funding for two decades – a direct financial return for participating beekeepers. We advocate *annually for nearly $30 million* in Agricultural Research Service funding and millions more across other USDA and federal agencies. We have worked since 2008 to secure and continuously improve the Emergency Livestock Assistance Program. *That program alone delivers more than $50 million a year directly to American beekeepers*, according to USDA. Most recently, AHPA worked to have beekeepers included in the Emergency Relief Program. While final numbers have not been released, we expect *tens of millions in additional direct payments* to beekeepers who experienced losses related to drought.

AHPA worked successfully alongside the livestock and trucking industries to protect bee haulers from onerous hours of service requirements at the Department of Transportation. We fought back to prevent FDA from requiring "added sugar" labels on honey. And we are currently working on numerous additional projects related to honey integrity, labeling laws, preservation of Tallow forage, access to conservation and public lands and reforms to the H-2A program – just to name a few.

We fund all the work we do from contributions. For decades, the majority of our funding came from donations out of the annual Byrd payments. That program is no longer available, and neither is the funding. In addition to Byrd contributions, we have relied on extremely low annual association dues. And finally, we rely on direct contributions based exclusively on the generosity of participants at the annual convention, and throughout the year – a dynamic that results in relatively few hands doing heavy work for the many.

In fact, some of our members repeatedly – even yearly – donate tens of thousands of dollars. And a select few have even contributed hundreds of thousands of dollars. Not surprisingly, those members are some of the most successful beekeepers in our industry. I know in the past, I've said to myself, "it's easy to donate when you have money." Well, friends, many of these industry stalwarts were donating significant amounts when honey was 40 cents a pound and they could only afford a used tire for a truck with a blowout. They attribute, in part, their success in beekeeping to their involvement in the AHPA. We want all of our members to succeed and we believe that by expanding the number of large donors and spreading out the costs more widely, we will all rise together.

To continue delivering hundreds of millions of dollars in benefits for mere hundreds of thousands in costs, we are calling on our members and industry friends to revisit their commitment to ensuring our industry remains resilient for the next generation. We need more hands to make our work a little lighter.

Going forward, we are proposing a new dues structure:

Voting Members:

Commercial 3 (20,000+ hives) – $5,000*°
Commercial 2 (5,000-19,999 hives) – $2,000*°
Commercial 1 (500-4,999 hives) – $1,000*°
Sideline (25-499 hives) – $500*
Hobbyist (1-24 hives) – $100
*plus voluntary per hive contribution $0.50 per hive
(ex. 4,000 hives = $1,000 plus ($0.50 x 4,000 = $2,000) = $3,000 annual dues)
°includes two voting memberships

Non-Voting Associate:

Firm or Beekeeping Association – $500
Individual (Scientist-Apiary Inspector) – $100

As our dues do not cover all of our operating expenses, much less the dumping suit (which only comes around every 20 years or so), we would like to ask our members to donate 50 cents a hive on their Summer hive total. With this, we hope to make up for the shortfall we currently have in operating.

We are hesitant to increase dues, but the costs remain, the Byrd money is no longer available and we haven't made any meaningful changes to dues in 18 years. We are confident in the value of the benefits we have been able to return to the industry over many decades of hard work.

In summation, how can you help?

Help Today – Support the anti-dumping case with a contribution commensurate with the benefit you've received! Please call me anytime to discuss further.

By December – contribute dues at a level that matches the scale of your operation, as suggested above!

Many hands make light work!

We are grateful for your continued loyalty and friendship.

In Service,

Chris Hiatt –President, American Honey Producers Association

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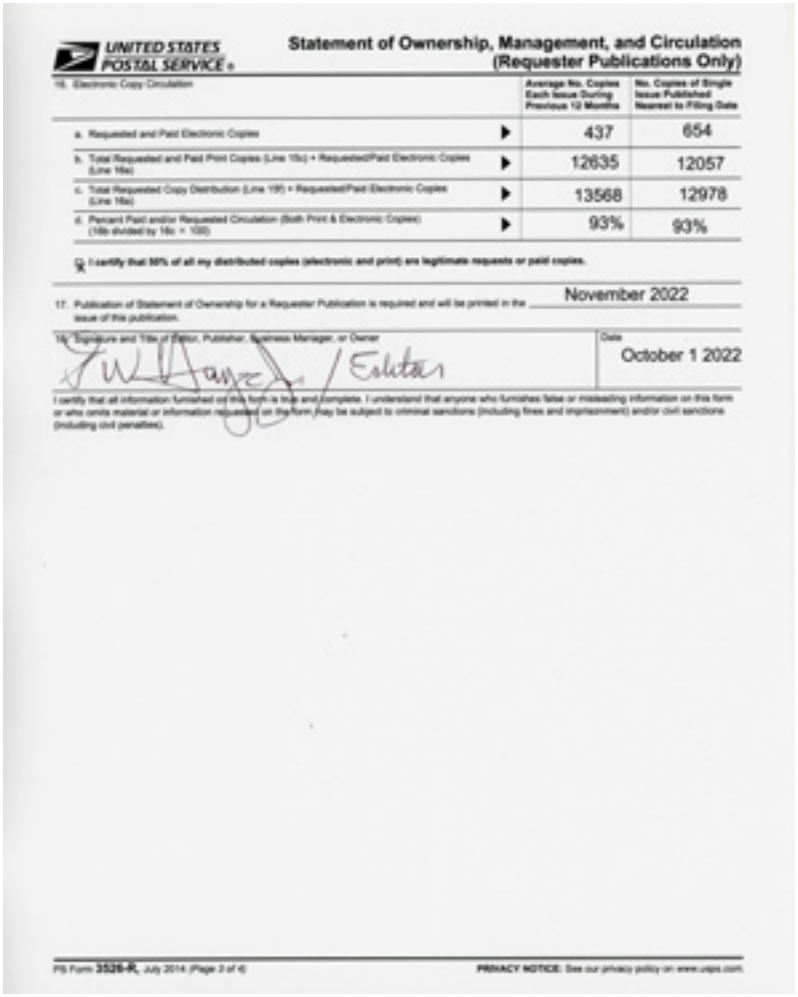


REMARKABLE BEAUTY

Diane Wellons

Often as a beekeeper I am struck by the remarkable beauty of the natural world around me. I might find myself standing in a field of wildflowers with the bees buzzing around me or next to a barn with a living, working farm raising crops of beautiful food for the community. I am a part of those natural living spaces that surround me, connected to the earth and my food. It is one of the reasons I love beekeeping and the journey this hobby has taken me on. That connection brings peace, tranquility and a grounded balance to my life and I appreciate it more every day. The people I meet and the care and concern they all have for the mighty honey bee impresses me routinely.

Every now and again I will have one of those moments that I know, without a doubt, is such a rarity it will be a once in a lifetime event. I had one of those happenings recently and I want to share that experience with you, dear beekeeper readers, who I know can appreciate the significant beauty of such an occurrence.

It's hot in Southern Maryland in the Summer, really hot, like Africa hot. High temperatures and high humidity can make beekeeping a bit treacherous. Dressing up in helmet, veil, long pants etc. and making sure to get plenty of hydration is hard when the bees are cranky and feeling the heat as much as we are. Plus, the slowing of nectar flow compounds is a stress for us all. I recently had surgery and have been fighting off a Lyme infection and just not quite feeling myself. To say I was run down and depleted is a bit of an understatement. Knowing all of this, I still said yes when a beekeeper friend sent me a photograph by text with a note that read "Want to see something special?" The photo he attached was so remarkable. I knew right then, I had to see it for myself.

This is an open-air colony. Created by the bees where they landed for bivouac. No hive required. This colony had built themselves a right beauty of a home on the side of a house. In this Summer heat, they were obviously doing just fine, but once Winter hits and temperatures drop, they will certainly perish (We live in growing zone 7b on the mid-Atlantic coast where it does get below freezing in the Winter). Lucky for these bees, the homeowners (Joe and Jane) have a first-year beekeeper daughter-in-law, Chrissy, who discovered the hive and decided to call for rescue.

I asked Jack if he was removing it directly and tried my best not to seem too desperate to go see it first-hand. The removal was taking place a week later and I managed to secure myself a ringside seat to watch or help. Never in my wildest imaginations did I expect what happened that day.

We arrived at the location of the hive. (We, a beekeeper friend Gina and myself.)

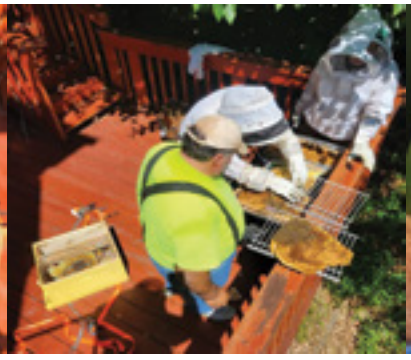
Jack is a dedicated friend and rescuer of the bees. His company Honey Bee Rescue of Southern Maryland does exactly that. In his free time, he manages to rescue and rehome these amazing little creatures and gives them a fighting chance to survive. He's a professional and it was a real treat and privilege to watch and learn from him.

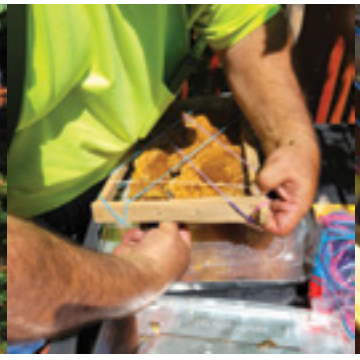
Because the colony was on a second story window, Jack brought in a bucket lift on a trailer and used it to get up close and personal with the bees.

Now, when I say I'm afraid of heights, I mean I'm terrified/petrified and am usually the very last one to ever volunteer for anything that requires being up off the ground. Besides the height, humiliation is not my bag and I refuse to vomit or wet myself in public as a matter of personal policy. I don't even like the step stool in the house and I'm only five foot two inches and need it all the time. Somehow, I managed to be the first one begging to go up and meet this colony face to face in the bucket lift. Call it a moment of sheer curiosity (I did manage to preface my ride up with a comment to the peanut gallery that I might actually need some clean pants at the end of this adventure.) Somehow, I braved the ride up and managed to stay focused on the task at hand. I was so enthralled; I saw nothing but the bees. They were really calm on this very sunny morning. They were busy doing their work and not paying any attention to us at all.

Immediately, I was amazed. Seeing something like this up close really took my breath away.

I was struck first by the sheer size and rigidity of the structure they had built. The comb was still bright white on the outer edges and quite solidly constructed. The rows of wax were packed very close together with the central core of the brood was well nestled inside. They had given the structure extra support and brace comb throughout. We had come into our dearth and thus found little to no wet nectar in the hive and no stored honey at all. But wow was this Queen crushing it with the brood. So it be-





gan, gently vacuuming and removing the bees and comb with as delicate a hand as possible.

They were relatively calm while suffering the everything bee vac and even managed to stay fairly sedate while I began cutting the comb from the roof edge. We hauled the comb down on racks and Jack and the team made short work of fixing them to frames. Ben, Gina and Jack did an amazing job getting things put together and hive ready. Then Ben went up and cleaned up the remaining wax and bees.

Overall, a remarkable experience. I'm so grateful to Jack for reaching out to me with this and to the homeowners who called for removal versus extermination. To all of the helpers and attendants onsite that day: Ben (who took home this beautiful colony) and his wife Abby (who brought in additional equipment and moral support), Dale who took amazing photos of the day, Maggie (Jacks' sister who brought in the man lift), Gina (first year keeper/apprentice), Todd and Debbie for more moral support and Joe, Jane and Chrissy and family who called for help in the first place. (I even managed to keep my bladder in check.)

I'm certain there will be many more bee adventures to come. To all the rescuers out there – blessings to you for all you do to help the bees and the beekeeping community at large. Removals like this are no easy task. It requires coordination of money and time and the help of friends and the community to make a rescue like this successful. Sincerely grateful to Jack and Honey Bee Rescue of Southern Maryland for all he does to support the beekeeping community and give keepers like myself such an incredible opportunity. You can visit Jack's website at **https://www.somdbeerescue.org**

The story is really seen best in photos, if you would like to see more, I made a reel of the images which can be viewed on YouTube, search for Deez L'town Beez. Happy Keeping Friends.

Interesting Things I've

Tim Martin

Introduction

There are many maladies that can affect the health of a beehive. Their effects range from nuisance to serious problem affecting hive survival (Arbia & Babbay, 2010). Fungal and bacterial diseases include American foulbrood (AFB), European foul brood (EFB) and chalk brood (Bailey, 1983; Ashiralieva & Genersch, 2006; Heath, 1982). These diseases do not affect the adult honey bees, but profoundly affect the developing brood (Oldroyd, 2007). Protozoan pests include two *Nosema* species, *Nosema apis* and *Nosema cerena,* which infest the gut of adult bees and can cause dysentery and death (Zander, 1909; Fries, 2010). Additionally, most honey bees carry viruses that under normal conditions do not cause harm to the honey bee (Ribière et al., 2000; Nielsen et al., 2008). Gajda et al. (2021) found at least 36 different bee viruses inside of tested hives. They posit that only seven of these are likely to cause harm to the bees. Those viruses likely to cause harm are deformed wing virus (DWV), acute bee paralysis virus (ABPV), black queen cell virus (BQCV), bee virus Y (BVY), *Apis mellifera* filamentous virus (AmFV), chronic bee paralysis virus (CBPV) and sacbrood virus (SBV). Two of the most common insect pests of beehives include the *Varroa destructo*r mite and the lesser wax moth *Achroia grisella* (Oldroyd, 1999; Burges & Bailey, 1968). This case report will detail and unusual instance of *A. grisella* in a healthy beehive.

Impact of Wax Moths on Beehives

The lesser wax moth, *A. grisella*, typically inhabits and consumes abandoned or empty bee hives of honey bees (Clarke, 1986). Additionally, *A. grisella* can inhabit the stored beekeeping equipment that contains beeswax. Although *A. grisella* is referred to as the wax moth, the larvae don't digest the comb wax (Clarke, 1986). Instead, they rely on the impurities within the combs, such as bee brood, honey and pollen, for their nutrition (Egelie et al., 2015). Most commonly, they tend to feed on wax combs where brood has been raised rather than clean honeycomb or honeycomb containing honey (Clarke, 1986; Egelie et al., 2015). Even though the feeding behavior of *A. grisella* is beneficial to wild bee colonies because the larvae consume and recycle the old honeycomb of abandoned or dead bee colonies thus clearing the space for a new colony to build, it is estimated that *A. grisella* larvae cause over five million dollars of damage annually to beekeepers in the United States (Caron, 1992).

Life Cycle

The life cycle of *A. grisella* consists of four stages: egg, larva, pupa and adult. Adult females lay up to 300 eggs that hatch into larvae in five to eight days depending upon the temperature, with warmer temperature shortening the hatching time (Egelie et al., 2015). *A. grisella* eggs are creamy white and spherical. They are typically laid in cracks or other protected areas close to the food source (Egelie et al., 2015). Eggs laid in hidden and protected areas combined with the small size of the eggs causes them to frequently go unnoticed by beekeepers.

Newly hatched larvae burrow into the comb seeking to reach the midrib of the comb (Caron, 1992). Most commonly, the larvae feed on weak or stressed colonies for the next one to five months (Egelie et al., 2015). The larval stage is the only phase during which the wax moth feeds. They generally feed on wax comb containing bee brood, pollen, or honey with preference given to brood and pollen over honey or virgin comb. In cases where both the lesser and greater wax moth (*A.grisella* and *Galleria mellonella*) are found in the same hive, the lesser wax moth can be found feeding on the hive floor because it is out-competed for space by the greater wax moth. Developing larvae tunnel through the beeswax comb in search of food leaving behind a trail of silk and feces (Egelie et al., 2015). Larvae undergo a total of seven molts with most of the growth occurring during the final two instars (Egelie et al., 2015). Larvae become fully developed in an average of six to seven weeks at a temperature range of 29°C – 32°C. Fully grown larvae are gray, about 20 mm long with a dark head capsule, three pairs of legs and several body segments (Egelie et al., 2015; Caron, 1992).

Larva enter the pupal stage by spinning a tough, silk cocoon around themselves (Egelie et al., 2015). They can sometimes be found on the bottom board among the hive debris but are most commonly found anchored to the hive body or frame (Caron, 1992). The larvae chew a cavity into the wooden hive body into which the frass and debris cocoon are affixed, further contributing to the damage caused by wax moths beyond the destruction of honeycomb (Caron, 1992; Egelie et al., 2015). It can take up to two months for the adult to emerge from the cocoon depending upon the temperature with typical emergence time being about 37 days (Egelie et al., 2015).

Adult male wax moths are slightly smaller than the females. Adult moths are most active at night and live for about one week (Caron, 1992). During this time, they will mate within the beehive. Males use ultrasonic frequencies to attract females who will lay their eggs inside the hive at night. During the day, the moths are mostly inactive and hidden in dark spaces outside of the hive (Caron, 1992; Egelie et al., 2015).

Treatment and Mitigation Strategies

Treatment and mitigation strategies for wax moths includes three strategies: prevention, treatment and recovery.

One prevention tactic is to pre-treat the beeswax to prevent wax moths from infesting bee hives. Burges and Bailey (1968) successfully used *Bacillus thuringiensis,* a gram positive bacterium found in soil, to pre-treat honeycomb which deterred wax moth infestation for up to two years without causing harm to the honey bees (Madigan et al., 2021)

While early efforts to use this technique were not practical due to the fact that *Bacillus thuringiensis* had to be mixed into the wax prior to use by the honey bees, advancements made in past decades allowed for formulations, notably, B401 and now B402 to be applied to

Seen in my Bee Hives

empty honeycomb as a deterrent to wax moth infestation and comb damage.

It has been widely reported that the best way to prevent an infestation of *A. grisella* is to maintain a strong and healthy colony. Bees in a healthy colony will kill the *A. grisella* larvae and remove any web left behind (Solanki, et. al., 2020).

No threshold treatment level has been established for *A. grisella* (Hood, 2010). In 2020, a product called B402 (also known as Certan) was approved for use in killing wax moth larvae (Flemming, 2020). B402 uses *Bacillus thuringiensis* to selectively target and kill the wax moth while it is in the larval stage. The manufacturers, Vita Bee Health in collaboration with Valent Biosciences Corporation, claim B402 is up to 100% effective at killing wax moths in the larval stage (Flemming, 2020). Dr. Max Watkins, CEO of Vita Bee Health, claims that when used to kill wax moth larvae, B402 is harmless to the honey bees (Flemming, 2020). B402 is mixed with water and applied to combs prior to storage. The protection is said to last until the following season. No data regarding use or efficacy of B402 applied into a live colony were available (Flemming, 2020).

Wax moths traps may reduce the number of adult females outside the hive, but they are not effective for destroying larvae already inside the hive (Hood, 2010). The best treatment for control of *A. grisella* is to maintain a strong and healthy colony (Hood, 2010; Jack & Ellis, 2018; Solanki, et. al., 2020; *5 Ways to Eliminate Wax Moths in a Beehive PLUS Expert Prevention Tips*, 2021). However, sometimes maintaining a healthy hive is not enough to prevent wax moths from reproducing and feeding inside a hive as I will describe.

Figure 1. Hygienic uncapping behavior of honey bees suspected as a response to *A. grisella* larvae.

Identification of Bald Brood in a Healthy Colony

Bald brood due to the presence of *A. grisella* larvae was first described in 1942 by P. S. Milne of the Rothamsted Experimental Station (Milne, 1942). Milne described the phenomenon as one of bald-headed brood. He further describes observing "patches of uncapped cells containing apparently normal pupae, the glistening white heads of the latter giving the affected part of the comb a distinctly bald appearance." Milne comments that there were no signs of the usual brood diseases beekeepers were familiar with at the time. Additionally, when the pupae were removed from the comb, he found several "small black or dark-brown objects sticking to them" (Milne, 1942). These pellets were removed and observation under a microscope confirmed them to be feces from *A. grisella* larva. He also noted that some of the larva had small amounts of silk on them and an *A. grisella* larva was found to be living in one of the cells alongside a honey bee larva. The *A. grisella* larva was allowed to complete its life cycle and developed into an adult *A. grisella*, thereby confirming the diagnosis that "bald-headed brood" was caused by the presence of *A. grisella* larvae. In this article, I share evidence to support a similar finding based on hygienic bee behavior response and pathology of the affected frames.

Hygienic Bee Behavior

Uncapping and hygienic removal of larvae by honey bees as a response to brood diseases occurs over a wide variety of maladies such as American foulbrood (Park, 1937), chalkbrood (Guilliam, et al., 1983), *Varroa destructor* mites (Peng, et al., 1987) and small hive beetle (*Aethina tumida)* (SHB) larvae (Ellis, et al., 2003). This hygienic behavior in honey bees can be stimulated by freezing (Taber, 1982) or by piercing the larvae (Newton & Ostasiewski, 1986). The behavior is so common among honey bee colonies, that the uncapping and removal of larvae is used as the standard to measure the level of hygienic response exerted by individual colonies (Villegas & Villa, 2006). Hygienic behavior as a response to *A. grisella* is unique in that it occurs in patches or in lines based upon the route taken by the larvae within the comb, whereas hygienic behavior in response to high levels of *V. destructor* mites typically does not follow a pattern and is sometimes referred to as a pepperbox brood pattern because of the seemingly random pattern of uncapping larval cells (Department of Primary Industries and Regional Development et al., 1993; Bee Informed Partnership, 2013; Shimanuki & Agricultural Research Service, 1991).

A Case of Bald Brood Caused by *A. grisella* Larva in a Healthy Hive

Figure 1 shows a linear pattern of uncapping cells containing larvae. The

Figure 2. Honey bee larvae containing purported *A. grisella* feces.

Figure 3. Larvae removed from cells of an infected hive.

pattern is linear and suggests it was done in response to *A. grisella* larvae.

Additionally, Milne (1942) described small black or dark-brown objects sticking to the larvae. The larva removed from the uncapped cells had small black or dark-brown objects adhering to their distal end (Fig. 2). The characteristics of the small black or dark-brown objects suggest they are the feces of *A. grisella* larva. In some instances, a similar condition occurs with American foulbrood, but the remains of larvae in colonies infected with AFB become dark brown and glue-like (de Graaf et al., 2006), and do not remain white like the larva I observed. Evidence also does not support chalkbrood, a fungal disease caused by *Ascosphaera apis*, as a cause. Larva infected with *A. apis* will die inside their capped cell (Bee Aware, 2014). Worker bees remove the cap and expose the dead larvae which will have a white, mummified, chalky appearance (Bee Aware, 2014). The larvae I observed remained white, intact and solid without a chalky appearance (Fig. 3). When worker bees uncap larvae in colonies infected with *V. destructor* mites, the worker bees chew the larva from the head down to remove it from the cell (Oliver, 2019), but the larva I observed in this colony remained largely intact (Fig. 4). In fact, only a small number of larvae in any of the photos showed evidence of being chewed by worker bees. Finally, while there was one small hive beetle present on the inner cover of the hive, an infestation of small hive beetles is characterized by slimy, discolored comb as well and masses of beetle larva on the frame (Fig. 5, Torgerson et al., 2016). There is no evidence of either slimy comb or larvae in any of the figures.

Figure 4. Uncapped larva from hygienic behavior.

Figure 5. Small hive beetle larvae on a brood frame (Martin, n.d.).

History, Treatment and Mitigation of This Hive

This hive was started, along with two others on May 23, 2021, using five frames of brood and a New World Carniolan Queen in a queen cage with a sugar plug. An inspection on June 8, 2021 revealed that the queen had been released and new eggs were present in the brood box. By June 29, 2021 the colony had combed eight of the frames in the 10-frame brood box and a second 10-frame brood box was added. On July 15, 2021, a full treatment of two strips of Mite Away Quick Strips (MAQS) were placed between the brood boxes. The weather unexpectedly turned warm in the next few days with high temperatures reaching 91°F on July 17 and July 18, 2021. This likely was a very stressful event for the colony as the manufacturers of MAQS note in their package insert that temperatures above 85°F can be harmful to the honey bees especially during the first three days of treatment (Application MAQS USA – NOD Apiary Products, n.d.). To support this suspicion, very few eggs were noted on the July 30, 2021 inspection and no eggs or sign of the queen were found on the August 5, 2021 inspection. The queen or eggs were present in the other two hives in the apiary on August 5, 2021. The queen was presumed to be dead in the colony of discussion so a new New World Carniolan was introduced into the colony inside of a queen cage

with a sugar plug on August 10, 2021. Nine days later during an inspection on August 19, 2021, new eggs were found in the top brood box. A mite check using an alcohol wash yielded two mites so a full treatment of two strips of MAQS were placed between the brood boxes of the hive. Nothing remarkable was noted on the weekly inspection notes until the discovery of what evidence suggests is bald brood was noted on the September 28, 2021 inspection. The colony was fed a mixture of 1:1 sugar/water weekly beginning July 8, 2021 through September 2, 2021, after which they were fed a mixture of 2:1 sugar/water until October 28, 2021. A treatment of oxalic acid vaporization was administered on November 28, 2021. It needs to be noted that feeding the bees during the mite treatment with MAQS may have been stressful to the honey bee colony as current treatment guidelines for using MAQS advise to not feed honey bees during the treatment period (The Honey Bee Health Coalition & Caron, 2018).

No treatment was administered to the hive in this case study other than removing the uncapped larvae to try to diagnose the malady. The frames were returned to the hive and the colony was able to remove any *A. grisella* larvae present. The hive survived the 2021 – 2022 Winter in Southwest Connecticut and as of August 15, 2022, this hive is alive and thriving. It yielded 48 pounds of honey harvested July 5, 2022.

My notes regarding this hive reveal that it was healthy and unremarkable for at least six weeks prior to discovering bald brood. Both brood boxes were full of bees and there was no empty space noted. By October 7, 2021, the entire top brood box was full of honey and the brood nest had moved to the lower brood box. This was only one week after the discovery of the bald brood. I believe this speaks positively to the healthy state of the hive in both the time period leading to the emergence of the bald brood, as well as the time period following the discovery. It is for this reason that this case is unusual and it is why I decided to share what I learned.

Advice for Beekeepers

Because there are no effective treatment measures for *A. grisella*, prevention tactics are the best approach for managing this hive pest. A few tactics to prevent *A. grisella* from becoming a problem within a hive are listed below (*5 Ways to Eliminate Wax Moths in a Beehive PLUS Expert Prevention Tips*, 2021; Hood, 2010; Jack & Ellis, 2018; Solanki, et al., 2020):

Keep your bee colony strong and healthy. As unhealthy colonies begin to decline, the number of worker bees available to keep the hive clean declines. Pests that feed on the waste and other products of bees begin to establish a presence, which can include *A. grisella.* Bees in a healthy colony will kill *A. grisella* larvae and remove any web left behind.

Keep a low bee to comb ratio. Healthy colonies that experience frequent swarms lose large numbers of bees in the process. Adjusting the number of brood boxes to fit the number of bees can help maintain a low bee to comb ratio making it more likely that worker bees will be able to service and clean all of the comb in the hive. Additionally, bees may come out of Winter with only a small number of bees. Careful Spring management of hive space will allow for the remaining bees to more easily find and remove pests that may be present in the comb.

Raise hygienic bees. Bees can be selected to be more resistant to certain pests. Bees that have been bred to be resistant to *A. grisella* and other pests tend to be better housekeepers, meaning they exhibit more frequent or strong behaviors associated with keeping the hive clean and free of pests.

Replace old comb with new foundation. Adult female *A. grisella* prefer to lay their eggs in darker, older comb. Even though drawn comb has been referred to as "a beekeeper's most valuable possession" (Imirie, n.d.), it is important to replace comb that presents an ideal egg laying site for *A. grisella*. Beekeepers should not be afraid to discard older, darker comb.

Use traps to trap adult females outside the hive before they can lay their eggs. There are currently no commercial *A. grisella* traps for sale in the United States. However, there are several homemade traps which can be easily made from readily available, low cost materials such as water, sugar, vinegar and banana peels in a two liter bottle. An internet search for "Wax moth traps" will yield several versions of this trap.

*(**#6** from Jerry… Apply B402 to empty comb as a bio-control for Wax Moths)*

Conclusion

Grant Gillard (2009) summed up the bane of *A. grisella* nicely when he said, "Wax moths keep us from becoming lazy. Conversely, they make us pay dearly for our procrastination. They wake us up from lethargy and reinforce our resolve in how we have to be better beekeepers and more efficient managers of our resources."

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Bee-Eaters

Jim Thompson

If you live in southern Europe, Africa, Madagascar, Australia, India and New Guinea, you might see the brightly colored birds called bee-eaters. There are 27 different species of bee-eaters and yes, they do eat honey bees as well as other flying insects. The main fear among beekeepers is that a bee-eater may catch the queen honey bee when she takes her mating flight. Bee-eaters normally consume about 250 bees and other flying insects per day. Bee-eaters have been recorded eating beetles, mayflies, stoneflies, cicadas, termites, crickets, grasshoppers, mantises, true flies and moths. However, they find butterflies distasteful. The largest part of their diet is bees and wasps, with the average being 70% of their diet. It is wise in picking your apiary site so it is not close to the bee-eater colonies. Hives that are placed under trees and overhead power lines have a higher risk as bee-eaters attack insects from their perches.

Bee-eaters typically mate for life and live in long nesting burrows about one meter long that are excavated each year. A burrow could be reused but is usually not because it might be occupied by other birds, snakes and bats. Look for the burrows in excavated earth or river sand banks. One report mentioned that an estimated 10,000 bee-eaters lived in a colony in Africa. It has been found that some migratory bee-eaters may find new mates each breeding season. The average lifespan for a bee-eater living in the wild is five to six years. The size of the bee-eater is from six inches to 14 inches and is a mid-sized bird.

The nests will have two to nine eggs, with the average of five. Both parents take care of the young and sometimes helpers, which are males from a previous hatch. The incubation starts soon after the first egg is laid and it hatches in about 20 days. Because the eggs hatch at different times, the older chicks have the tendency to survive as the food supply may be short. The chicks stay in the nest for about 30 days.

In hunting food, some bee-eaters ride on the back of "beaters" which stir up grasshoppers, dragonflies and other prey. The beaters could be elephants, donkeys, goats, Kori bustards or Arabian bustards. Sometimes the bustards feed on similar food such as locusts, grasshoppers, beetles, reptiles and small mammals. So the bee-eater might choose to sit on a perch rather than ride and swoop down on their insects from the perch.

To eat a stinging insect, the bee-eater removes the sting by hitting the insect on a hard surface to kill it and then wipe the insect's abdomen on the perch to discharge the sting.

In Africa, some of the bee-eaters feed upon stingless bees.

Bee-eaters may be killed by raptors or their nests could be raided by rodents and snakes. Sometimes the bee-eater carry parasites such as blood-feeding flies, biting flies, chewing lice and stickfast flies.

Meropidae of bee-eaters is divided into three genera. Nyctyornis with two large species, Meropogon which has the Purple-bearded Bee-eater as a sole member and Merops has all the other species. Merops bee-eaters have a black bar across the eyes.

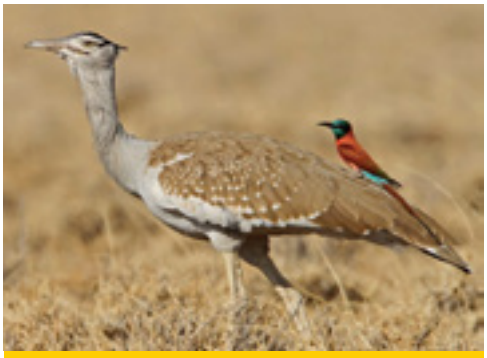
The naming of the bee-eaters was done in 1815 by Samuel Rafinesque-Schmaltz, a French polymath Constantine who created the subfamily Meropia. The name is now modernized as Meropidae from the Greek word Merops and the English term bee-eater.

Sub species of Bearded bee-eaters – Nyctyornis thinae

1. Red-bearded Bee-eater, Nyctyornis amictus – Asia
2. Blue-bearded Bee-eater, Nyctyornis athertoni – Asia

3. Meropogon bee-eater
4. Purple-bearded Bee-eater, Meropogon forsteni – Indonesia
5. Third group of bee-eaters, Merops
6. Little Bee-eater, Merops pusillus
7. Blue-cheeked Bee-eater, Merops persicus – Africa
8. Little Green Bee-eater, Merops orientalis – Africa
9. White-throated Bee-eater, Merops albicollis – Africa
10. Swallow tailed Bee-eater, Merops hirundineus – Africa
11. Blue-tailed Bee-eater, Merops philippinus
12. Black Bee-eater, Merops guiaris – Africa
13. Blue-headed Bee-eater, Merops muelleri – Africa
14. Blue-moustached Bee-eater, Merops mentalis – Africa
15. Red throated Bee-eater, Merops bulocki – Africa
16. White fronted Bee-eater, Merops bullockoides – Africa
17. Blue-breasted Bee-eater, Merops variegates – Africa
18. Cinnamon-chested Bee-eater, Merops oreobates – Africa
19. Black-headed Bee-eater, Merops breweri – Africa
20. Somali Bee-eater, Merops revoilii – Africa
21. Boehm's Bee-eater, Merops boehmi – Africa
22. Blue throated Bee-eater, Merops viridis
23. Olive or Madagascar Bee-eater, Merops superciliosus – Africa & Europe
24. Rainbow Bee-eater, Merops ornatus – Australia
25. European Bee-eater, Merops apiaster – Africa & Europe
26. Chestnut-headed Bee-eater, Merops leschenaultia
27. Rosy Bee-eater, Merops malimbicus – Africa
28. Northern Carmine Bee-eater, Merops nubicus – Africa
29. Southern Carmine Bee-eater, Merops nubicoides – Africa

Bee-eater nesting area near Modi'in, Israel



Arabian Bustard with Bee-eater

European Bee-eater

Bee-eaters in culture:

"In Greek mythology, the Theban Botres was fatally struck by his father when he desecrated a ritual sacrifice of a ram to the god Apollo by tasting the victim's brains. The god took pity of him, turning him into a bee-eater.

The Ancient Egyptians believed that bee-eaters had medical properties, prescribing the application of bee-eater fat to deter biting flies, and treating the eyes with the smoke from charred bee-eater legs to cure an unspecified female complaint.

In Hinduism, the shape of the bird in flight was thought to resemble a bow, with the long bill as an arrow. This led to a Sanskrit name meaning "Vishnu's bow" and an association with archer gods. Scandalmongers were thought to be reincarnated as bee-eaters, because of the metaphorical poison they bore in their mouths.

Depictions in classical art are rare for such striking birds. The only known Ancient Egyptian example is a relief, probably of a little green bee-eater, on a wall of Queen Hatshepsut's mortuary temple, and an early Roman mural depicting blue-cheeked bee-eaters was found in the villa of Agrippina. Bee-eaters have been depicted on the postage stamps of at least 38 countries, the European and Carmine bee-eaters being the most common subjects, with 18 and 11 countries respectively." EC

Spring Flowering Bulbs are Not Just for Squirrels

Now is the time to plan and plant Spring flowering bulbs for color next year. Many species, colors and varieties are available and many provide much needed nectar and/or pollen for honey bees and other pollinators. Dreary, wet Spring days can last for several months, yet honey bees and native bees require lots of food to feed their progeny.

Any day that provides some sunshine and is over 42°F will entice bees to search for food resources near their "nest," so that they don't expend a lot of energy to fly and can get back quickly before the cooler temperatures thwart their efforts. Insects obtain energy from the sun and warm temperatures, so quick trips for food are critical before cold temperatures slow their energy and prevent them from returning safely. For this reason, it is best to plant patches of Spring bulbs around the yard instead of planting single bulbs. It is also much more pleasing to see.

The most protein packed bulbs are Crocus (*Crocus spp.*) *Allium spp.* (many!), Winter aconite (*Eranthis hyemalis*), Snowdrops (*Galanthus spp.*), Glory-of-the-snow (*Chionodoxa spp.*), Leucojum vernum (no common name-Amaryllis Family), Siberian squill (*Scilla siberica*), Scilia tubergeniana (no common name), *Hyacinth spp.* (common hyacinth), Spanish bluebell (Wood hyacinth)-Hyacinthoides hispanica), Grape hyacinth (*Muscari spp.*), Star of Bethlehem (*Ornithogalum umbellatum*) and tulips. All contain medium to high levels of nectar.

Other desirable bulbs that have some protein and nectar are Winter anenome, Dutch Iris, (also called Reticulated iris, Winter buttercup (*Eranthis spp.*), Fritillaria (also called Crown Imperial, *Fritillaria meleagris*) lilies and daffodil species.

Many of these will naturally spread and cover banks, rock gardens and sunny slopes (be careful of Star of Bethlehem as it spreads rapidly and is often considered to be a weed) and be virtually weed and maintenance free.

The common complaint with growing bulbs is that the deer and squirrels often enjoy them more than the pollinators. Squirrels dig the bulbs and deer eat the delicate leaves and flowers in the Spring. Tulips seem to be the favorite of squirrels, chipmunks and ground squirrels.

Many tips are available online to keep them away (some are dangerous to people and pets! Follow label directions) but successful gardeners have placed bone meal or hot sauce/jalapeño pepper flakes or loose stones on top of the bulbs. Another idea is to lay chicken wire (or similar fencing) on top of the bulbs before adding the soil, so that the leaves can emerge but squirrels are less likely to dig them up. Many deer repellents are available but are short term, so fencing the bulbs is recommended. Fencing large areas is not practical or aesthetically pleasing so other tactics are necessary. You can find

Winter aconite
https://www.gardenia.net/plant/eranthis-hyemalis-winter-aconite

Red Crown Imperial (*Fritillaria rubra)*
https://www.americanmeadows.com/flower-bulbs/other-fall-flower-bulbs/crown-imperial-bulbs-red

Bumble bee on Grape hyacinth
https://www.buzzaboutbees.net/flower-bulbs-for-bee

lists of deer resistant bulbs, however if they are hungry they can mow about any leafy plant in the Spring.

Known deer resistant bulbs are Snowdrops, Winter aconite, *Crocus spp.*, Siberian squill, Allium species and any of the daffodils. Sometimes mixing daffodils, crocus or alliums with the other bulbs, such as tulips helps to deter hungry deer. Hyacinths deter both deer and squirrel as well as *Crocus tommasinianus*, referred to as "tommies". Strategy two is to enjoy the flowering bulbs and plan to add more each year. The pollinators will appreciate you and your efforts to provide those crucial Spring nutrition "bars".

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Allium "Millennium" at A.I. Root Co.

Give thanks this month.

FARM/CITY DAY

Peter Sieling

Honey display.

Every two years, our county Cooperative Extension sponsors an event called Farm/City Day. One of several local farms hosts the event. They clear out the machinery sheds and agricultural businesses set up displays in them. They want educational displays, but you can sell your products. It is kid friendly: milk a cow, play in a corn pile, pick your own pumpkin, sample free ice cream, yogurt and cheese. Get lost in the corn maze. They get thousands of visitors. No one knows how many are lost in the corn maze until they harvest it.

I set up a honey display with an observation hive, give away National Honey Board recipe brochures and sell flavored honey straws and honey. I don't sell enough to make it pay, but I get enough new customers to make it worthwhile. Over the years I've learned some lessons that may help others who want to sell honey at farmer's markets, fairs and seasonal festivals.

Two people are better than one. My wife, Nancy usually comes and helps. She sells and I talk bees—all day. I've had people standing in line to ask me questions. By evening, my voice is about gone, and Nancy has sold twice what I could sell alone.

When they put you in a merchant tent, your booth is supposed to face the inside of the tent. Nancy knows these things instinctively, but because setup is early morning, I set up and she comes just before the crowds pour in. The first time I set it all up backwards. Nancy came at ten. People were walking through the tent behind me. "They don't want people tripping on the guy lines," she explained while turning it all around.

Outdoor displays should be wind resistant. One year our honey variety poster blew over at least one million times, the brochures blew across the driveway unless held down with rocks and once Helen, my mannequin in a bee suit, tipped over, breaking all her fingers off one hand.

Our display dummy Helen.

Lost in a corn maze.


Farm City day.

Price everything to the even dollar including tax. There's no time to use a calculator when there is a line of people grabbing jars of honey. Bring lots of one-, five- and ten-dollar bills. People will buy one dollar's worth of honey straws with a twenty-dollar bill. The wind especially tries to grab twenty-dollar bills and blow them into the corn maze. Rather than carefully sort bills, I end up stuffing them into one pocket and making change with the other.

Take an eleven-year-old. Nancy couldn't come one year so I invited Lindsay, my young apprentice. She was very helpful… most of the time. During one of the lulls, she asked me if she could go look at some of the displays.

"Sure." I said, immediately worrying what her mother would say if I lost her. As soon as she left, the crowd thickened. I talked as fast as I could, made change and kept children from handling all the honey straws. Lindsay returned as the crowd thinned. She brought two cartons of free chocolate milk.

"Mr. Sieling, may I go up in that thing?" Steuben Rural Electric had set up a truck with a twin basket cherry picker. They were giving rides in the baskets. The truck's grill stared at our booth and the engine ran all day, making it hard to hear.

Lindsay returned later with a handful of string cheese to share. Her family came that afternoon. They got lost in the corn maze. Lindsay made another round of the displays and brought back two of everything: food samples, magnetized signs, compasses (the cheap kind that point anywhere but north), thermometers and two rain gauges. I wondered if we could sell them.

There were short periods between customers, times when I tried to impart beekeeping knowledge to my young apprentice. She had lots of her own questions.

"Mr. Sieling, what color are your eyes? What color was your hair when you were my age? Did you know a compass doesn't point to true north? It just points to the nearest metal object, so if you follow the needle, you're sure to find civilization, or at least an old, junked car or steel barrel. I think you'd like the corn maze. Could we go through it after we pack up?"

Three hours later the crowds were gone, and the display packed in the van. I was tired, hoarse and lost in a corn maze. My pockets were stuffed with cash. Money is worthless if you are going to die in a corn maze. Lindsay had her compass out.

"Which way now, Mr. Sieling? I've seen that same flyer on the ground at this intersection three times."

I sat down next to the flyer and waited for Lindsay to come around again. There should have been a sign-in/sign-out book at the maze entrance. How else would they know how big a helicopter to send to rescue all the lost souls?

The sun is setting on a long day. Lindsay wants to do this again next time.

Carol Ann Harlos

SHARING BEEKEEPING WITH CHILDREN. IT'S IMPORTANT!

I am a backyard beekeeper... three hives, and in my ninth year of beekeeping. Beekeeping has given me so many opportunities... learning and watching, taking care of, worrying about my bees and taking some of their honey. Perhaps my greatest joy is sharing not only honey and beeswax crafts with other people but sharing information and creating awareness with children. I remember one particular, beautiful June day when I was pushing my wheelbarrow through the yard. I had just taken several frames of honey from the hives and had replaced them with empty frames. There were a few bees following me, or I should say following the full frames of honey... My next-door neighbor's five year old grandson was watching and ran over to see me. His grandmother in a caring tone said, "Watch out for those bees." Without thinking twice, I said "Please don't teach him fear." I showed him the comb, the filled cells. I gave him a piece of comb to chew. He was delighted! (He went inside and brought me a candy bar.)

I had the opportunity to share beekeeping at a library near my home. In Spring, I captured some drones and workers in a screened jar right before leaving home. I wanted the children to observe and see the differences between the workers and the drones. Later in the season, at another library session elsewhere, I took some dead bees with me as well as magnifying glasses and asked a group of ten-year-olds some questions: How many eyes do you see? Can you tell which are drones? Workers? How many legs? Where are the bees furry? What do their legs look like? They loved it! Lots of questions and discussion followed. "How do the drones sting?" was my favorite. Some children already knew about ovipositors and wondered if the females still used them to lay eggs. They also asked if workers could lay eggs if the queen died. Many of the children's questions were better than adult groups I have taught!

At a day camp, I set up a large empty box with one large side missing. I taped black cloth to the top so a person could stick their head inside to block out daylight. I gave the children flowers from the garden including blanket flowers, sunflowers, lavender and an ultraviolet flashlight. Since honey bees only see ultraviolet light, the children (and their counselors) could see what honey bees see. They said, "Way cool."

The words "pollinators" and "pollination" are presently popular topics. People are told that pollinators are necessary for most food we consume. So, I brought some apples for a group of children... of course they asked if they could eat them. I said "Not yet! We are going to be scientists and collect data." We cut the apples in half around "the equator." I gave the children toothpicks. Their task was to dig out the seeds and to place these seeds on white paper next to each apple. I purchased bagged apples which tend to be smaller for their type and thus less expensive. We tallied the number of seeds per apple. Everyone noticed the "star" shape of the cross section but the children (and the adults that were present) were surprised to learn that a fully pollinated apple blossom will produce fruit containing ten seeds! The average number of seeds was five! This led to a discussion about apple size. Did better pollination mean larger fruit?

I also had the children make their own beeswax candles. I purchased the beeswax. We got in a discussion about how beeswax is made by honey bees, why I didn't prepare my own, how beeswax candles are different from paraffin candles. We did this activity outdoors on a hot Summer day, perfect for nice, tight rolling of sheets of wax.

We had discussions about opening beehives. I dressed one of the children in my beekeeper outfit, (OK I am quite short). They asked about getting stung. I said "How would you like it if someone took the roof off your house to check it? "They said they would sting too! We discussed getting stung, why honey bees might try to sting a person, how to prevent it, how to respond to it. We talked about what happens if you are a bee and someone waves their arms around. They said they would get confused and mad. Truly these kids were now on the side of the honey bees.

I also had experience with a father who called our local extension looking for someone to teach his 10-year-old son about honey bees. The boy was scared of everything. The father called me, and I told him that I was willing to take his son to the hives but he must wear a beekeeping outfit. I would not be responsible for any possible bee stings. I thought I would not hear back but two weeks later the father called back. He had purchased two beekeeping outfits, one for his son and one for himself. We met. I asked the boy what the first thing was he thought of when he thought of honey bees. His answer: stinging. We sat and talked about honey bees for about half an hour. Then the three of us suited up, started the smoker, grabbed a pry bar and went out to the hives. We stood on either side of one hive. He just stood there with his head down... he was terrified! I said, "Please tell me what you see." He looked up a bit. A honey flow was on. We could see filled pollen baskets on the legs of returning workers. He became fascinated with their landing and the handing off of pollen. Soon, he was standing up straight, watching and observing. I smoked and I opened the hive, removed a frame and held it up. He was fascinated! His dad told me that he talked about the honey bees all the way home and looked forward to telling his friends.

I also had my eight-year-old grandson come up from Virginia (We live in Western New York). He is planning to become an entomologist and an engineer. I bought him a child-sized beekeeper outfit. I had him smoke the bees and pry off the top cover. I smoked both the entrance and wafted smoke across the top frames. We waited and then removed a frame for an inspection. He observed the workers and the business of the hive. After setting the supers down on the top board we examined the brood chamber. It was so full of bees that the queen was not readily visible. No matter. He loved it.

The joy of sharing beekeeping to the next generation is truly beyond compare.

In Memory of Bill Sheppard

How I Became a Beekeeper

Hugh Madison

I have been keeping bees since 1993 and I'm very proud of how far I have come as a beekeeper. To me, honey bees are some of God's most wonderful creatures. I have not always been a beekeeper. My first career was a stint of 31 years in the United States Air Force.

So how did I choose this beekeeping career? Let's go back to my years as a high school student. In those days, if you were in high school and you had a drivers license, you could apply for a permit to drive a school bus. If I remember correctly, we were also paid. I believe it was $21 a month.

I applied for the bus driver position, went through the training, and was certified as a school bus driver. I was assigned to bus #73. My route was through Colonial Heights (a housing area just outside the city limits of Aberdeen) and I had a couple of stops on Linden Road between Aberdeen and Pinehurst.

Colonial Heights was started back around 1948 when Robbins Mill came to Aberdeen. I guess a good name for the kids who lived there would be "mill hill brats."

One of those "mill hill brats" was a kid by the name of Billy Sheppard. Billy was four or five years younger than me and he was one of the students that rode my bus to school every day. One day on the way to school, Billy got a bit unruly so I stopped the bus and put him off. You could do things like that in those days. (Keep in mind, Billy said this happened but I don't remember doing such a terrible thing.) Anyhow, Billy had to finish his trip to school via his two feet. He said that he promised himself that some day he would get even with "ole Hugh" for throwing him off the bus.

Well, he did get even. In 1992, my wife and I came back to Aberdeen after completion of my Air Force career. My wife's parents owned a large farm about five miles west of Aberdeen and they gave us some land to build our home on. I am not a farmer (remember I was a "mill hill brat") so I needed something to occupy my time. Someone mentioned beekeeping. I asked several people "How do I get into beekeeping?" I was told "contact Bill Sheppard." Remember Billy? He is the one I supposedly threw off the school bus. I looked up his phone number and I called him. I asked, "Billy, do you remember me?" And I know he is thinking to himself "I sure do remember you, you sorry so and so."

I told Billy I might be interested in learning to keep bees. His reply was "Great, come see me and I'll help you get started." I'm sure he was thinking "now I get even." I believe his objective was to lure me in by saying "start

Billy is wearing the green shirt. Pictures were taken during a hands-on part of the Beginners Beekeeping Course that Hugh teaches at Sandhills Community College in Pinehurst, NC with Billy helping with the in-apiary training.

with one hive", and then "split the hive and make two." And after I had two, he would keep needling me "to split and make four." Then split and make eight, and so on and so on. All the while, his primary objective was to have me keep spending money on bees and equipment until I was bankrupt, thereby getting even with me for tossing him off the school bus.

Well, he didn't bankrupt me, but he did cause me to become so interested in honey bees that I was able to get up to 80 colonies in three beeyards but that wasn't good enough for Billy. "You need to learn how to raise queens and start making nucs to sell" said Billy. And I did just that. With Billy's encouragement and mentoring, I enrolled in the North Carolina State Beekeepers Association (NCSBA) Master Beekeeper Program, and on May 30, 2006 I became a Master Beekeeper. Something I am very proud of. I also own a small bee supply business.

Hugh is wearing the blue shirt. Pictures were taken during a hands-on part of the Beginners Beekeeping Course that Hugh teaches at Sandhills Community College in Pinehurst, NC with Billy helping with the in-apiary training.

Billy and I became very close friends and we went to a lot of places together to talk to folks about bees. We conducted a lot of "field days" together and had some truly amazing times. I'm going to miss Billy.

SOME SIMPLE QUESTIONS ABOUT BEES THAT I CAN'T ANSWER

Can you?

Listen along here!

I don't know what I don't know

Increasingly, as I have aged, I have been forced to realize that *I do not know what I do not know.* I tend to have some of my opinions and beliefs – *for the moment.* As I gain insight and experience, maybe some of my opinions and beliefs will need to be updated – or even eliminated.

Lazy drones

In my earliest years, I was taught that drones were laggards. They only ate food stores and did not work for the colony good[1]. In fact, I was told to destroy drone combs in order to keep my colonies at peak efficiency. That notion had to be updated. Drones are a vital reproductive component of a colony. *(But wait, Jim. Shouldn't I remove drone combs to reduce* varroa *populations?).* Don't go crazy, but four hundred – six hundred drones in a colony and during the warm season are a good thing. The colony wants a "normal" drone population.

Sleepy bees

During my entomology classes in the 70s and early 80s, I was distinctly told that insects do not sleep. Now, it is commonly accepted that insects – and our beloved honey bees – do routinely take naps[2]. That notion of mine had to be updated.

[1]It is important for you to know that honey bees were wildly plentiful at the time. There was no concern for mating efficiency.

On and on...

In my high school science classes, I was taught that atoms were the smallest component of all the atomic building blocks – there was nothing smaller. *Duh, dummy.* What about quarks and leptons? Even the smallest part has smaller parts.

In my third-grade class, my teacher said that we were lucky to live in the gulf areas of the U.S. We would never starve because the ocean had endless supplies of food. *Yeah, right.* Then later, eggs are bad for you. No, eggs are good for you. Drink coffee. Don't drink coffee. Jogging is bad for your knees. Well hold on. Maybe jogging is good for you, for your circulatory system. Battery-powered hand tools are a fad. Not anymore. I love them. Latex paint is not as durable as oil paint. I can hardly even buy oil-based paints now. It seems that I am constantly updating and changing. In my old age, I seem to have beliefs and opinions – *for the moment.*

My beekeeping – *for the moment*.

Late in my life, my altered perception of my various opinions has affected my beekeeping psyche. So many things – so much science – that at first seemed so solid is now passé. It would seem that there are only a few remaining sure beekeeping havens. For instance, the old me would have boldly said, *"Rest assured! You absolutely cannot keep a colony of bees underwater!"*

Now, when queried about underwater beekeeping, the current, indecisive version of me would hesitate and ponder. I would probably tell you that this project is going to be very difficult to accomplish, but before I said, *"No, you cannot keep bees underwater,"* I would now need to know if your hive is watertight, how deep are you considering putting the hive underwater and how long will the colony be underwater? I would be less decisive – but that's just the new me. *(Just to be sure, you do know that I am kidding about underwater beekeeping. Right?)*

[2]Klein, Barret A. and Thomas Seeley. *Work or sleep? Honey bee foragers opportunistically nap during the day when forage is not available* https://doi.org/10.1016/j.anbehav.2011.03.026

I don't know

There's not a day in the year that I don't think about bees. After so many years and so many thoughts, I should really have this bee thing down now. Right? No, I do not. If anything, I have gone the other way. I did not realize how much I did not know. What follows are just a few examples of some of my presently unanswered beekeeping questions. Clearly, unanswered questions will always be with me.

Why do a few bees forage for water on cold days?

That whole business about bees clustering at 57°F is probably generally correct, but I can readily tell you I have had a few water foragers at my water source when the temperature is in the upper 30s. These foragers are (seemingly) nearly suicidal. There are only a few of them, so either the tiny amount of water is consummately valuable back at the nest, or they are really bad at foretelling the weather.

The books commonly say that house bees gather in-hive condensed moisture. What if there is none? What if I did a good job of ventilating the hive – as I have been instructed to do? Should we be providing in-hive water for our wintering colonies? I have never read that. Why are these few foraging specialists so crazy for this Winter water? I don't know, but while I am nearly on the subject, consider the next question.

Why do bees frequently drown in my waterers?

Every day, I find bees drowning in my waterers. Before you tell me, I know that floats would help – I guess. I need to write that bees will still drown even if I have floats present.

Even so, I am sure they would help. But what about colonies located near natural bodies of water? Are water foragers drowning in similar numbers at those sources? Some bees seemingly misjudge the water's surface and plunge in. Over the years, I have saved – probably – several hundred. Is the polarized reflected light from the water? Are the reflective shadows confusing? Do these possibilities even matter?

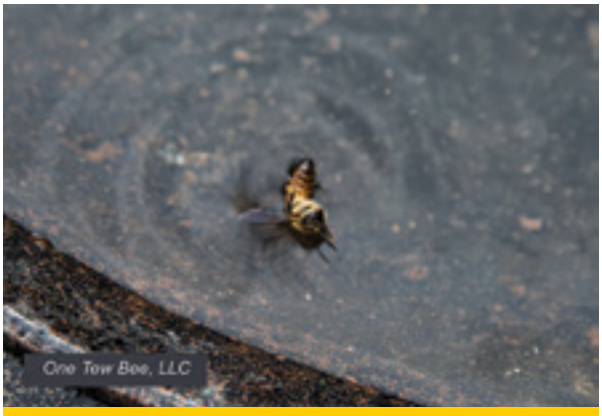

Figure 1. A water forager that misjudged an amphibious landing.

I have seen this time and again. A bee misjudges and lands in nearly freezing water. They only have a few minutes to get out of that cold water or they quickly become comatose, but interestingly, they can live for hours and hours in that cold water. I have taken them out, warmed them with my breath and sent them on their way. Why are they taking these dangerous foraging trips, and why did they misjudge the landing? I don't know.

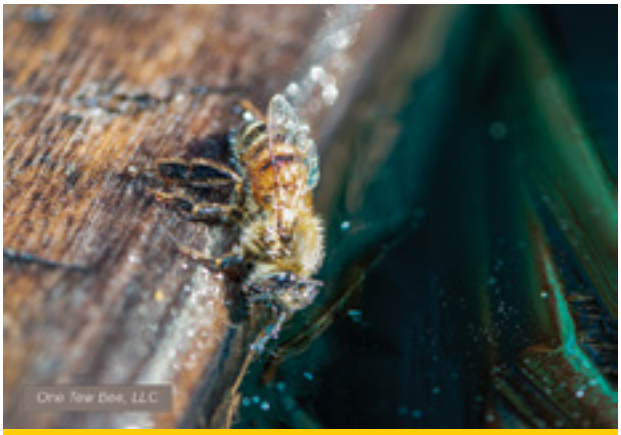

Figure 2. This frost-covered bee must have really been thirsty. There is a thin film of ice on the blue/green water to the right.

Should I whimsically reposition frames?

As beekeepers, we all do it. When we manage our colonies, we move frames to different positions within the hive. Should we? I know a very few of you number your frames and put them precisely back where you got them, but most of us don't always do that. Colony management is filled with variables. What if it is for the greater colony good?

In natural colonies, combs are built and are never moved. Over time, the brood nest may be moved to different locations within the nest cavity, but individual combs stay in the same position.

How much does it affect the natural organization of a colony to have brood and food frames moved about within the hive? I don't know. So long as I am not breaking up the brood nest and I'm keeping the honey in (seemingly) proper areas, I will continue to do it. But I will always wonder how much this comb movement disrupts the organization of the colony.

Do foundation inserts affect wintering success?

Roughly measured, the midrib of natural comb may be something like a thin sheet of newspaper or about .004" thick. The midrib of a foundation insert is about .03" or about eight times thicker. Overall, if I include the shallow preformed cell walls, a foundation insert is nearer to ⅛" thick.

Wintering bees put their heads in cells within the nest area to generate heat. Other bees that are not in cells surround those heat-producing bees to insulate them and hold the heat in the cluster. Does that significantly increased midrib thickness require wintering bees work harder producing heat?

I am suggesting that wintering bees with their heads in natural wax cells – remember that their heads

Figure 3. This is the way the bees like their lives.

are the warmest part of their bodies – are very nearly touching each other – head-to-head. All that separates their two heads is a beeswax film thinner than the thickness of a sheet of newspaper. Yet, I put in a barrier that is eight times thicker to separate the several thousand bee heads and that are now much more separated. I sense that the bees must work harder, but just how much? Beekeepers, does this minuscule point matter in the wintering scheme of things? I don't know. But that leads the next similar question.

Are nice, straight combs good or bad for the bees?

Straight combs are a fundamental requirement for modern beehive management, but I cannot tell that the bees have ever liked them. Believe me, younger beekeepers, you have no idea how much time was required to assemble wooden frames, install eyelets, wire those frames, install beeswax foundation and then electrically embed the wires into the wax foundation – ergo – I love, just love using foundation inserts.

But what did the bees give up to live in our new, improved concept of what the hive interior should look like? Not only are comb midribs much thicker, but the long straight combs don't seem to be conducive to housing a tight, efficient Winter cluster. A wintering cluster on straight frames is essentially composed of several smaller, separated wintering clusters. The frames are straight and there is no way for wintering bees to intermingle within the overall cluster – but only their small part of it. Would bees Winter better in a nest of their design with combs weaving and twisting in seemingly random order? I don't know, but I do know that I like straight combs.

Smoke effects

Smoke effects on you and me

"Smoke may smell good, but it's not good for you. The biggest health threat from smoke is from fine particles, also called fine particulate matter or PM2.5. These microscopic particles can get into your eyes and respiratory system, where they may cause burning eyes, runny nose and illnesses, such as bronchitis."[3]

I grew up outdoors. Campfires were common. Burning piles of Autumn leaves were the norm. In my earliest years, my great grandparents actually burned most of their trash. Everyone had a burn pile. Fire and smoke were common. If you build a fire, then there will be smoke. That was the beginning and end of that. Smoke smells hanging in the air of my early life were common.

I became a beekeeper and was immediately introduced to the basic tool that is older than the classic hive tool – the bee smoker. I saw nothing novel about that. All I had to do was build a small, smokey fire in a bellows-assisted canister. I was told that smoke forced bees to engorge on honey in preparation for departing their burning hive. At the time, I bought that fairy tale. It was only later that I began to wonder what would happen to the fertile, heavy queen that would be essentially unable to fly with the departing bees.

Things change. Then the reason morphed to the explanation that the smoke masked internal hive pheromonal systems and that bees could not amass an organized defensive response. That's pretty much where I am now, but that explanation still has holes in it. Why would masking pheromones with smoke make bees engorge on honey? I don't know.

Smoke effects on the bees

What are the effects of smoke on bees? I don't know. I do know that it "calms" them or does it just confuse them? I do know that I could not work a testy bee colony without dependable quantities of smoke. So, the use of smoke on bee hives is seemingly not going away any time soon. It's too valuable as a management tool.

Figure 4. A classic bee smoker – on the job generating smoke.

Honey bees are tropically derived insects. Fire and smoke have long been a part of their natural world. Does that relationship imply that smoke is in any way good for bees? I don't think so. I suspect that smoke is deleterious to the respiratory system of bees just as it is for my respiratory system. How bad – I don't know.

Smoker fuels

The list of potential smoker fuels used in this country and around the world is huge. It would seem that nearly any product that can be burned has been used for smoker fuel. Burlap, leaves, wood shavings, cow manure, rolled corrugated paper, cotton cloth, punky wood, sumac pods and wheat straw are examples of fuels that beekeepers have used in their smokers. Is any one of them better (safer?) than any other? I don't know.

Years ago, I communicated with a respiratory specialist who kept bees. He had invested some intellectual energy in analyzing smoke fuels and felt that smoke from wheat straw had the least amount of byproduct volatiles. I generally use wood shavings in my home yard when applying smoke and pine needles, that are readily available, when I am in my remote yard.

But the use of pine needles as smoker fuel, though used all over the southeastern and Midwestern U.S., is apparently problematic. Csinca wrote to me saying, *"We talk, write and read about the compounding multi chemical exposure (including pesticides, pollution and pest control chemicals). Do you want to add something to that with your smoker fuel too? The pine oil itself has more than 23 chemical compounds and combined with the high temperature in the smoker, the outcome will be highly unpredictable, but for sure won't help the bees."*[4] Now, I am considering eliminating a common smoker fuel – pine needles – from my common smoker fuel list. Another change?

When I am conscientiously working colonies and expect to be in them for a while, I now wear a respirator to protect my lungs from the smoke. I have the remnants of childhood asthma and I instinctively do not like breathing smoke. However, I have noticed that after a long day in the bee yard, my unprotected eyes are also irritated. Did the smoke do this, too?

In any case, I would suggest using billowing white, cool smoke and only use as much as is needed to subdue the colony. Rather than apply a lot of smoke a few times, I try to use a little bit of smoke frequently. Is this the right thing to do? I don't know.

It's not just beekeeping

Believe me, it is not only beekeeping that seems to have endless unanswered questions. I have many, many unanswered questions about topics that are non-bee related. The side effects of medications that I am expected to take, what foods are safe for my general health and am I exercising enough are some quick vague questions to which I do not presently have answers. It would appear that questions, without obvious answers, will always be with us.

Thank you

Thank you for making it this far through this piece. I always appreciate your time and thought.

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[3] *Wood Smoke and Your Health*, Environmental Protection Agency https://www.epa.gov/burnwise/wood-smoke-and-your-health#

[4] Csinca, Tibor. 2015. Personal Communication. Forestry engineer and hobby beekeeper.

Salted Honey Pie

Shana Archibald

Ingredients

- ☐ Pie crust, refrigerated or a homemade one (for this recipe, I used a pre-made one.)
- ☐ 4 large egg yolks, lightly beaten
- ☐ 2½ cups heavy whipping cream
- ☐ 1 cup unpacked light brown sugar
- ☐ ⅓ cup cornstarch, sifted
- ☐ ½ tsp salt
- ☐ ½ cup honey
- ☐ 2 tsp vanilla extract
- ☐ Sea salt, optional

Directions

Step 1
Prepare the pie crust in a deep dish eight-inch pie pan, or a nine-inch pie pan, and set it in the fridge. Do NOT pre-bake it.

Step 2
Preheat the oven to 375°F

Step 3
Add the egg yolks to a large bowl. Set aside.

Step 4
To make the filling, heat the heavy whipping cream, brown sugar, cornstarch and salt in a medium saucepan on medium heat until it comes to a rolling boil, stirring regularly. It should start to thicken.

Step 5
Once the mixture comes to a full boil, remove it from the heat.

Step 6
Temper the eggs by adding a little bit of the cream mixture to the eggs and whisking, then adding a little more.

Step 7
Add the remaining cream mixture and stir until combined and smooth. (If you add all of the custard while it's still hot, you risk scrambling your eggs.)

Step 8
Add the honey and vanilla extract to the custard and stir until well combined.

Step 9
Pour the mixture into the pie crust.

Step 10
Bake the pie for 40-45 minutes. It will bubble up and start to brown on top.

Step 11
Remove the pie from the oven. It will still be pretty jiggly.

Step 12
Set it on the counter to cool until it comes to room temperature. (It will firm up as it sits)

Step 13
Refrigerate the pie until it's cold and firm.

Step 14
Sprinkle the sea salt onto the pie (or not) and serve.

CALENDAR

♦IOWA♦

Iowa Honey Producers Association 2022 Conference and Fall Meeting will be held at the Gateway Hotel and Conference Center on November 11-12, 2022.

Speakers include Juliana Rangel Posada, Randy Oliver (Zoom), Michael Palmer (Zoom) and Eugene Makovec.

The two day event will include speakers, breakout sessions, vendor hall, Friday night banquet, live and silent auctions and more.

For online registration: **ihpatreasurer@gmail.com**

♦KANSAS♦

Kansas Honey Producers Association Fall 2022 Conference will be held in Salina, KS at Courtyard by Marriott on November 4 and 5, 2022.

Speakers include: Katie Lee, Randy Oliver and many more.

See **www.kansashoneyproducers.org** for more information.

♦NORTH CAROLINA♦

Union County Beekeepers are holding the second annual Bee Palooza on November 7, 2022 from 5:30pm to 9pm.

This year's keynote speaker will be Laurie Hamin PhD Department of Entomology and Plant Pathology NC State University. She will present on what a grocery store would be without pollinators.

The event will include a silent auction, food trucks, a professional honey judging contact and honey tasting.

Register online at **https://www.ucncbeekeepers.org/**

♦TEXAS♦

Texas Beekeepers Association will be holding their Annual Convention on November 3-5, 2022 at the Mayborn Convention Center.

Their conference includes renowned keynote speakers, interactive classes, industry updates, legislative updates, and annual membership meetings.

To register visit: **https://texasbeekeepers.org/** or for more information contact Dodie Stillman at **vp@texasbeekeepers.org**

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- Larry's Backyard Bees Beekeeping Equipment: USA Made Hive Boxes, Package Bees, Beekeeping Tools, Smokers, Bee Suits and more. Order online at **www.larrysbackyardbees.com** or Call Toll Free (844)561-BEES. Newburgh, NY

Contact Jen Manis to place an ad: Jen@BeeCulture.com

As of the time writing this, our event BEEing Diverse: Inspiring Leaders in Beekeeping was this past weekend. We had a wonderful turnout with amazing speakers. We've heard nothing but good comments from speakers and guests all around.

Thank you to all who joined us, both online and in person. And an even bigger thank you to our speakers for taking the time to come to the event after the multiple cancellations and travel and everything! You are the reason this was possible.

Check back next month for a full recap and some more information about seeing the event if you missed out!

If you are having a beekeeping event, we are happy to send back issues to give to your attendees and students. Please email Emma at Emma@BeeCulture.com with the number of magazines needed, a complete mailing address and a contact person.

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Image Contest - Winter Feeding

We've started an image gallery! This month, we want to see any and all pictures you have of **Winter Feeding**. Please make sure that your image is nice and big! We may pick your image for the gallery, or you have the chance to get on the cover! So get creative.

Photo by Greg Carey

How To Submit:

Email your images to **Emma@BeeCulture.com**
Use the subject "**Image Gallery**"
Please include in your email:
- The image as an attachment (we will not consider it if it is embedded)
- Your First and Last name
- Your mailing address
- Your renewal code (if you know it)

If your image is chosen:

For the Gallery:
You will get three months added to your current subscription.

For the Cover:
You will get twelve months added to your current subscription.

Just when you think you have your bees all figured out, the little darlings will laugh at you and prove you so wrong.

It's mid-September as I write. Three weeks ago I divided a dozen colonies and put queens from Hawaii in the queenless halves. They still had on their hula skirts. These were Carniolans mated with Italian drones. Italians aren't my favorite bees, but most of the queen breeders were shut down for the season, and as Paul once pointed out to me, "Sometimes the best queens are the ones you can get!"

I let the resident bees eat through the candy plugs in the queen cages to release their new monarchs. This is the way to go for beekeepers who don't have time to open each hive and manually release queens from their cages when they think the colony has accepted them. Manually releasing queens is the sure-fire way, if you know what you're doing, and you're looking for a project. I'm not. I have a bunch of bee jobs unfolding more or less simultaneously right now, like pulling and extracting honey, testing and treating for mites, moving colonies down from the Colorado high country, packing honey for sale and tinkering with my sometimes fickle 1983 flatbed Ford. Then there's the IRS. Despite my reasoned and persistent entreaties, they won't listen. They gave me a refund, and now they want it back. On top of all this, my gal Marilyn still expects to get taken out on dates. I have to look at the big picture and prioritize.

I'll overwinter these colonies in single brood boxes stacked two-hives-deep, with only a queen excluder and a sheet of metal window screen separating the two colonies. That way they can share the warmth but not intermingle. Bees from the lower hive go to the top of their super, while those from the upper hive descend to the bottom of theirs, creating a single cluster.

My beekeeping strategy is to charge ahead, always. I either get it right, or I learn from my mistakes. A week ago, I discovered that one of the aforementioned splits had rejected its new queen and created some replacement queen cells. I don't normally make divisions in late Summer. I make them in the Spring. If an April queen fails to get accepted, the bees won't tolerate another introduced queen, so I simply let the queen-less split make its own queen. But right now, it's critical to have a laying queen pumping out eggs that are destined to become Winter bees – those special bees that live all Winter, unlike short-lived Summer bees. This is not the time for a brood break. I didn't want egg-laying to stop, while a virgin queen hatches, mates and then heads a colony destined to not survive the Winter due to insufficient numbers of Winter bees.

I wanted to put that no-queen split with the queen cells to good use, so I placed it on top of a weaker, queen-right split right next to it, with a sheet of newspaper between the two colonies. Based on what I just told you about queen cells and introduced queens, this made no sense, but I don't always put two and two together out in the beeyard.

I had an uneasy feeling afterwards, so I called my queen guru Tina. She never minces words. Absolutely I did the wrong thing, she patiently explained. The stronger, no-queen colony would have fidelity not to the laying queen in the other hive, but to its own unhatched queens biding their time in their cells. A murder most foul lay in the offing.

Tina and I had a good laugh over my ineptitude, and we agreed that I'd best get back over to the beeyard first thing in the morning and re-separate those hives. It can take days for colonies to eat through a sheet of newspaper dividing them, so I figured I'd simply undo my mistake, no harm done.

The following morning when I returned to the scene of my blunder, the first thing I saw was a pile of shredded newspaper in front of the hives I'd united the day before. When I lifted off the upper box, I found the newspaper completely eaten away, and the lower, queen-right super – the one containing the weaker colony – completely overrun with bees. Fearing the worst, I took a deep breath and placed the upper super back in its former location. I never even lifted off the cover. Then I drove home.

I've been extracting honey this week, but today, I saw enough daylight to check on those two hives again. The no-queen split with the queen cells had run out of brood – and almost out of honey – so I gave it a word of encouragement and fed it some honey-laden wax I'd skimmed off the top of freshly extracted five-gallon buckets.

And the other colony – the queen-right one I feared had been overrun by marauding invaders? It had lots of bees, brood, eggs and honey. Its queen survived the turmoil of being united with what I had assumed was a hostile colony. All was well, after all.

You see? Every assumption I made turned out to be wrong. I lucked out, but the bees got the last laugh.

A Beekeeper's Life – Tales from the Bottom Board, is an attractive paperback collection of the best of Ed Colby's Bee Culture columns, with photos. Signed copies are available in time for Christmas. Contact the author at **Coloradobees1@gmail.com**.

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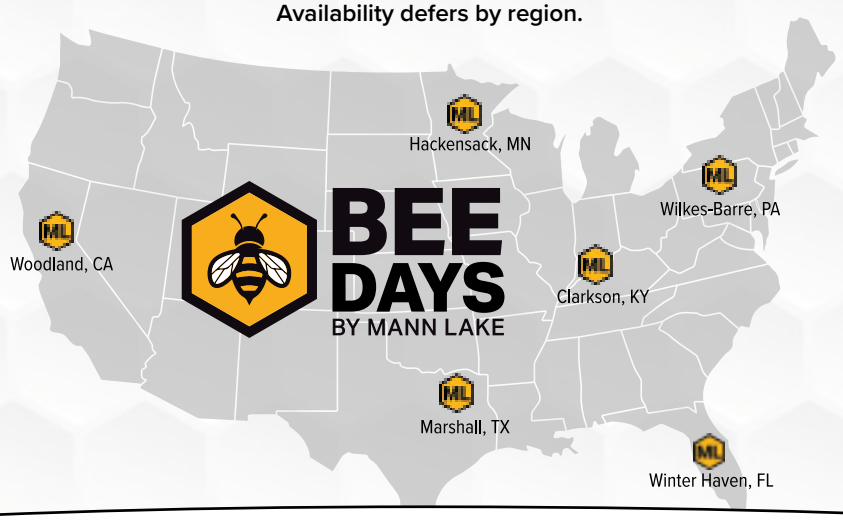

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