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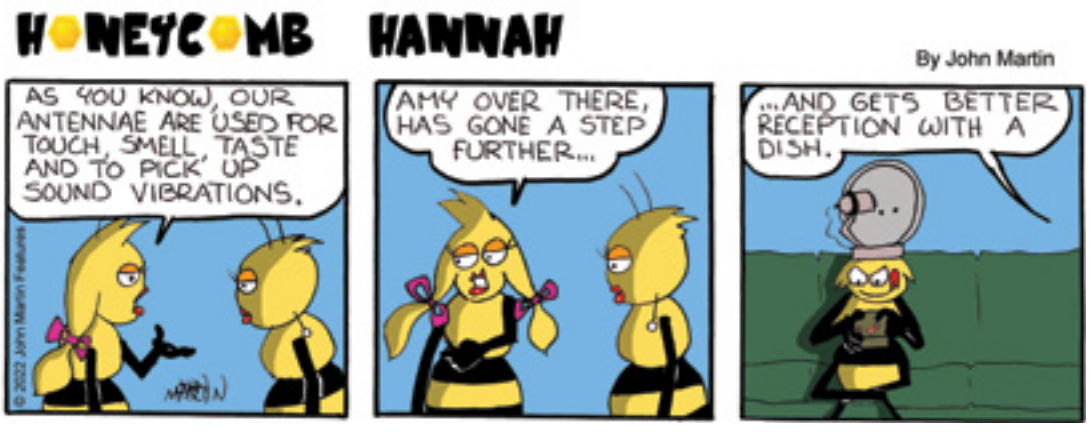
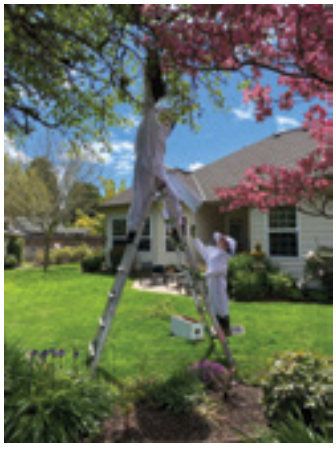


Cover Photo submitted by Laura Burke in the Image Contest.

My neighbor took this photo of my 6 year old and I catching a swarm!



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APISTAN WORKS & HERE'S THE PROOF

95% Efficacy
Apistan, lab study: 95.72% Varroa mortality *(Insects, 2018)*

84% Efficacy
Apistan, field study: 84% efficacy (Apiguard: 86%; Apivar: 79%; HopGuard: 64%), @ Mississippi State University *(Insects 2018)*

94% Efficacy
Apistan: 94.90% efficacy *(2019, Veterinary Bee Inspector, Spain)*

96% Efficacy
Apistan: 96.92% Efficacy *(2018, Veterinary Bee Inspector, Spain)*

97% Efficacy
Apistan + 50 g Apiguard: 97.97% Efficacy *(2018, Veterinary Bee Inspector, Spain)*

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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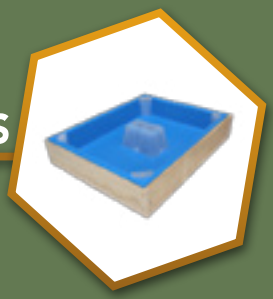

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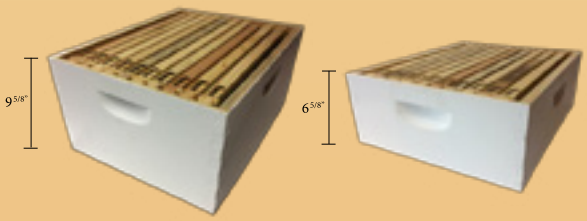

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- Honey Supers & Hive Bodies
- Added Strength 1 – 5/8" Top Joint
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World Bee Day 2022

As I'm sure many of you know, World Bee Day is May 20. To celebrate, the *Bee Culture* staff worked with our employee council to do something special for all of the A.I. Root company employees. This year, we made goodie bags with some honey candy and sticks, a bee keychain, some pollinator seeds and little cards introducing the *Bee Culture* staff since we are all relatively new and many do not know us. We also gave each employee a copy of our May issue. Along with the bags, we worked with a local ice cream shop and passed out Lavender Honey Ice Cream to everyone. Overall, it was a very exciting experience for the whole company!

Jerry wore part of his beekeeping outfit for World Bee Day. He wanted to show off just how messy it can get sometimes, so he didn't wash it!

While the council did a quick first pass with the ice cream (it was in the 80's that day!), Jerry, Emma and Jen went around slower to pass out bags and magazines and answer all of the bee questions many people had.

From left to right, Steven, Jen, Emma and Jerry. *Bee Culture* staff, Jen, Emma and Jerry with warehouse receiving employee Steven who helped us navigate the warehouse and made sure we didn't miss anyone.

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FORMIC PRO

M01467

M01465 M01464

Formic Pro™ is the next generation in formic acid treatments for mites. Made of all natural materials, this product can be used during the honey flow. Unlike Mite Away Quick Strips, Formic Pro™ has a longer shelf life of 24 months after manufacturing date and no temperature requirements for storage.

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NATURAL THYMOL VARROA CONTROL SLOW RELEASE GEL\ PRODUCT

M01480

- → **Natural and Non-toxic**
- → **Kills up to 99% of mites in one application**

Foil pack contains 10 individual 50g treatments ready for application. Also available in bulk tubs.

M01481

Api-Bioxal Oxalic Acid

Oxalic acid is a newly registered chemical control for Varroa Mites. Can be used in both drench and vaporization methods. Best used during broodless periods late fall through early spring, in packages, and nucleous colonies. Can't be used on colonies during a honey flow with supers in place. Available in 3 sizes.

M01758 Oxalic Acid - 35 grams
M01763 Oxalic Acid - 175 grams
M01764 Oxalic Acid - 350 grams

Mite Away Quick Strips

M01463

M01461 M01460

Mite Away Quick Strips are a Formic Acid polysaccharide gel strip which, when placed in the brood chamber of a honey bee hive, is an organic miticide that kills the Varroa mite where it reproduces under the brood cap.

Apivar®

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M01490

- → **Kills up to 99% of mites in one application**
- → **Continuously-released in the colony over a six-week period, ensuring healthy and productive hives**
- → **Proven safe and effective for more than 15 years**
- → **Leaves no significant residues in hive products**

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NEXT MONTH

Region 1
- Extract honey
- Sample and treat for mites if needed
- Sample and treat for mites rotating controls
- Put supers on
- Check nucs for growth
- Requeen if necessary
- Alcohol mite wash
- Monitor beetle population

Region 2
- Alcohol wash for mites, treat if needed
- Check queen, requeen if needed
- Remove honey supers for extraction
- Check hives for hive beetles
- Do good checks on brood for disease

Region 3
- Pull supers and extract
- Feed through dearth
- Alcohol wash for mites, treat if needed
- Add supers as needed
- Requeen if needed
- Monitor for SHB, put in traps

Region 4
- Mite wash and treat if needed
- Put robbing screens on
- Add supers
- Pull honey supers and extract
- Equalize colonies
- Ensure all colonies are queen right

Region 5
- Check colonies for viable queen
- Mite wash check, treat if necessary
- Pull supers and extract
- Add honey supers

Region 6
- Keep adding supers
- Order jars early
- Mite wash and treat
- Check queens, requeen if needed
- Pull supers and extract

Region 7
- Feed during the dearth
- Mite sample alcohol wash
- Treat for mites if wash is above three mites per 100 bees from brood area
- Check queen laying patter
- Check brood for disease
- Mites, mites, mites – safe control after sampling
- Pull supers and extract
- Combine weak colonies

Honey Reporters Wanted

We are expanding our Honey Reporter population in EVERY region. We ask that you fill in most of the sections, most months, and our short survey at the bottom. We give you a FREE subscription for your service. So if you are interested fill out the form **https://forms.gle/EnZW531NHM7sbMUz8** OR send an email to **Emma@BeeCulture.com** and put REPORTER in the subject line. Include name, email, phone number and mailing address and we'll get you the next Honey Report form. Sign up today and be a part of the BEST Monthly Honey Price and Beekeeping Management Report in the industry.

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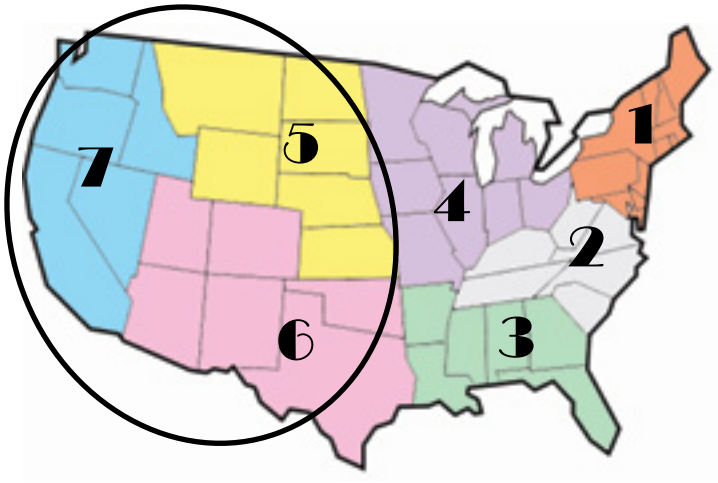

JULY – REGIONAL HONEY PRICE REPORT

	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	2.49	2.22	3.35	9.32	2.48	2.75	2.90	2.00-29.17	4.06	4.06	2.48	2.23
55 Gal. Drum, Ambr	2.28	2.18	2.97	7.88	2.55	2.40	2.58	1.90-29.17	3.78	3.78	2.39	2.14
60# Light (retail)	213.89	230.60	221.00	207.50	215.00	190.69	231.85	120.00-310.00	216.79	3.61	215.12	198.70
60# Amber (retail)	213.64	222.10	221.00	202.60	220.00	187.69	228.75	120.00-290.00	214.20	3.57	212.91	193.46
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	100.07	107.24	96.00	95.60	108.00	96.00	-	64.80-190.00	101.24	8.44	98.62	99.36
1# 24/case	154.55	205.40	122.67	123.26	173.91	82.38	117.00	45.00-288.00	146.91	6.12	148.92	142.91
2# 12/case	146.94	188.87	118.00	107.65	123.84	-	156.00	78.00-264.00	138.09	5.75	142.26	118.81
12.oz. Plas. 24/cs	142.71	148.46	103.50	98.93	80.04	117.36	114.00	40.68-240.00	115.32	6.41	116.15	106.96
5# 6/case	153.37	229.39	-	117.64	126.87	-	-	90.00-330.00	149.64	4.99	150.43	133.44
Quarts 12/case	189.20	209.21	133.50	149.14	167.10	152.34	192.00	69.24-276.00	175.71	4.88	169.10	160.11
Pints 12/case	111.50	155.61	81.00	99.25	101.73	96.00	114.00	60.00-180.00	111.79	6.21	95.00	96.21
RETAIL SHELF PRICES												
1/2#	5.81	6.18	5.75	5.60	4.00	4.00	-	2.19-9.50	5.65	11.30	5.90	5.44
12 oz. Plastic	7.46	7.54	6.50	6.62	5.00	6.00	7.47	2.99-12.50	6.87	9.15	6.89	6.29
1# Glass/Plastic	9.26	9.54	9.11	8.22	9.20	6.15	9.75	4.99-16.00	9.01	9.01	9.05	8.30
2# Glass/Plastic	15.27	16.06	16.22	13.31	15.40	8.00	13.00	6.50-30.00	14.85	7.42	16.14	13.54
Pint	11.82	13.14	9.13	12.67	10.58	10.00	10.20	6.75-22.00	11.46	7.64	11.97	11.08
Quart	22.47	22.78	16.31	20.90	18.48	15.33	20.84	10.00-40.00	20.47	6.82	20.50	18.80
5# Glass/Plastic	36.13	37.44	39.63	25.33	27.88	18.00	-	18.00-60.00	33.55	6.71	34.08	29.27
1# Cream	11.43	12.91	10.74	10.33	10.00	-	12.00	6.04-18.75	11.09	11.09	10.21	9.38
1# Cut Comb	15.06	20.10	13.40	13.25	10.00	-	12.00	7.00-25.00	14.07	14.07	13.73	12.63
Ross Round	11.70	8.90	8.00	10.67	-	-	13.75	6.50-15.00	10.32	13.75	10.16	10.71
Wholesale Wax (Lt)	8.71	7.90	7.21	7.09	6.33	4.25	6.30	3.00-17.00	7.19	-	7.08	6.75
Wholesale Wax (Dk)	7.00	6.75	6.50	6.75	6.00	3.50	6.00	3.00-15.00	6.06	-	5.87	6.16
Pollination Fee/Col.	81.90	72.83	125.00	135.00	-	-	112.00	50.00-240.00	97.89	-	85.89	88.29

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.

See page 45 for the monthly AHPA update.

STUDY HALL

VARROA CONTROL

QUESTION

Thank you for your Zoom presentation to the Maine Beekeepers Association.

I was going to write this in the chat but opted to email instead… I struggle with the idea of waiting for threshold levels to treat. I am a fanatic about ensuring that my Winter bees are healthy. In Maine, they start emerging in hives the second or third week of August. So if I do my math correctly, 21 days prior to emergence is the end of July when I want my hives pristine for those eggs so that the young larva and pupa are not parasitized by the mites. Year after year, when I sample my hives the end of July I am rolling zero mites. If I wait until end of August or September to reach my threshold, it's way too late for my Winter bees. So, I treat my hives the last week of July or first of August regardless of what my alcohol washes reveal and have been hugely successful with over wintering colonies.

I find that folks rely too much on threshold numbers, treat far too late in our season and as a result, lose hives. I recognize that we need healthy cluster sizes as well but am fearful that we miss the mark because we aren't looking at the dynamics of hive make up at critical times of the year when Winter bees need to develop and grow in an environment with minimal threat of having their fat bodies consumed.

When I teach bee school, I constantly refer to and integrate the *varroa* management decision tool and the handbook into instruction… they are excellent resources!

Thank you again Jerry….

Jane

ANSWER

I would agree with you that Maine seasonality confers differences in *Varroa* population growth in comparison to other states such as Florida, California, North Dakota or Illinois which all have that longest day/shortest day variability.

All that to say, you are most likely in that 1% range of beekeepers who are actually 'managing' using vetted documents, sampling, recording and doing the math. I think I mentioned in my talk that an option to become more accurate and successful in keeping colonies alive is to sample for *varroa* monthly and keep a record of those numbers to refer to over the next year and the next and the next. It gives the beekeeper a historical record and a potential time frame of the best time to sample/treat/sample again for *Varroa* control.

For the remaining 99% who do not do what you do there is the HBHC, 'Tools for *Varroa* Management Guide' as a resource to at least get started in becoming a better beekeeper manager rather than the alternative, which is to do nothing, have the colony die and then blame something or someone else for the death, not themselves.

HOW MANY *VARROA* SPECIES?

QUESTION

I have been around bees and beekeeping for most of my life, and retired from a long career with USDA-APHIS in 2004. Back then, *Varroa* mites were referred to in the scientific literature as *Varroa jacobsoni*. But lately, all I read now is *Varroa destructor*. Why the name change? Are there two separate species?

Peter C. Witherell

ANSWER

Hey Pete,

More species have been identified. Life finds a way.

- **Varroa destructor (https://en.wikipedia.org/wiki/Varroa_destructor)** (Anderson & Trueman, 2000) is a virulent parasite that infests its natural host, ***Apis cerana* (https://en.wikipedia.org/wiki/Apis_cerana)** (Asian honey bees), on mainland Asia and also *Apis mellifera* (**western honey bee (https://en.wikipedia.org/wiki/Western_honey_bee)**) worldwide.
- ***Varroa jacobsoni* (https://en.wikipedia.org/wiki/Varroa_jacobsoni)** (Oudemans, 1904) is a relatively benign parasite of *Apis cerana*.
- *Varroa rindereri* (de Guzman & Delfinado-Baker, 1996)
- *Varroa sinhai* (Delfinado & Baker, 1974)
- *Varroa wongsirii* (Lekprayoon & Tangkanasing, 1991)

APISTAN

QUESTION

Good morning Jerry,

To begin, I am a long time reader of *Bee Culture* and greatly enjoy the content of the magazine. There is always something I can use in every issue and I gladly promote *Bee Culture* to all new (and old) beekeepers. There is, however, one advertisement in the most recent edition that has me troubled.

I cannot cite specific studies, however, I have read many opinions stating that mites are developing resistance to Apistan and that Apistan does leave detrimental residues in the wax, which affects the long term health of the developing bee. There are other mite products that may be more appropriate.

From the Editor, Jerry Hayes

On page 17 of the April 2022 edition, there is an ad for Apistan. It includes these:

1. "PROBABLY" the world's #1 *varroa* control
2. "ALL NEW* APISTAN"
3. "It's not the world's #1 *varroa* control product by accident"
4. "It is ideal for use in your integrated pest management system"
5. Test results that indicate *varroa* mortality and efficacy of 84-97.97%

My concerns are the following claims:

1. " ...**the world's #1 *varroa* control,**" is this an accurate statement?
2. The "**ALL NEW APISTAN**" statement would have one believe the **product** is "all new." The asterisk, in their defense, does state that "**ONLY THE PACKAGING HAS CHANGED**" and that I may be surprised at how effective it is... Maybe "sadly" surprised. This is a poor and misleading advertising technique.
3. The "test" results could lead one to believe that maybe this is a great product.

Jerry, I have been keeping bees long enough and can make my own educated decisions about beekeeping methods and products. After 16 years, I am still making some mistakes but am hopefully learning from them. I will not use Apistan but worry about the new beekeepers who will see this ad and will be swayed by its statements. If nothing else, the "ALL NEW APISTAN" wording is deceptive (even with the asterisk explaining that only the packaging has changed) and is a sad, misleading marketing claim.

I realize ads pay for the production and distribution of this great magazine but this particular ad, in my opinion, is inappropriate and detracts from the quality and credibility of *Bee Culture*.

Sincerely,
Ray

ANSWER / Jerry Hayes

Hello Ray,

Let's go right to the top on this one. I have copied the CEO of Vita, Dr. Max Watkins.

Thank you for reaching out.

Jerry

ANSWER / Max Watkins

Dear Ray,

Thanks once again for your comments. As Jerry Hayes can attest, Vita has a very long history of serious research and in managing *varroa* control worldwide. We have had long experience of and have invested a lot of time in resistance monitoring in many countries, unlike other treatment manufacturers. Vita is well aware of resistance appearing to the pyrethroid active ingredient tau-fluvalinate and of course there are many cases where Apistan is no longer as effective as it once was, if used on its own. This is why, for many, many years we have been recommending to use Apistan as one tool in an Integrated Pest Management approach, and where this has been tried, it can actually work. No snake oil here.

At the same time, there are many areas where *varroa* resistance to pyrethroids, including tau-fluvalinate has reverted or diminished and it is possible to use pyrethroid based treatments, including Apistan effectively. If you read our literature you will see that we recommend rotating treatment types on a seasonal or regular basis. Resistance is a natural phenomenon and will occur wherever a high selection pressure is applied; it is well documented that if the selection pressure is removed – i.e. if treatment with a particular product is halted for several seasons, it is possible for the pest target to again become susceptible to the treatment.

Where there is still a high degree of resistance, of course beekeepers, rightly, will not wish to use Apistan and where this is known with absolute certainty it is only rational not to use that product. It is such a pity though, that some blogs just rely on borrowed information and throw-away comments, rather than individuals making a decision of their own, based on actual experience. Treatment choice is just that – a choice. Nobody is obliged to buy our products, Apistan included, and Vita certainly doesn't make beekeepers buy anything. They buy because they have trust in what we do and in the products we provide.

I am sorry you don't appreciate our ad, which has been running for two years already with no complaints from anyone else. You are entitled to your opinion.

Kind regards,
Max Watkins

Ray / Comment

Hi Max,

I believe you have done extensive research and you rightly stand by your product. I will leave you with these thoughts regarding advertising. Do with them what you will.

1. Your statistics show that Apistan works on non-resistant mites. I believe that. Please continue to research and improve Apistan since some mites are becoming resistant. This is a statement I would offer to any producer/manufacturer (most products can be improved).
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3. The misleading statement that says "**All New Apistan**" really should be removed since it is false advertisement (the asterisk explanation does not negate it). It is not a good joke either. If your product is as good as you say, you do not have to resort to this improper technique. I look forward to the removal of this statement in your future ads. And, I will be the first (and maybe the only) *Bee Culture* reader to observe and congratulate Vita for this correction. I can also praise as well as criticize. :)

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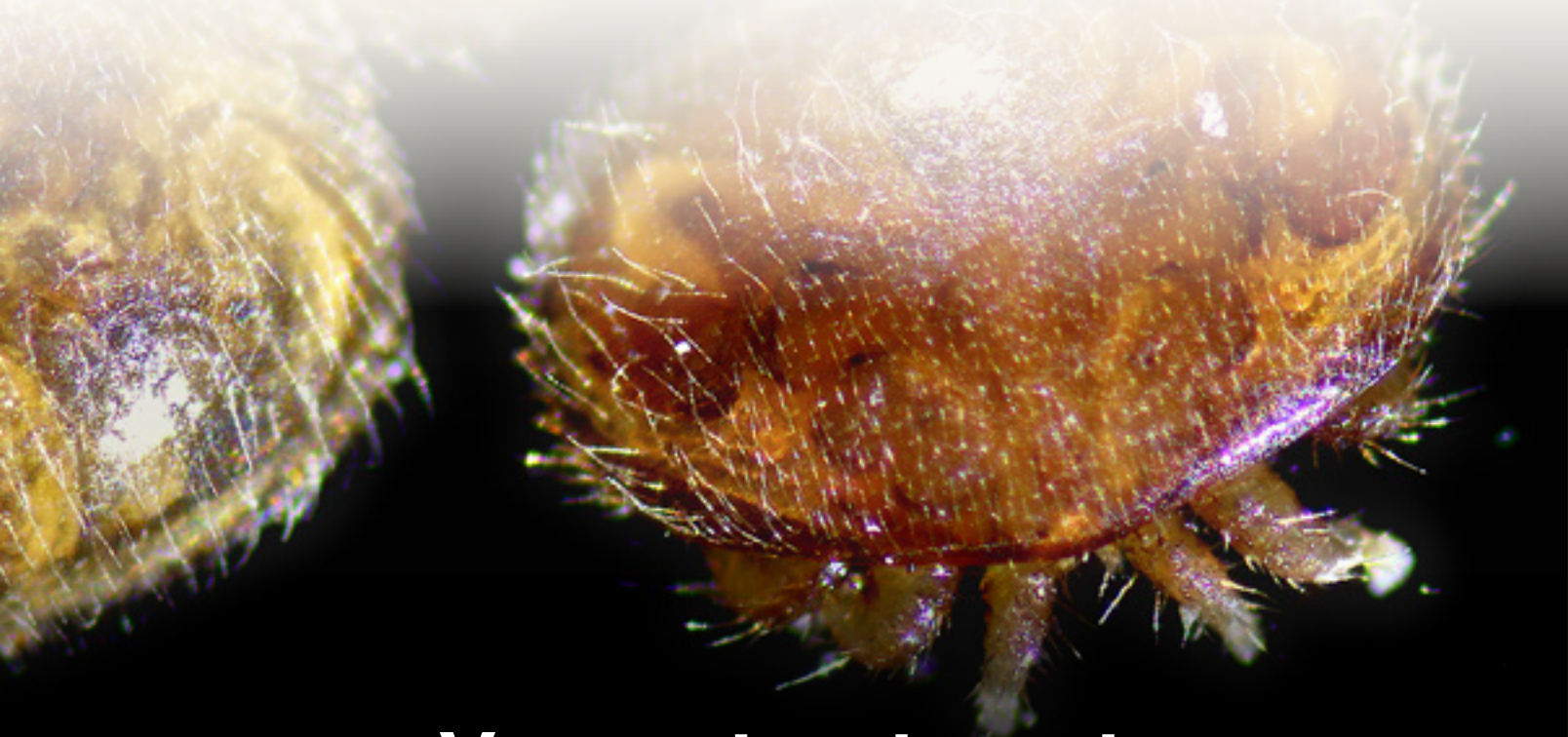

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Image Gallery

Swarms

Submitted by Glenn Hile

Bee Swarm Branch
Submitted by Anthony Brigano

Forgot to pick up my bee jacket the day before.
Submitted by Hager Hicks

Swarm went to a Bottle Tree.
Submitted by Deborah Sasser

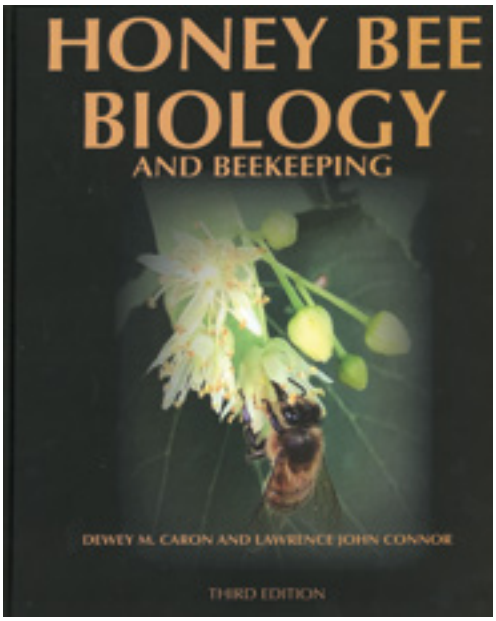
Submitted by John Karcher.

Swarm low in the Bottle Brush.
Submitted by Deborah Sasser

Submitted by Fabian Weber

Book Reviews

Kim Flottum



Honey Bee Biology and Beekeeping, Third Edition. Dewey M. Caron and Lawrence John Connor. Published by Wicwas Press LLC, Kalamazoo, MI 49001. **www.wicwas.com**. ISBN 978-1-878075-62-8. Released May 2022. 488 pgs., hardcover, color throughout, 10.75" tall x 8.3" wide, three pounds, four ounces $90.00 postpaid in the U.S. Additional books discounted, available from Wicwas Press.

This is an update to the second edition released nine years ago. It contains, in my opinion, at least 90 years of updated information. It is, without doubt, a major textbook of apiculture. Universities use it to teach college students bee biology and beekeeping, and lots of bee clubs use it to teach both new, and advanced bee and beekeeping classes.

It has, basically, two sections. The 207 page first section is labeled Bee Biology, and it has 11 chapters. The very first is an Introduction chapter that covers the basics of bees, beekeeping as a science and an art, beekeeping history, and are bees in trouble and what can beekeeping do to help?

Each chapter has, at the very beginning on the first page, a concepts box, which sort of summarizes what the chapter is going to tell you. Then it takes these concepts and further breaks them down into subchapters detailing the 'concept' named.

Included in the Introduction Chapter are sub-chapters on classification, from phylum *Arthropoda* down to the genus *Apis*, subspecies and hybrids. The second is on looking at insect societies, Eusocial species, comparisons of bees, wasps and ants and controlling wasps. What is a honey bee is next, which looks at the differences of each bee in a hive and discusses what is a superorganism. Anatomy is next examining very carefully each of the three body regions and what occurs in each and all about glands. The Physiology chapter looks at nutrition primarily with attention paid to the gut biome, and internal hive environment regulation. The Pheromone chapter looks at communication, many of the glands used for production and dispersal, and the behaviors they regulate or affect. This is followed by the Dance Language chapter, looking at all the variations, dialects, types of dances, accuracy and the controversy surrounding this activity. The bee nest chapter is about wax, organization, man-made hives and is followed by the chapter on Queens, which covers replacement, swarming, absconding, mating and of course, drones. The final chapter in this section is on Bee Botany. It is everything and anything you've ever wanted to know about the plants bees visit, where these plants grow and the seasons when they will bloom, and growing your own.

Section two is all about beekeeping, now that we've covered all about bees. Getting Started is the beginning, and it's as good a beginner's book as you will find. Next is Management Basics including protective gear, stings, inspections, smokers, robbing and feeding. The next chapters are about seasons. The Fall and Winter chapter tends more toward where it's really Winter, as opposed to management requirements in milder subtropical and tropical locations. I think they tend to underdiscuss Winter protection techniques for northernmost colonies, including reduced or no ventilation, wrapping, grouping and the like. Indoor wintering is mentioned briefly, mostly because it is not yet universal, but it will be available to many beekeepers before this book is out of print and I think should be explained and encouraged a little more. A minor point, however.

Of course Spring Management is next, and this is more evenly described for both north and more southerly locations. This covers feeding, water, weak colonies, swarms and swarming, making divides and late Spring to-do jobs. Honey Production is next and explores, of all things, growing degree days (a VERY

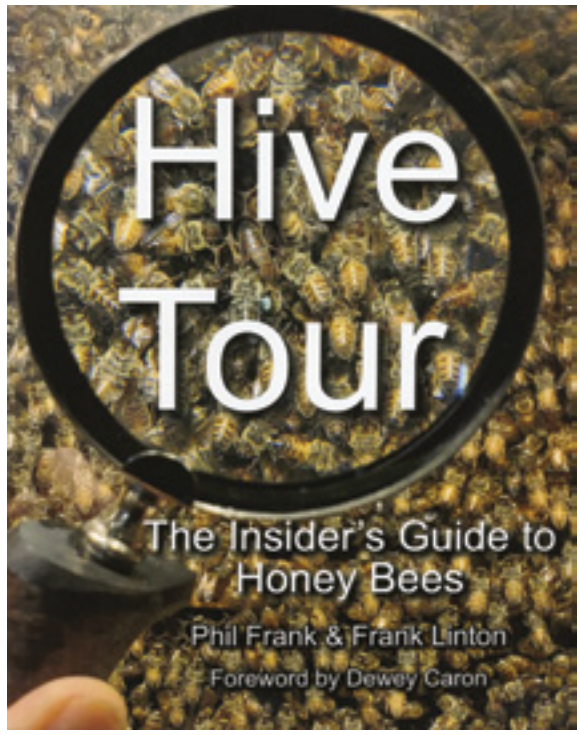
important skill for beekeepers), but also nectar flows, supering, removing bees, and then the honey, and handling honey for sale later.

What bees make is next, including honey, wax, comb honey, pollen, mead, venom, live bees and other products. It also looks at other ways to make money with bees. Raising queens and drones for queen rearing is next, looking at small scale size, using the Cloake board, mating control and introduction of new queens.

The final three chapters are as detailed as those already discussed, including making and using nucs, pollination as a business, and finally, mites and diseases. *Varroa* mite control especially is well covered, including sampling and key control tactics to make this pest go away. Brood and adult diseases are looked at, and the trouble with pesticides is explored quite well, covering new developments, symptoms and confusing with some diseases.

The amount of information in this book is amazing. But one other thing needs to be brought to light. At the end of each of the 23 chapters, there is a section of discussion questions, exercises and the references cited in that particular chapter. As a teaching tool, these sections will be invaluable. So too is the fact that there is not a single page that does not have an explanatory photo or three, along with a chart or diagram to further explain the information included. At the end there is a glossary to die for, all 30 pages of it, followed by a very thorough index.

$90 is a hefty price for a book; however, you are really getting at least two very informative books here. And I ask carefully, what did that package of bees cost you this Spring? Can you afford to lose it this next Winter? Compare and contrast – saving even one package pays for this book, and you actually have at least two books here. What is the value of your whole apiary? This book should be not on every beekeeper's book shelf, but should stay on the dash board of their truck. It's that good, and that necessary.



Hive Tour. The Insider's Guide to Honey Bees. By Phil Frank and Frank Linton, with a forward by Dewey Caron. Published by Honey Tongue Press. ISBN 9798745339738. 8.5" x 11", soft cover, 56 pages, color throughout. $25.00 on Amazon.

Frank Linton wrote a book awhile ago on observation hives, and he uses this experience to produce another book with coauthor Phil Frank, on showing all about bees, bee anatomy, hives and parts, bee food, bee behaviors and even hive intruders. In fact, they expect you to be using this book when you are looking at an observation hive. What a great idea!

It is excellently illustrated with photos by the two authors and even without the copy, would be a great book to explore.

Finding hive parts shows entrances, wax cells and comb, frames and bee space, feeders and more. And each of these has a fun fact to explore too. For instance, when finding a vent, the fun fact says bees fan moist air out of the vent to help dehydrate nectar – an essential step to making honey.

Finding adults includes stripes, old and young adults, queens and drones, eggs and larvae (now remember, these photos show a larvae larger than a dime on the page, very easy to see and learn from), drones and royal jelly.

Bee parts include the head, thorax and the rest, and then parts including the proboscis, the eyes, antennae and what they do, and yes, the stinger. Bee food includes pollen, nectar and honey. Behaviors include nurse bees, the retinue, fanning and undertaking.

Next come intruders, *varroa*, deformed wings, small hives beetles (here as big as a dime), wax moth and their larvae.

The book finishes with a Find Answers page, with 32 questions that were answered in the book, and this is followed by a long list of reference books to further your learning.

There is no doubt that taking this book to some place with an observation hive would be a great learning experience, especially if you are accompanied by someone who is eager to learn more.

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FOUND IN TRANSLATION

Do bees feel sick?

Jay Evans, USDA Beltsville Bee Lab

In our own species, disease can be swift and devastating. In the U.S. alone, SARS-CoV2 has killed at least one million loved ones in two years, behind only heart disease and cancer as our leading cause of death. Much of the time, however, disease can be chronic, setting us back somewhat but not, at the time, causing death. Many illnesses have more favorable outcomes, with time and our immune systems erasing all signs in a few days. The same mix of devastatingly swift disease versus long-term illness versus, one hopes, full recovery, holds true for the many plants and animals we cherish and/or rely upon. A lot of our work as researchers goes toward better understanding the long-term effects of disease on colony productivity, from lost days as a nurse, to some sort of brain fog when trying to find flowers or return home, to slightly shorter lifespans that are rarely noticed aside from their additive effects on colony size and productivity.

In musing about this for honey bees, I wondered if they ever take sick days, if they move just a bit slower in the hive or on the wing during or after an illness, and if they ever fully recover from an infection picked up in the cozy confines of a colony. We can get some insights into these effects by looking at both historical and recent work on nosema disease. Here is my attempt to get some clarity on long-nosema and the impacts of chronic disease in bees.

Nosema is regarded as a metabolic disease, a case of the parasite growing to such numbers in the cells lining bee guts that the energetic demands of keeping this alien population alive become taxing. This could be said for many parasites, of course. Those that do not tear risky lesions on skins, or release toxins during infection, normally cause harm by simply being dedicated mooches, taking what they can from their hosts. Nosema, and others in the Microsporidia, have taken this theft to a new level for cellular parasites, foregoing any pretense of generating the energy their cells needed when they dropped having mitochondria in their cells millions of years ago. As a result, even the transfer of nutrients to the molecules that make cells respire and function is left to their bee hosts.

In one of the first papers to tackle the impacts of *Nosema ceranae* on bee health, Christopher Mayack and Dhruba Naug used clever experiments to test "Energetic stress in the honey bee *Apis mellifera* from *Nosema ceranae* infection" (2009), *Journal of Invertebrate Pathology* 100; 185–188, **doi:10.1016/j.jip.2008.12.001**. First, they proposed that bees infected by an energy-sapping parasite would be eager to replace that energy. They confirmed this prediction in that infected bees were both less selective of syrup concentrations and ate more. They also found that the impacts of nosema on infected bees could be reduced by abundant sugar supplies.

Further making the case that nosema is an energy pirate, these two researchers next showed that blood sugar levels in infected bees were lower than in healthy bees of the same age (Mayack C and Naug D "Parasitic infection leads to decline in hemolymph sugar levels in honey bee foragers" (2010), *Journal of Insect Physiology* 56: 1572-1575, **https://doi.org/10.1016/j.jinsphys.2010.05.016**). Ignoring the challenge of assessing blood sugar in worker honey bees (hint: blood tests are harder on bees than the infection itself), it would appear that reduced blood sugar in bees that rely on sugar to fuel adult activities would make those bees 'sick' in ways that hurt productivity. There are at least two possible outcomes to nosema-induced pressures on worker bees in colonies. First, infected bees could take a sick leave and tone things down, flying less far and perhaps taking fewer trips

daily. Second, infected bees could return more frequently to honey stores, removing the valuable resources that they should be collecting. Do sick bees indeed fly less often? A paper by Trish Wells and colleagues in the United Kingdom ("Flight performance of actively foraging honey bees is reduced by a common pathogen" (2016) *Environmental Microbiology Reports*, **doi:10.1111/1758-2229.12434** suggest this is not the case for nosema infection. So perhaps the real cost is in over-consumption of colony food stores. Interestingly, this paper *did* find that bees infected with viruses made poor foragers, travelling one third as far as healthy bees and spending half as much time overall foraging, indeed a direct sickness cost to the colony. Given that bee viruses also seem to cause a form of brain fog that affects the abilities of foragers to find food and return home safely (Iqbal J and Mueller U "Virus infection causes specific learning deficits in honey bee foragers" (2007) *Proceedings of the Royal Society B: Biological Sciences* 274: 1517-1521, **doi:10.1098/rspb.2007.0022** assessing the colony impacts of viral sickness is a great topic.

As far as nosema, there is one more recent paper that hints at an underlying sickness of bees carrying this parasite. As if it weren't enough to take the energetic building blocks of bees, nosema is also extremely good at scavenging iron from the cells of their bee hosts. In a paper co-led by my USDA colleague Judy Chen, Cristina Rodriguez-Garcia showed that not only does nosema scavenge iron from bee hosts, they enlist the bee's own transferrin protein (an iron vehicle) as an accomplice ("Transferrin-mediated iron sequestration suggests a novel therapeutic strategy for controlling *Nosema* disease in the honey bee, *Apis mellifera*" (2021), *PLoS Pathogens* 17(2): e1009270. **https://doi.org/10.1371/journal.ppat.1009270**. Exploiting this vehicle, Judy, with some of us at the USDA-ARS Bee Research Lab, is trying to knock down the transferrin protein in order to iron out nosema disease.

So, it is clear that bees can get sick and that the effects per bee range from drop-dead bad to subtle. Bees have a strong individual and 'social' immune system and the benefits of food buffers to help nurse sick bees back to productivity. How far a wave of nosema goes to reduce productivity will probably depend on colony genetics, nutrition, and the co-occurrence of other pathogens and stresses. Colony-level studies using tagged healthy and sick bees will be key for firmly assessing the rate of sick days in a honey bee colony, and the impacts of management schemes aimed at keeping workers healthy.

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A Closer LOOK

Honey Bee Environmental Monitoring

Clarence Collison

Human activities produce contaminants.

Human activities produce contaminants, the amounts and toxicity of which often exceed the environment's homeostatic capacity to cleanse itself. Hence, the systematic analysis and monitoring of the environment is increasingly a matter of urgency. Honey bees, thanks to their morphological features, and also bee products are regarded as good indicators of environmental pollution by toxic substances, be these heavy metals, radioactive elements, or persistent organic pollutants such as pesticides. Bees can carry back to the hive many contaminants deposited on utilitarian plants. The pesticides used in agriculture (especially in Spring and Summer when farming activities reach their peak) may not only be the cause of the large-scale mortality of bees but can also get into bee products. The presence of xenobiotics (substances that are foreign to the body or to an ecological system) in these products may impair their quality and properties and put human health at risk (Bargańska et al. 2016).

The honey bee has increasingly been employed to monitor environmental pollution by heavy metals in territorial and urban surveys, pesticides in rural areas and also radionuclide presence in the environment. The bee as a biological indicator possesses several important morphological, ecological and behavioral requisites, and man's beekeeping assures an unlimited supply. The bee acts as a detector of environmental pollution in two ways, as it signals either via high mortality rates the presence of toxic molecules, or via the residues in honey, pollen and larvae the presence of heavy metals, fungicides and herbicides that are harmless to it (Celli and Maccagnani 2003).

Honey bees have great potential for detecting and monitoring environmental pollution, given their wide-ranging foraging behavior. Previous studies have demonstrated that concentrations of metals in adult honey bees were significantly higher at polluted than at control locations. These studies focused on a limited range of heavy metals and highly contrasting locations, and sampling was rarely repeated over a prolonged period. In this study, the potential of honey bees to detect and monitor metal pollution was further explored by measuring the concentration in adult honey bees of a wide range of trace metals, nine of which were not studied before, at three locations in the Netherlands over a three month period. The specific objective of the study was to assess the spatial and temporal variation in concentration in adult honey bees of Al (Aluminum), As (Arsenic), Cd (Cadmium), Co (Cobalt), Cr (Chromium), Cu (Copper), Li (Lithium), Mn (Manganese), Mo (Molybdenum), Ni (Nickel), Pb (Lead), Sb (Antimony), Se (Selenium), Sn (Tin), Sr (Strontium), Ti (Titanium), V (Vanadium) and Zn (Zinc). In the period of July–September 2006, replicated samples were taken at two week intervals from commercial-type beehives. The metal concentration in micrograms per gram honey bee was determined by inductive coupled plasma–atomic emission spectrometry. Significant differences in concentration between sampling dates per location were found for Al, Cd, Co, Cr, Cu, Mn, Sr, Ti and V, and significant differences in average concentration between locations were found for Co, Sr and V. The results indicate that honey bees can serve to detect temporal and spatial patterns in environmental metal concentrations, even at relatively low levels of pollution (van der Steen et al. 2012).

An experiment was carried out using 12 colonies of honey bees raised in hives located near an extra-urban crossroad. Leita et al. (1996) analyzed the Pb (Lead), Cd (Cadmium) and Zn (Zinc) deposited on the bee's surfaces and the heavy metal accumulation in the foragers, dead bees, honey products and some environmental markers during nine weeks of the experiment. Results showed a large amount of Zn and Cd on the bee's surface as a consequence of atmospheric fallout, whereas Pb seems to be either water-extractable and/or likely accumulated in the body of the insect. Dead bees expelled from the hives displayed a progressive accumulation of all heavy metals during the experimental period. Royal jelly and honey contained large amounts of heavy metals. In particular, they found a linear relationship between Cd in the honey and that found in flowers of *Trifolium pratense* L. (red clover). Results obtained suggested that honey bee products and the examined environmental markers may be considered useful parameters to assess the presence of environmental contaminants, whereas the measure-

ments of heavy metals in the dead bees may be considered a suitable tool also to verify possible dynamics of accumulation of pollutants.

The potential use of honey as an indicator in mineral prospecting and environmental contamination studies has been investigated. Silver, Cd, Cu and Pb levels are reported in honeys collected throughout the U.K. The elemental content of honeys was investigated in relation to that in the soils collected from within the foraging area. For samples collected over two seasons the following concentrations were found: Ag < 0.1 to 6.5 ng g^{-1} (d.w.); Cd < 0.3 to 300 ng g^{-1}; Cu 35 to 6510 ng g^{-1}; Pb < 2 to 200 ng g^{-1}. Considerable spatial and seasonal fluctuations were apparent. No correlations were observed between honey and soil concentrations for either Cu or Pb. It is concluded that the low concentrations of heavy metals in honey and their inherent variability (due to differences in floral source, foraging range, entrapment of atmospheric particulates on the flower, etc.) detract from the reliable use of honey as a monitoring tool (Jones 1967).

Arsenic can be toxic to living organisms, depending not only on the concentration, but also its chemical form. The aim of this study was to determine arsenic concentrations and perform arsenic speciation analysis for the first time in honey bees, to evaluate their potential as biomonitors. Highest arsenic concentrations were determined in the vicinity of coal fired thermal power plants (367 µg kg^{-1}), followed by an urban region (213 µg kg^{-1}), with much lower concentrations in an industrial city (28.8 µg kg^{-1}) and rural areas (41 µg kg^{-1}). Until now, honey bees have never been used to study different arsenic species in the environment. For this reason, four extraction procedures were tested: water, hot water at 90°C, 20% methanol, and 1% formic acid. Water at 90°C was able to extract more than 90% of the total arsenic from honey bee samples. Inorganic arsenic (the sum of arsenite and arsenate) accounted for 95% of arsenic species in bees from three locations, except the industrial city, where it represented only 80% of arsenic species, while 15% was present as DMA (dimethylarsinic acid) (Zarić et al. 2022).

Three beehive matrices, sampled in eighteen apiaries from West France, were analyzed for the presence of lead (Pb). Samples were collected during four different periods in both 2008 and 2009. Honey was the matrix least contaminated by Pb (min = 0.004 µg g^{-1}; max = 0.378 µg g^{-1}; mean = 0.047 µg g^{-1}). The contamination of bees (min = 0.001 µg g^{-1}; max = 1.869 µg g^{-1}; mean = 0.223 µg g^{-1}) and pollen (min = 0.004 µg g^{-1}; max = 0.798 µg g^{-1}; mean = 0.240 µg g^{-1}) showed similar levels and temporal variations but bees seemed to be more sensitive bringing out the peaks of Pb contamination. Apiaries in urban and hedgerow landscapes appeared more contaminated than apiaries in cultivated and island landscapes. Sampling period had a significant effect on Pb contamination with higher Pb concentrations determined in dry seasons (Lambert et al. 2012).

Due to their extensive use in both agricultural and non-agricultural applications, pesticides are a major source of environmental contamination. Honey bee colonies are proven sentinels of these and other contaminants, as they come into contact with them during their foraging activities. However, active sampling strategies involve a negative impact on these organisms and, in most cases, the need of analyzing multiple heterogeneous matrices. Conversely, the APIStrip-based passive sampling is innocuous for the bees and allows for long-term monitorings using the same colony. The versatility of the sorbent Tenax, included in the APIStrip composition, ensures that comprehensive information regarding the contaminants inside the beehive will be obtained in one single matrix. In the present study, 180 APIStrips were placed in nine apiaries distributed in Denmark throughout a six-month sampling period (10 subsequent samplings, April to September 2020). Seventy-five pesticide residues were detected (out of a 428-pesticide scope), boscalid and azoxystrobin being the most frequently detected compounds. There were significant variations in the finding of the sampling sites in terms of detections, pesticide diversity and average concentration. A relative indicator of the potential risk of pesticide exposure for the honey bees was calculated for each sampling site (Murcia-Morales et al. 2021).

Honey bee health is compromised by complex interactions between multiple stressors, among which pesticides play a major role. To better understand the extent of honey bee colonies' exposure to pesticides in time and space, Tosi et al. (2018) conducted a survey by collecting corbicular pollen from returning honey bee foragers in 53 Italian apiaries during the active beekeeping season of three subsequent years (2012-2014). Of 554 pollen samples analyzed for pesticide residues, 62% contained at least one pesticide. The overall rate of multi-residual samples (38%) was higher than the rate of single pesticide samples (24%), reaching a maximum of seven pesticides

per sample (1%). Over three years, 18 different pesticides were detected (10 fungicides and eight insecticides) out of 66 analyzed. Pesticide concentrations reached the level of concern for bee health (Hazard Quotient (HQ) higher than 1000) at least once in 13% of the apiaries and exceeded the thresholds of safety for human dietary intake (Acute Reference Dose (ARfD), the Acceptable Daily Intake (ADI), and the Maximum Residue Limit (MRL)) in 39% of the analyses. The pesticide which was most frequently detected was the insecticide chlorpyrifos (30% of the samples overall, exceeding ARfD, ADI, or MRL in 99% of the positive ones), followed by the fungicides mandipropamid (19%), metalaxyl (16%), spiroxamine (15%) and the neonicotinoid insecticide imidacloprid (12%). Imidacloprid had also the highest HQ level (5054, with 12% of its positive samples with HQ higher than 1000). This three year survey provides further insights on the contamination caused by agricultural pesticide use on honey bee colonies. Bee-collected pollen is shown to be a valuable tool for environmental monitoring, and for the detection of illegal uses of pesticides.

Monitoring the environment for pollution, pesticides and pathogens is crucial for protecting human, agriculture and overall ecosystem health. Diverse strategies ranging from physical sensors to sentinel species have been used for environmental monitoring. The European honey bee is a globally managed pollinator that can serve as a continuous biomonitoring species. During foraging, honey bees are exposed to contaminants and pathogens and carry them to their hives where they can be detected and quantified. Although individual bees are vulnerable to environmental stressors, the honey bee colony as a whole is more resilient and can accumulate contaminants or respond to them without collapsing. This allows for long-term monitoring of the colony to map contaminants in a geographical area and study ecotoxicology gradients over space and time. (Cunningham et al. 2022).

Environmental DNA (eDNA), defined as DNA extracted from environmental- or organismal-related specimens or matrixes, has been proposed as a powerful tool to detect and monitor cryptic, elusive, or invasive organisms, including parasites and many other pathogens that might be difficult to sample or to identify. Ribani et al. (2020) recently demonstrated that honey constitutes an easily accessible source of eDNA. In this study, they extracted DNA from 102 honey samples (74 from Italy and 28 from 17 other countries of all continents) and tested the presence of DNA of nine honey bee pathogens and parasites (*Paenibacillus larvae* (AFB), *Melissococcus plutonius* (EFB), *Nosema apis*, *Nosema ceranae* (Nosema Diseases), *Ascosphaera apis* (Chalkbrood), *Lotmaria passim* (Trypanosome Parasite), *Acarapis woodi* (Tracheal Mite), *Varroa destructor* (*Varroa* Mite), and *Tropilaelaps* spp., (Parasitic Mite)) using qualitative PCR assays. All honey samples contained DNA from *V. destructor*, confirming the widespread diffusion of this mite. None of the samples gave positive amplifications for *N. apis*, *A. woodi*, and *Tropilaelaps* spp. *M. plutonius* was detected in 87% of the samples, whereas the other pathogens were detected in 43% to 57% of all samples. The frequency of Italian samples positive for *P. larvae* was significantly lower (49%) than in all other countries (79%). The co-occurrence of positive samples for *L. passim* and *A. apis* with *N. ceranae* was significant. This study demonstrated that honey eDNA can be useful to establish monitoring tools to evaluate the sanitary status of honey bee populations.

Nucleus colonies (nucs) of 4,500 honey bees were evaluated as an alternative to full-size colonies for monitoring pollution impacts. Fifty nucs were deployed at five sites along a transect on Vashon Island, Washington. This provided a gradient of exposure to arsenic and cadmium from industrial sources. After 40 days, statistically significant differences were observed among sites for mean mass and numbers of bees ($P \leq 0.01$), honey yield ($P \leq 0.07$), and arsenic and cadmium content of forager bees ($P \leq 0.001$) (Bromenshenk et al. 1991).

References

Bargańska, Ż, M. Ślebtoda and J. Namieśnik 2016. Honey bees and their products: bioindicators of environmental contamination. *Critical Reviews in Environmental Science And Technology*. 46: 235-248.

Bromenshenk, J.J., J.L. Gudatis, S.R. Carlson, J.M. Thomas and M.A. Simmons 1991. Population dynamics of honey bee nucleus colonies exposed to industrial pollutants. *Apidologie* 22: 359-369.

Celli, G. and B. Maccagnani 2003. Honey bees as bioindicators of environmental pollution. *Bull. Insectol.* 56: 137-139.

Cunningham, M.M., L. Tran, C.G. McKee, R.O. Polo, T. Newman, L. Lansing, J.S. Griffiths, G.J. Bilodeau, M. Rott and M.M. Guarna 2022. Honey bees as biomonitors of environmental contaminants, pathogens, and climate change. *Ecol. Indicators* 134: 108457.

Jones, K.C. 1987. Honey as an indicator of heavy metal contamination. *Water, Air And Soil Pollution.* 33: 179-189.

Lambert, O., M. Piroux, S. Puyo, C. Thorin, M. Larhantec, F. Delbac and H. Pouliquen 2012. Bees, honey and pollen as sentinels for lead environmental contamination. *Environ. Pollut.* 170: 254-259.

Leita, L., G. Muhlbachova, S. Cesco, R. Barbattini and C. Mondina 1996. Investigation of the use of honey bees and honey bee products to assess heavy metals contamination. *Environ. Monit. Assess.* 43: 1-9.

Murcia-Morales, M., F.J. Díaz-Galiano, F. Vejsnaes, O. Kilpinen, J. J.M. Van der Steen, and A.R. Fernandez-Alba 2021. Environmental monitoring study of pesticide contamination in Denmark through honey bee colonies using APIStrip-based sampling. *Environ. Pollut.* 290: 1-10.

Ribani, A., V.J. Utzeri, V. Taurisano and L. Fontanesi 2020. Honey as a source of environmental DNA for the detection and monitoring of honey bee pathogens and parasites. *Vet. Sci.* 7(3): 113 **https://doi.org/10.3390/vetsci7030113**

Tosi, S., C. Costa, U, Vesco, G. Quaglia and G, Guido 2018. A 3-year survey of Italian honey bee-collected pollen reveals widespread contamination by agricultural pesticides. *Sci. Total Environ.* 615: 208-218.

van der Steen, J.J.M., J. de Kraker and T. Grotenhuis 2012. Spatial and temporal variation of metal concentrations in adult honeybees (*Apis mellifera* L.). *Environ. Monit. Assess.* 184: 4119-4126.

Zarić, N.M., S. Braeuer and W. Goessler 2022. Arsenic speciation analysis in honey bees for environmental monitoring. *J. Hazard. Mater.* 432: 128614.

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SAVE THE BEES, SAVE THE WORLD
HOW TO START

Greg Carey

Forewarned is forearmed.

When I first started thinking of keeping bees, I did not know that "all the bees are dying." I only remembered that several of my uncles had kept bees when I was a child and reminisced on those good old days, needing something to keep me busy in my retirement. My initial research yielded little until I happened upon the beekeeping magazines. From these I quickly learned that my new calling would result in my becoming a national hero since one out of every three bites Americans take is a direct result of the honey bee pollination and all of mankind would soon perish with the honey bees without my intervention. Nevertheless, I used the ads in those periodicals to order books for my library: *The Beekeeper's Handbook*, *The Hive and The Honey Bee*, *ABC&XYZ of Bee Culture*, *Keeping Bees*, *Honey Plants of North America*, *Beekeeping for Dummies*, etc., etc. and read them all cover to cover. It seemed there was more to this hero stuff than just being bitten by a radioactive insect.

After three years of self-study, I knew I would need help. I found and contacted my local beekeepers' association, the Association of Southern Maryland Beekeepers (ASMB) and signed up for their late Winter short course on beekeeping. Some of these national heroes had been in the battle for a lifetime. They knew beekeeping.

That Spring I purchased my first package of honey bees and installed them into a Langstroth style ten frame hive. I was told not to expect any honey that first year as the bees would use most of the nectar flow to draw out comb in the brood nest. I bought a shallow super anyway, and when they had mostly completed the comb for the brood, I installed the super with thin foundation and ended up harvesting about 20 pounds of cut comb. That's how I saved the world.

Well, you know that is not true, but wouldn't that be a short story with a happy ending. I had not saved the world any more than those grizzled old beekeepers who gave me a leg up. I have managed to keep fighting. My purpose here is to give you a leg up or keep you from becoming a casualty. If after you do some self-evaluation and determine that you have flat feet, do not enlist!

The truth is that first season those bees lit me up and kept the heat on relentlessly. I went out to visit them looking like an armored personnel carrier, coveralls with zippered veil, gloves above the elbows, duct tape around the cuffs and ankles with a lit smoker that would make the little train that thought it could envious. That night I would lie in the bed swollen and itching, whining to my wife that I had made the worst mistake of my life. I could hear my dear Ol' Granny, "Honey, you got the hardest head of any young'un I ever seen." She had 13 of her own, and I wasn't about to make a liar out of her. I kept at it, never quit, never gave up. Besides, I was making progress. I had learned that in addition to genetics what makes bees defensive are movement, vibration and odor. My movements became slow and fluid and avoided being directly over the frame tops as much as possible. I started covering the frame tops with old bath towels, setting the top hive body to one side, inspecting the bottom first and then the top before placing it back on top. This reduced vibration, and the bees set to one side covered with the towel seemed to just keep on with their lives as though nothing was going on. I got rid of those gloves when I noticed that they would get stuck in the propolis under the frame ends causing me to be clumsy and accumulate stingers and alarm pheromone. Yes, the bees could sting me through those gloves. Removing that source of vibration and odor greatly reduced my need for smoke; a few gentle puffs at the entrance became sufficient.

The second year I got a wonderful surprise. When I got stung, it hurt the same as ever, but the surprise was that my body had adapted to the venom. I no longer swelled

or itched to high heaven. Best of all I was seldom stung compared to what I had become accustomed.

I was also saddened that second year when I noticed that some of my classmates and others from the previous year were offering used equipment for sale. They had experienced what I had experienced, defensive bees intolerant of clumsy, smelly, nervous neophytes, sweating under the veil in 95-degree high humidity heat in mid-Summer. An officer in the association told me that the casualty rate was about 60 to 70 percent. Saving the world is not easy if you have flat feet.

While I mourned their loss, I searched the carnage for items that I could use to continue the fight. Most had stayed in the middle of the road using Langstroth style equipment as I had. These would heal and move on to fight in a different campaign. Others had succumbed to the hype and purchased equipment out of the mainstream that few had a need for and would linger in the recovery room for quite some time. You know the hype. Beekeeping is like being a fisherman and walking into the bait shop. There are more kinds of lures than can be counted, the majority designed to hook the fisher instead of the fish. Since I started small with equipment recommended and used by the old timers in the area, I was able to assist some of my fallen shipmates by giving them their asking price for the used equipment and grew my apiary from one colony to 17 colonies in two yards.

The growth didn't happen overnight. I even transitioned from ten frame equipment to eight frame equipment with several five frame nucs as back up. That first queen's progeny kept going for 12 years with plus ups from caught swarms. That's how I saved the world.

Well, you know that is not true. I think it was about my fifth year that one of the colonies in the out yard became defensive. I am talking "killer bee movie" defensive. I looked for evidence of animal or human molestation and found none. The other colonies in the yard were kittens, patting me with their paws but never baring the claws. After several inspections with them boiling out the top as soon as the inner cover was removed and following me the 100+ yards back to the truck where I sat on the tailgate for 20+ minutes with them bouncing off my veil and stinging my ankles, slow learner that I am, I decided action was necessary. Changing the queen was the predominant recommendation, but that process takes about 60 days to deplete the old queen's offspring from the yard. Those drones would be active during that time spreading their hatred for mankind to other colonies. A hard decision was made. I went home and came back with large, black, plastic bags. I placed each hive body into a bag and sealed it. I then placed the bags in the full afternoon sun of my backyard. Now, while you're gasping and crying, "MURDERER," I assure you that when I removed the bags the next day those bees were as calm as any I have ever saw. Strategic goals take priority. We can ill afford to alienate our allies (neighbors) in this battle to save the world. Think HOA's and zoning.

I mentioned the twelfth year earlier. That was the Fall that every colony that I had perished. I had closed the out yard and had 13 colonies in my backyard in an effort to reduce my workload. This looks like a good spot to warn you that colonies are like chickens. No one keeps just one. Most recommend starting with two, and then they tell you that you should keep nucs as cushion. My original plan was to have three hives between some fruit trees. The fruit yield exploded, by the way. That grew to an out yard and "shrank" to 13 colonies which all died in one season. I am now back up to nine colonies in eight frame, five frame, one Long Lang and an observation hive in the family room.

Will my efforts ever save the world? To be honest, that's just hype. There were no honey bees in America before the Pilgrims brought them. The Native Americans were getting on just fine. Of course, there weren't many vegans, and they could not go to the market 24/7 and get fresh fruit and vegetables on a whim. Most species managed by us seem to thrive under that management. The bald eagle and white tail deer are good examples. Managed honey bee populations are increasing.

So back to the title. How to start? Some overlap is tolerated. Start by studying the subject. Sample the beekeeping magazines and subscribe to the ones which provide you with the most useful information, like *Bee Culture*. Join your nearest beekeepers' association. It's the best money you will spend. Listen to them. Take their course or one at the local university if they do not offer one. Check your home owners' agreement and zoning regulations. You may need to think outyard here. Do not fall for the gadgets. Look to those commercial guys who feed their families and meet a payroll with their practices. Imitate them to start and then move on to your beekeeping dream after you are comfortable with the conventional methods. Practice good beekeeping habits. Understand that anyone who purchases 15,000 bugs that sting and places them in their yard will be stung. You will be stung! Beekeeping is more than just bugs in a box. Beekeeping is a passion, a fascinating hobby that can pay for itself or grow into a career, OR it can be the worst mistake you ever make. The question: Do you want to SAVE THE WORLD?

John Miller MOOCHED

Science is hard.

The beekeeping industry doesn't fund a lot of bee research science.

We do some very good science – but the amount of funding available to conduct good, rigorous scientific bee research is comically/tragically small. You've heard me say before: 'Apple computer spends more per second on research than beekeeping spends in a year.'

Beekeepers and almond growers are aligned. The almond growers seek the maximum return on orchard investments. Beekeepers seek the maximum return on beehives. Almond growers and beekeepers gather and sort information from lots of sources.

Beekeepers and almond growers have a bit of a dilemma. I'm thinking of a 15-year-old opportunity beekeepers and almond growers have not resolved. Hive stocking rates. For many years – a boilerplate recommendation, indeed language in almond acreage crop insurance states the grower shall have two hives per acre (hpa) to qualify for crop insurance. How quaint. A grower can rent garbage hives into his garbage orchard and obtain a return on his policy. This is bad for both industries – and it's long past time to re-visit hpa stocking rates. It's especially important to re-visit hpa stocking rates in the so-called self-fertile varieties.

A few terms beekeepers should be comfortable with: Self-fertile = Pollen from the flower will fertilize the ovule within that flower (and other flowers of the same variety).

Self-pollinating = Transfer of pollen actually occurs within the flower, without the use of an external vector, typically insects.

Self-fruitful = a mash up of the prior two terms.

Unpublished findings of 'bagged trees' speaks to a self-fertile tree in the absence of bees will not set enough nuts to be profitable. Published reports of almond growers who rented no bees for so-called self-fruitful bragging about 4,000 pounds per acre crop proves the point. Those trees maximize nut set with bees. Always have, always will.

The nurseries propagating these new tree varieties do a disservice to both beekeeper and almond grower by claiming 'no bees needed here!' This is a disingenuous claim. Believed by the bee-freeloader grower – now an almond growing neighbor's bee mooch. A parasite. In fairness, one nursery web page states: "Research shows that independence can set full commercial crops with fewer bees."

This is the hard part. There is no published science on an appropriate stocking rate on trees that may be self-fruitful – but do in fact benefit from the presence of bees. A lot of benefit: In the above example – over a ton per acre difference. Nurseries should modulate their claims about self-fruitful, be truthful.

An even harder truth is that in almond growing regions of California – it is nearly impossible to find a so-called self-fruitful block of trees not surrounded by traditional plantings of traditional trees. Thus, a good science test of magical nursery claims – is nearly impossible. A good science test of the 'mooch factor' is nearly impossible.

This stocking rate recommendation issue for traditional and self-fruitful trees is actually an opportunity.

The opportunity is in the aligned priorities of the beekeeper and the almond grower: optimize the return on investment. The variables in the opportunity formula are mostly known.

Almond growers using hive-strength contracts have an advantage. If almond growers engage with the same beekeeper over the years – she knows – based on the quality of hives her beekeeper brings, year after year, that two hpa is a higher stocking rate than necessary. The more accurate measurement is 'frames per acre' than hives per acre. If the Beekeeper consistently grades at 11+ frames per hive – for over a decade of hive-strength testing – the grower surely knows that 22 frames per acre exceeds the optimum nut set requirement. But! The science is hostage to the mysterious – outdated – insurance policy most growers use to arbitrage risk.

Opportunity: Change the (needlessly rigid) insurance policy terms.

I will be dead before this happens.

Almond growers planting blocks of so-called self-fruitful trees may save money formerly invested in pollination services. However, the almond grower is not entitled to mooch bees from her neighbor – and her neighbor's rented bees *will* visit the so-called self-fruitful variety as evidenced by the Hughson, CA grower who rented no bees in 2021 – and mooched a 4,000-pound crop from his neighbors who *did* rent good bees.

This is the hard part of the science-based stocking rate recommendations.

The stocking rate science in a co-mingled planted area – which is everywhere in CA - is hard.

The priorities beekeepers and growers share are easier, more collaborative.

The grower needs every nut the tree can set.

The beekeeper needs hives to thrive – in a safe environment.

The grower may not need two hpa on so-called self-fruitful – but she does need one hpa.

The grower can strengthen the long-term relationship with her beekeeper by continuing the hive-strength contract. Advocate for a change in insurance policy language – to a more accurate stocking rate formula. This is long overdue. 15 years overdue.

So-called self-fruitful varieties are now approaching 15 years in the ground.

Traditional and self-fruitful varieties have different stocking rate needs.

Beekeepers support what growers support.

Nurseries should support optimized return on investment from almond growers, their customers. Claims should be verified. Again, a hard thing in almond acreage new and old.

A tidal wave of recently planted acreage will come online over the next five years.

Both traditional and non-traditional root stocks deserve sound stocking rate recommendations.

In the interim, a couple of suggestions:

In the absence of hard science – consider stocking traditional acreage with 1.75 hpa.

In the absence of hard science – consider stocking non-traditional acreage at one hpa.

Bees need trees. Trees need bees.

Grower success is beekeeper success.

BEE VET

The Diagnosis of the Shrew

Dr. Tracy Farone

One thing about beekeeping is it always provides an opportunity to learn something new. It definitely keeps one humble trying to keep up with new (while remembering the old) information. In a recent conversation with a few Honey Bee Veterinary Consortium colleagues, one member was trying to figure out a sudden early Spring collapse of a single hive located in Iowa. The main evidence was a large pile of dead bees that looked chewed up with the thoraxes apparently hollowed out (see photos 1 and 2). Long story short, the conclusion was made that pygmy shrews were the main culprit. Pygmy shrews… hmmm. I vaguely remember reading about them as a pest in Canada, but they really were not on my radar as a common differential for a cause of a weak colony coming out of Winter and/or colony collapse. Turns out they are a common pest to add to the list in the U.S., particularly northern States. In my research of this pesky mammal, I found that many beekeepers may be unaware of this pest, so I thought I would devote an article to help bring more awareness to this little creature.

Pygmy shrew (*Sorex hoyi*) fast facts

- Common names used: Northern or American pygmy shrew.
- *Sorex minutus* is not the same shrew but found in Europe and Asia.
- Very small; smallest American mammal by weight with an average of three grams.
- Can fit through a hole less than one centimeter- so typical mouse guards will not keep them out.
- Pointy snout with whiskers.
- Have a tail almost as long as their 1½-inch body.
- Grey in color.
- Eats primarily insects and arachnids.
- Take bees from the outside of the cluster and then consume the bulk of the thorax containing the delicious meatball of flight muscles.
- Fast moving, so they are hard to catch a glimpse of…

Clinical Findings in a Colony

- Pile of dead bees, bodies macerated, thoraxes eaten or hollowed out.
- A more common reason for decapitated bees (If you are in Washington state area, it is very likely Asian hornets are the cause of decapitation).
- Shrew droppings may be found – they look similar but are somewhat different compared to mice droppings.
- Finding a dead shrew in a hive is the only 100% way to confirm a diagnosis.
- Shrews do not eat honey/pollen. Stores will be left undisturbed unlike mice infestations.
- Pygmy shrews can be a cause of colony weakness or colony collapse. There may or may not be signs of other diseases.
- Seasonality: active bees keep shrews away, so shrews are a Winter and early Spring issue.

Typically, only one or a few hives are affected. This may not be important for a larger operation but if you only have one backyard hive the results could be devastating. The literature reports that in Canada the shrews have adapted to invading hives in the Winter as a survival strategy, so some Canadian commercial operations unfortunately have had considerable losses due to pygmy shrews.

Prevention or Remedies?

Assessing your risk for pygmy shrew invasion is up to you, whether it is worth it for you and your operation to apply preventative remedies or not. Wire mesh can be applied going into Winter at hive entrances. Recommendations range from one quarter to three eighth of an inch. Such small entrances are harder for bees to get into the hive especially with pollen loads, but the three eighths of an inch mesh may be more forgiving for honey bees to enter the hive with pollen. Beekeepers may choose to apply the mesh only in the late Fall and remove it in the Spring. Again, it is a risk verses labor cost assessment for beekeepers to consider but it is something else to keep an eye out for now that you know the signs.


Photo 1

References and for Additional Information

https://beeinformed.org/2014/04/18/the-pygmy-shrew-a-little-mammal-that-is-causing-big-problems-in-canadian-overwintering-colonies/

http://www.nbba.ca/wp-content/uploads/2014/03/shrew_screen.pdf

https://www.michiganbees.org/northern-shrew-and-bee-hives/

https://www.honeybeesuite.com/blaming-shrew/

https://animaldiversity.org/accounts/Sorex_hoyi/

Study Hall. Question on pygmy shrews answered by Jerry Hayes, ed., *Bee Culture,* April 2022, pg.14.

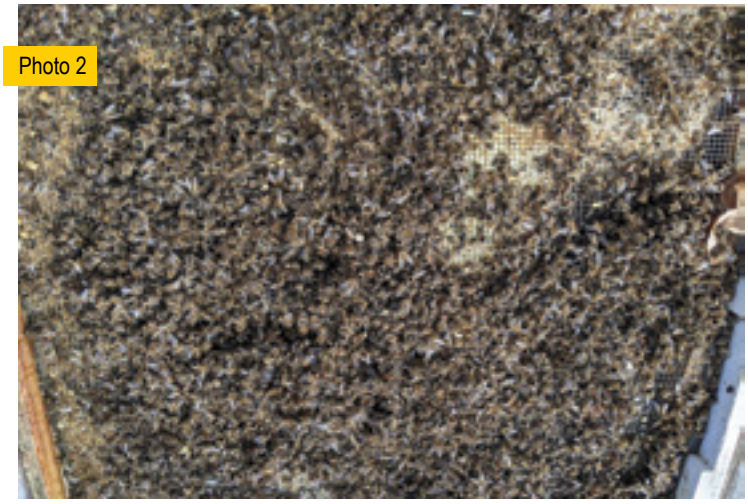

Photo credits: Gracious thanks to Dr. Kristen Obbink, DVM

Off the Wahl Beekeeping

PLACING A HIVE AND HOW MANY

Richard Wahl

Siting a Hive: Hive placement can be one of the first critical considerations if you are someone thinking about getting into bee management or becoming a new beekeeper. During my dozen years of bee management I have learned a few things about hive configurations and placement. The most often seen arrangement of a group of hives is in a straight row with all facing the same direction perhaps a few feet apart from each other.

Straight line hive placement.

This stems from the human perception that neatly organized arrangements in a military style straight alignment best serve the needs of the beekeeper. Research has shown that bees do not think this way. Common practice is to align those hives with the bottom entrance facing either east or south. There is good reason for the easterly or southerly facing alignment, but not so much for a straight row military alignment. If you ever watch bees on the side of a frame doing their flower location dance, research has shown one of their directional reference sources to be the sun. The number of degrees off a vertical axis for the waggle dance provides a directional clue while the duration of the waggle provides a distance clue to other bees. As soon as the sun rises and temperatures are sufficient for forager bees to venture out, these waggle dances begin as foragers find new sources of nectar.

Having the earliest possible exposure to the rising sunlight became glaringly important as I assisted a new beekeeper with a problem a few years ago. In his first year he had purchased a package of bees and installed them in a new hive near the rear of his property lot. Things seemed to be going well for this new hive, as on occasion through late Spring and Summer, he reported the hive doing well with a queen laying, comb being built and nice brood patterns. Then one day he called and asked if I could come to look at his hive as he thought his bees were gone. I had not seen his hive location or bees before this since all seemed to be going well for him. Upon my arrival and a quick check of his hive it was indeed apparent that he had but a few dozen bees still hanging around the hive. He explained it had been a booming deep to which he had recently added a second deep to provide more space. Since there were no indications of critters, pests or disease in the hive I could only conclude that his bees had absconded most likely due to the hive location. His hive sat against a row of twenty to thirty foot tall pine trees on the east edge of his property with their bottom entrance to the west. In that position the hive was shaded until shortly after lunch. Bees taking waggle dance clues from returning forager bees would not have the sun to use for orientation until well after noon. It would seem that this was enough of a deterrent to first time forager bees that the entire hive decided to abscond and find a better location from which sunlight orientation could be used much earlier. The following year he moved his hive location to an open area in the middle of his property where the sun reached the hive early in the morning and he had much better luck.

Getting back to the straight line placement, bees have a tendency to drift from one hive to another. Research has shown that if a bee from a nearby hive returns to a hive other than its own loaded with pollen or nectar (and possibly mites) it will be allowed to enter the foreign hive. I was rather perplexed one Winter when one of my hives seemed to be continually increasing in bee population throughout the Winter while the hive a few feet away was decreasing.

Two hives where extensive Winter drifting occurred.

As it came time for Spring inspection it became clear that sometime in early Winter the decreasing hive had lost its queen. My guess is that as bees left that hive on cleansing flights they were returning to the sister queen-right hive next to it. It is the only plausible explanation I can come to as a result of the continuous decrease in one hive and the enormous increase in the hive right next door through the cold Michigan Einter. So in order

to decrease the potential for drift of bees between hives a better practice is to place the hives with their openings at different angles. It would seem as long as a hive gets the early morning sun, a hive opening on the north or west does not impede the bee's ability to orient. I have had several hives set with entrances to the north or west and they seem as productive as the others open to the east or south. All my hives are bathed in early morning sunlight regardless of the bottom entrance direction.

A common hive management practice that is becoming less adhered to is to have all hives painted in white. I have found that a difference in hive colors or different designs on hives helps bees find their way back to their own starting point. Again I have found research that shows bees to be most attuned to the colors of yellow, blue and purple in that order. I have repainted some of my hives in these colors and it seems to make a difference in bees finding their own hives. A strong indicator of this is mite migration after a swarm catch. For some reason my swarms seem to come with heavier mite loads than those that exist in my own overwintered hives. Anecdotal evidence seems to suggest that when all hives were white ,the mite loads in adjacent hives increased much more than when the adjacent hives were of different colors.


Supers of different colors.


Painted half supers.

Another consideration that one often hears from experienced beekeepers is to start with two hives if one can afford it. The rationale for this is that the two can be compared to each other and any noticed differences can be explored. It might be easier to catch a problem with one or the other at an earlier time. Also, with two hives present, the loss of a queen in one does not require the purchase of a new package. A frame of brood and eggs from the queenright hive can be moved to the queenless hive and the bees will normally select a few cells to make a new queen. It will slow the production of the previously queenless hive down since it will take a new queen sixteen days to hatch and another ten days to two weeks to mate before she is laying eggs, but at least the beekeeper still has two hives. Another trick when buying a package of bees is to buy a spare queen at the same time. Dump half the bee package in one hive with one of the queens inserted and place the other half in a second hive with the other queen. Again, the build-up of the hive will be slower due to a smaller number of bees in each hive, but it does provide an additional hive at the cost of one additional queen. I have had a beekeeper friend successfully split a package three ways, purchasing two extra queens to start three new hives. Of course the sooner this is done in late Spring or early Summer, the longer the bees have to build up stores for the Winter and it is unlikely much honey, if any can be taken from secondary or tertiary split packages the first year.


Two hives are better than one.

A feature that seems to hold true in SE Michigan is that the number of hives in a single location should be limited to nine or ten. With only one or two hives I can expect to put four or five honey supers over two, ten frame deeps. With nine to ten hives I rarely get more than two honey supers on a hive and if a third is added it usually goes into Winter storage with very little capped, harvestable honey since the bees from more hives are competing for the same area's nectar.

One last way to increase honey production in the first year is to set two hives next to each other with queen excluders over each and a single set of honey supers set halfway over each. In this manner there are two hives of bees working one set of honey supers. I have had success with both bottom entrances open to the same side but it seems most would recommend that entrances be on opposite sides. This is probably a good idea with queens from different sources. In my case, the queens were raised from my own hives and were sisters to each other which might be a factor assuming their pheromones were very similar to each other. In one instance, I had a third queen start laying in the honey supers above the queen excluders. I soon moved her to a separate hive.


Two hives, one set of honey supers.

Your Ad Deer, Inc.

Stephen Bishop

For anyone looking for prime advertising space, boy have I got a deal for you. Last night, while I was driving home from a bee yard, I had a "Eureka!" moment. Yep, while I was swerving and slamming on brakes, the thought came to me that many of the deer grazing the roadside were big enough to put billboards on. In the best-case scenario, a deer in the headlights already commands your attention even without snazzy ads applied. In the worst-case scenario, you can't get more in-your-face advertising than a deer through your windshield.

Of course, there would be a certain irony to me becoming a wealthy deer advertising mogul. Frankly, I'm pretty sure the local deer herd already has my bank account information, considering how much money they've stolen from my farm over the years. Think you've got a beautiful crop of melons? So do the deer, which is why they're having a picnic and playing croquet in your field as you read this.

Wildlife biologists estimate the current deer population in North Carolina stands at one million. I agree and estimate the vast majority stand in my zip code. According to biologists, there were only ten thousand deer in North Carolina a century ago, which means that deer may be the only large land mammal that has multiplied faster than people. And this is despite the billion-dollar hunting industry and my participation in it.

Yes, I once was a prolific hunter. In fact, I bagged a ten-pointer, sabretooth tiger, and windowpane in the same trip, the trip before my mom confiscated my bb gun. Afterwards, two roads diverged in a yellow wood, and my mom made sure I took the one straight to my room, not the tree stand. But apparently a lot of other people are prolific hunters, and you'd think with the run on ammo in recent years, there wouldn't be a deer left standing. The only thing I can figure is most hunters are pretty bad shots, which I suppose is why I've found a few bullet holes in my hives over the years.

Admittedly, one hole was my own doing because I hadn't properly sighted in my little .22 rifle in several decades, which caused me to fire about two feet above the skunk that was terrorizing the bee yard, or possibly there was a major updraft in the atmosphere that day. Either way, for any skunk lovers who may be reading this, you can rest assured that no skunks were shot in the making of this story—in fact, mostly it just ate like a king, feasting with its belly full of bees each night until it was flattened on a road.

Speaking of roads, I can assure you there are plenty of deer still standing on the roadsides, which brings me back to the advertising idea. The good news is I've already solved the main obstacle to advertising on the broadsides of deer, which is catching the deer to adhere the advertisement. Deer stagger away from my fields so engorged on farm-fresh melons that they fall over in a sugar coma. Thus, I have ample time to splatter some paint on a deer—strike that, I mean apply a targeted ad on a mobile billboard—before the billboard wakes in a craze and darts in front of a car full of potential customers.

So if you want to reach a coveted demographic, namely drivers who are highly alert and trembling, consider placing an ad with my newest business venture, Your Ad Deer, Inc.

My slogan is, "There's no money in farming, but big bucks in deer."

Stephen Bishop helps feed the world's deer population from his farm in Shelby, NC. You can sign up for his weekly blog post at ***misfitfarmer.com*** *or follow him on Twitter @themisfitfarmer*

BIGGER PICTURE

Jessica Lawrence

Prepper Nation

I am so tired of politics. What was once a (mostly) mildly disagreeable topic that could be discussed with some civility has now turned into an epic battleground of opinions, Facebook university misinformation and outright rage. The fact is, on a national level, the political scene is only about power and nobody truly cares about the average American outside of getting their vote by any means necessary. In reality, we are all suffering from the fracture in our society from bickering on both sides of the fence, and it is the time more than ever to be more independent in taking care of yourself and your family. Inflation is skyrocketing and the finale of 2021 was rising gas prices, rising food prices, food scarcity, shipping delays and media fearmongering of not being able to get toys for Christmas. The truth here is that the American people have done a lot to put themselves into this predicament rather than only blaming the government. American made products are typically more expensive because of labor costs, but we prefer cheaply made imported goods and overbuy everything. I am also to blame because I have a massive shoe collection and last time I checked, Nike and Adidas didn't make their shoes stateside.

The problem coming at us is not only an extreme price increase, but the availability of common products. The toilet paper disappearance early in the pandemic is just one example of how people panic because they were not prepared. If you planned to store things, you can buy a couple extra every time you shop and not empty out the shelves. This is typically better for your finances, other shoppers and your storage abilities. Panic hoarding leads to shortages that leaves a lot of the vulnerable population struggling to get by. Senior citizens, in particular, are at the mercy of a caretaker a lot of the time and do not have the physical or spatial capability to keep extra supplies on hand.

Most people who keep bees are already mindful of the independence of being prepared. Keeping bees is not easy, and keeping it up for years takes dedication and research. The price of sugar is going up all the time, but honey will stay good in storage for years and almost any recipe can be modified for honey instead of sugar. Bees also give you multiple sources of bartering or creating revenue, whether it's from selling queens, bees, candles, wax, propolis, bee bread or honey. It's more important than ever to take care of your bees because even colonies may be difficult or expensive (more so than usual) in the coming months.

Besides honey, people often overlook the importance of condiments or base ingredients in food. You may be able to grow all the vegetables in the world, but you're going to want some salt at some point. Things like salt, pepper, seasonings and spices, and any dry goods that have long term storage capabilities should be purchased as extra any time you go to the grocery store. Most of those aren't too expensive, particularly salt and pepper, will keep a long time in low humidity storage and they are items you will use over the course of time anyway. High sugar or high fat condiments, like ketchup or Crisco, can be bought in bulk but need to be rotated more often because they are more likely to go bad.

If you can grow your own vegetables, you can have meals that have more flavor and are tuned to your tastes. If you're not careful with your garden though, the Baker's Creek

Jessie with Biscuit and Gravy.

Henry cutting up deer meat.

Henry and a buck.

seed catalog and the Johnny's Seeds catalog and High Mowing Seeds catalog will overwhelm you and then you have 43 varieties of tomatoes and you don't even really eat them but they're really pretty in pictures. Try to think about meals you eat commonly and go from there. If you don't eat a lot of vegetables, this is probably the time to think about how you can incorporate more into your diet and what you're eating instead. If nobody in your family eats cabbage, then don't waste your time growing it just for variety. It would be a much bigger waste of space and time to grow a lot of vegetables that you might not eat than a couple vegetables you eat regularly. We eat a lot of broccoli, brussels sprouts, asparagus, corn and turnip greens. I love peas and green beans but I would rather buy them pre-frozen or pre-canned any day of the week than grow them if I have the option. There's nothing wrong with stocking up on frozen and canned vegetables either if you can't grow your own or you don't want to. They are inexpensive and don't take a lot of room in a freezer.

Speaking of freezers, that's a hot commodity that has been difficult to find since the very beginning of the pandemic. If you get the opportunity to buy one you should absolutely jump on it, even if you have to strap that box to the top of a smart car. If you are so fortunate as to have options, upright freezers are a lot easier to organize and manage than a chest freezer. A chest freezer is not that bad if you have storage bins or are incredibly organized, or if you are using it for meat, but I definitely prefer upright when they are available.

I'm sure there's some vegetarians out there reading this, or even vegan, but most of us aren't. Meat prices have skyrocketed and I don't see them coming down anytime soon. If there is any way you can harvest or grow your own meat, you have a definite advantage. If you're really struggling, you can open a meat processing center and never have downtime for the rest of your life. My mom bought Charlie (middle son) two pigs for his birthday this year in February. Well, two thousand dollars later after building a pen and a house and buying food and lime, the girls were getting pretty large. Charlie had acquired a girlfriend and was not exactly as interested in pig maintenance as he might have been otherwise, and me and Biscuit and Gravy became friends. We weren't the kind of friends where I wouldn't eat them, but we were friends like they knew I'd bring them food and they could scratch their heads on my boots. The problem coming up here was the unavailability of the processors. They were booked solid for six months. When I called, I thought I was being proactive and was a couple months at least ahead of where our pigs should be when they were processed. The lady told me that they had a cancellation the next week and if I wanted it to tell her now. The girls weighed out at around 150 and 160 pounds, but it would have been better to have them closer to 200 each for maximum benefit. Sometimes you just have to roll with what you have though, and it was better meat than if you keep them too long. If you do decide to grow your meat, do a lot of research and see what it is going to take to maintain them and to process them and how much you are willing to do. It is almost impossible to find people who are selling piglets right now because everybody wants them. The pens are an expense and a lot of work but they will last a long time if you plan on keeping animals long term or on a yearly basis. Understanding how the process works to butcher your animals and deciding if you have that capability or you need to take it to a professional is also extremely important. If you don't do it right, you've went from a humanely and responsibly raised food source to animal abuse in a hot second.

If you are one of the lucky people who have the ability to hunt (hunting skills, time, and acreage availability), then you can stock your freezer with meat for "free" for as much space as you have. I use the term "free" loosely because technically the meat didn't cost you anything, but you have to be proficient with a weapon (plus buying it), tracking and hunting, safety and licensing, skinning and butchering, and several other random skills. My son Henry and I went bowhunting this year a lot and it is more difficult than a gun because you have to be able to track the deer, but it is more satisfying because of the skill needed to kill with a bow. You shoot it, track it, drag it out of the woods, then you have to clean it, have a space to clean it, know how to clean it without wasting all the good meat (or any meat preferably), understand deer (or bear or moose or whatever you are hunting) anatomy, and how to process the butchered meat in a way that it is palatable to you. A lot of people do not like the taste of wild game because someone did it wrong one time and gave to them. It takes a lot of learning and a lot of time to be able to hunt, so it's not as easy as buying something in a store but potentially more rewarding and less cost in the long run.

Planning for the future in times where availability is uncertain is crucial for taking care of yourself and your family. Make a plan, make recipes, and decide what fits you best. The most important part is to make sure you don't wait until the last minute and you're in a panic with everyone else. Figure out how to make it work for you and do your best to make it happen.

Post-Gravy processing.

Minding Your Bees And Cues

The Merchant of Honey

Becky Masterman & Bridget Mendel

Somewhere in Minnesota, in the biggest shopping mall in America, there is a small shop called Worker B (**www.worker-b.com**). This independent shop sells hand-made hive-based skincare products and honeys of all colors, from pale white, to dense, crystalized brown, red-gold or amber, to almost black. These are honeys from all over the globe, sourced by store owner Michael Sedlacek via a constellation of beekeeper friends and acquaintances. Mall visitors stop by to taste or buy honey, some looking for exotic flavors, others, searching for the particular taste of home, the sense-memory of some local flowering tree, a season, as captured by honey bees.

"Elsewhere in the world, honey is kept in high esteem. It's maybe the most valued food," says Michael, gesturing to a tiny batch of honey only produced in Yemen which he says is sought-after by his Middle Eastern customers.

Not all Americans share this reverent attitude. Some are surprised to learn that his honeys aren't artificially infused with flavors, and instead are distillations of particular landscapes. Many of his local midwestern customers are used to one, homogenized "plain-sweet, grocery store" honey flavor, and are shocked by honeys tasting of cotton candy, prunes, molasses, mint or bitterness.

And Michael is constantly searching for new honeys to meet the taste of long-time customers, and surprise new ones.

"We sell honey from tiny producers, who send batches pulled from particular nectar flows or some unique weather situation. So, we run out of things… We have to teach people to adjust their expectations, especially folks who are used to one flavor, or one consistent product."

Somewhat unexpectedly, Michael describes his soon to be 200 varieties of honey as "all the same." By which he means that, after thousands of hours manning the honey counter at the shop, Michael believes it's all about celebrating the uniqueness of a particular honey. "Even if you don't like it, it doesn't mean it isn't good," he says. Rather than having a favorite variety, Michaels pulls a jar of honey like a tarot card from a deck, looking for stories.

What kind of stories? Stories about seasons, flowers, growth, climate, natural disasters.

Michael also hears a lot of stories from customers, about their connection to bees or to beekeeping, a particular sting or honey they recall from

Worker B owner, Michael Sedlacek, behind the counter at his Mall of America store. Customers interested in purchasing honey enjoy an ultimate honey tasting journey. **Photo credit:** Mitchell Brown

A unique retail experience, Worker B is located in the Mall of America, the largest shopping mall in the United States. **Photo Credit:** Mitchell Brown

According to Worker B owner Michael Sedlacek, their skincare line (shown here) and honey sales proved to be a winning sales formula for their retail and online stores. Both lines need each other. **Photo credit:** Mitchell Brown

childhood. Often, deals are made right in the shop: a beekeeper walks in and asks, Would you be interested in honey sourced from persimmon trees in Illinois? Absolutely! Would he sell a few cases of honey produced after wildfires in the western United States, when chokecherries were all that bloomed? For sure, send a three ounce sample. Would you buy two dozen 10oz jars of zinnia-field honey? Oh, yes.

How about some clover honey? Well, not so much... Michael rarely takes the stuff; it just doesn't interest him.

"The best honey comes from the beekeepers that care the most. You can feel it if people care. The honey feels alive. I don't know what it is..."

Worker B is a business sustained by a unique confluence of factors: place, personality, and passion. Michael is outgoing, gregarious, and patient. While he describes the honey counter as a "challenging place to be," you wouldn't know it by his demeanor. While casually answering bee questions – Why is honey so expensive!? (it's hard work to produce!) Can I buy your most expensive honey? (Sidr from Yemen, Samar from UAE and Melipona bee sourced from the Yucatan) who stop by this retail landmark on their way to the Mayo Clinic or elsewhere. Michael says the shop wouldn't thrive without that stream of international folks who love and seek out rare honeys. Though, Michael has reached a fair number of locals, who may have come in looking for clover, but end up starting their own collections of unique honeys.

Like many small businesses, Worker B, a 12 year old institution, was massively affected by the global pandemic: Supply chains were disrupted, so imports halted. The Mall went dark. A business model dependent on members of the public standing elbow-to-elbow at a counter in a mall, licking honey off sticks, became unthinkable.

Pre-pandemic, Worker B had been in a phase of expansion, opening a spa and another honey shop. Everything closed down very fast, and bills piled up. "We are just not the same business as we were pre-pandemic."

But Michael and his small team (cut to four from 22 by the pandemic) were determined to keep going, and incredibly, they did. They shipped honey and skincare products to a loyal customer base, and bided their time until the world opened up again. After all, the buying, selling and gifting of honey is a tradition that has persisted through every human catastrophe in recorded history.

Note: The authors disclose that Worker B has been selling University of Minnesota Bee Squad honey for many years.

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

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. If you would like to contact the authors with honey selling success stories or other thoughts, please send an email to mindingyourbeesandcues@gmail.com

American Honey Producers Association

www.ahpanet.com

We Won!

Chris Hiatt

On May 9, 2022, the United States International Trade Commission (USITC) voted unanimously that U.S. beekeepers producing raw honey were being materially injured by dumped imports of raw honey from Argentina, Brazil, India and Vietnam. This was the last step necessary in the trade case that was filed in April 2021 by the American Honey Producers Association (AHPA) and the Sioux Honey Association (SHA) to have an antidumping duty order imposed. The USITC found that imports were significant and undercut domestic prices, leading to poor and declining financial performance of the domestic industry. The USITC also found that critical circumstances applied to dumped imports of raw honey from Vietnam, which will result in antidumping duties being applied retroactively to dumped imports of honey from Vietnam going back to August 25, 2021.

I would like to thank the team at Kelley Drye for their work in helping us get this big win. Besides myself, Matt Halbgewachs from Exec. Board of AHPA, Ron Spears AHPA/Sue member, Alex Blumenthal, CEO of Sue and Craig Rodenberg of Sue all took time off to prep and then testify in the hearing. All did a great job.

When this antidumping duty investigation was initiated, importers and packers claimed that the imports were not being dumped and that the domestic industry was not being injured. The U.S. Department of Commerce (DOC) found that every exporter of honey in the subject countries was dumping honey in the United States. The unanimous affirmative injury decision by the USITC indicates the overwhelming evidence that unfairly traded imports, and no other factors, caused injury to the domestic industry.

The antidumping duty orders cover approximately 82 percent of imports of raw honey in 2021. As a result of the successful trade case, the prices of imported honey have risen significantly over the last year, which has allowed domestic prices to rise over the last year as well, as demonstrated by published prices. For the last several years, domestic honey producers as a whole have been unable to turn a profit on their honey producing operations. The increase in prices that the case has achieved should allow the domestic industry to begin recovering. Importers and packers now know that we are watching imports and will act to protect our businesses and way of life.

Now that the industry has some protection from unfairly traded imports, we will have to be vigilant to protect and maximize that relief. Our trade attorneys tell us that the DOC made some significant errors in the dumping margin calculations for India and Vietnam and that they should be higher. They are recommending that we appeal those decisions to ensure that we get the maximum relief from the orders. It is unclear whether any of the foreign producers or importers will appeal the dumping margins calculated for them. They have several more weeks in which to file any such appeals. If those foreign producers and importers do file appeals, it will be important that we intervene and participate to protect our hard-won relief.

It is also possible that importers and foreign producers will challenge the affirmative injury determination, and more likely that importers will challenge the critical circumstances determination which is costing them many millions of dollars in additional antidumping duty deposits. Once the time for appeals has run, our attorneys will provide us with options for participation in the proceedings to protect our relief from unfair trade.

This all costs money. The appeals process can take up to a year and we need more money to pay for it. If you have not donated yet to AHPA to help pay for this Win, please do so.

This case has been an important victory for the domestic industry and should provide the basis for recovery, just as the first dumping suit vs. China in 2001 brought relief for the industry. There will still be work to do to ensure we get the most out of the orders. We can be proud of what we have already achieved, however, and we will keep the industry informed of any ongoing efforts.

Curing an MRSA Infection with Direct Application of Local Honey

Carolyn Fluehr-Lobban

In the first years of the 21st century, my husband and I hired a carpenter-friend, John McCabe, to work on our 1855 home in Rhode Island. During this time John showed me a MRSA infection on his wrist that he had contracted while working on a project in New York City. He revealed that he had been hospitalized there for several days with intravenous antibiotics that failed to have any effect, and he was released after the unsuccessful treatment of the antibiotic-resistant MRSA (Methicillin Resistant Staphylococcus Aureus). MRSA infections are novel bacteria known to be resistant to the broad-spectrum of antibiotics, such as methicillin, amoxicillin and penicillin. There are both community acquired infections (CA-MRSA) and hospital acquired infections (HA-MRSA). The progress of a MRSA infection is such that you get a small cut that does not heal after two to three days and the area becomes swollen, oozing pus and is hot to the touch (**www.hopkinsmedicine.org**). MRSA infections are typically spread by contact with infected people or things, and it is estimated that 5% of patients in U.S. hospitals carry MRSA in their nose or on their skin. An MRSA infected area is: red, swollen, painful, warm to the touch, full of pus or other drainage and is accompanied by a fever.

When I saw John's infected wrist and heard his story of having been hospitalized in New York City without any remittance of the symptoms despite the introduction of intravenous antibiotics, I recommended that he try applying honey directly to the wound using a jar of my local honey that I gave him. He took the eight ounce jar that I offered and within a few days he reported back to me that the infection was abating after only two to three days of applying the honey, and that within two weeks he was cured. I had offered him the honey with the knowledge that one of our medical doctors in the Rhode Island Beekeepers Association had successfully treated unresponsive bedsore infections in his geriatric practice using natural—not store-bought—honey packs. I thought, why not try my local honey? As it turned out, the results were both immediate and dramatic.

Scientific Studies Demonstrate the Healing Effects of Honey

This report would not be news to the ancients, who kept honey more for medicinal purposes than for culinary ones, nor to contemporary natural healers. However, they made delicious desserts, like *baklava* popular today, with honey being the only source of sweetening before the dominance of sugar from sugar cane after the "discovery" of the New World.

For example, "Yemeni Sidr Honey," from the SidrTree, has been shown to be 73% effective in killing MRSA and the commercialized Manuka Honey (from Hawaii) has proven to be 63% effective. Honey has also proven to be effective in healing infections by the MSSA (methicillin susceptible staph aureus) bacterium (Kelley Colihan, 2008).

The use of honey for healing dates back to human antiquity and is documented from the earliest civilizations of the Near East, c. 2100 BC, and it has been recognized in Saudi Arabia for its effective antimicrobial uses (Saad B. Almasaudi, et. Al. 2017). Modern science has concluded that the honey bee's ability to produce hydrogen peroxide and enzyme oxidase both combine to produce the healing effects of honey. I can personally attest to my use of honey applied directly to various wounds and burns I have incurred. I have found that not only is the pain immediately relieved by applying honey directly to the wound but the healing time is reduced dramatically. But, until my experience with John, I had not had any experience with an infection as serious as a resistant MRSA infection. I am grateful to him for his permission to use his name in the telling of his very interesting case of the curing of a MRSA infection with the direct application of natural honey—i.e. from my own bee yard—to cure his serious infection.

References:

"Humble Honey Kills Bacteria", Kelly Colihan. **Webmd.com/9/22/2008**.

Saad B. Almasaudi, & 9 others. 2017, "Antibacterial Effect of Different Types of Honey on Staph Aureus": **pubmed.ncbi.nlm.nih.gov/28855819/**

The tale of an ecological whodunnit

Rosamund Portus, research fellow at UWE Bristol

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Artwork by Rosamund Portus

There are few practitioners of bee husbandry who will easily forget the events which began to unfold in 2006. It was in November of that year when, according to Alison Benjamin and Brian McCallum (2009), beekeeper David Hackenberg visited his apiary only to find half of his hives empty, seemingly devoid of life. This discovery would come to be known as the first confirmed case of colony collapse disorder (CCD), a disorder which caused honey bees to disappear from their hives. It captivated the attention of people far beyond the usual scientific, beekeeping or agricultural communities.

Over a decade after David Hackenberg's shocking discovery, I began a PhD project examining the decline of bee species. It was during this process that I became intrigued by how the crisis of CCD captured our collective imagination and brought the human and honey bee relationship under global scrutiny. My subsequent research demonstrated how the unique circumstances surrounding CCD resulted in the crisis being framed as an 'ecological whodunnit' (see Portus, 2020). My work, outlined in this article, traces the story of CCD, and provides an understanding of how the repercussions of CCD being framed as an ecological whodunnit continue to this day.

Following David Hackenberg's devastating news of his empty hives, similar instances of honey bee loss were soon reported by beekeepers across the United States and, less prominently, in Europe (Oldroyd, 2007; Dainat et al, 2012; Cressey, 2014). But with few physical honey bee remains to study and no clear presence of any specific disease, pathogen or parasite, the reason for this sudden disappearance left researchers puzzled (Watanabe, 2008).

As expected, the sudden disappearance of honey bees inspired significant media attention. In an article in *The Guardian*, John Vidal (2007) described CCD as a "mystery plague." In the same article, Vidal quoted a London-based beekeeper who compared the crisis to the case of the Mary Celeste, a ship from which the crew famously and mysteriously disappeared. In a similar tone, Alexei Barrionuevo (2007) wrote in *The New York Times* how "in a mystery worthy of Agatha Christie, bees are flying off in search of pollen and nectar and simply never returning to their colonies. And nobody knows why." Finlo Rohrer's (2008) article for *BBC News Online* likewise emphasised the 'thrilling' nature of CCD, suggesting that future beehives would stand empty, their "once-buzzing occupants mysteriously vanished."

As time moved on, the culprit behind CCD continued to prove elusive which, as described by Lisa Moore and Mary Kosut (2013), resulted in people imagining all manner of reasons for honey bees' disappearance: "Did they leave purposefully – simply walk off the job? Were they forced out of their hives?" Yet, rather than dampen people's interest, the continued lack of a definable 'killer' only served to intensify CCD as a dramatic and fear-inducing whodunnit story. *The New York Times*

The Hive at Kew

continued to describe CCD as "one of the great murder mysteries of the garden" (Johnson, 2010), *National Geographic* labelled it a "mysterious killer condition" (Holland, 2013) and *Science News* ran the headline, "Honeybee Death Mystery Deepens" (Emerson, 2010). Throughout the past decade concerns surrounding CCD began to circulate in ever-widening forms of media communication, with the 2010s seeing the release of feature-length documentaries[1], *TED Talks*[2] and publications of both nonfiction and fiction works[3].

In the present day, as cases of CCD dwindle, it has become generally agreed that a multiplicity of factors is responsible for the disorder (Milius, 2018). Indeed, public interest surrounding the mystery has all but vanished. Yet, the legacy of this ecological whodunnit remains. The intrigue which accompanied this narrative propelled the plight of both domesticated and wild bee species onto a global platform, cementing their struggle as one of the key environmental concerns of our time.

The centrality of bees' plight in environmental thinking is captured well by the results of a 2014 YouGov poll which surveyed adults living in the United Kingdom. It found that people felt bee decline was more urgent than climate change (Dahlgreen, 2014). Today, this sense of urgency and anxiety for bees, which has extended itself even to places where bee loss has yet to be witnessed continues to show itself through bees' apparent adoption as mascots of extinction (Phillips, 2020). Examples include the blazoning of bees' image across the flags of Extinction Rebellion protestors (Portus, 2020), the installation of creative works examining bees' plight in places such as Kew Gardens (Benjamin, 2016) or, despite their questionable success, the inclusion of bee boxes into the walls of every new house developed by Brighton and Hove City Council (Booker-Lewis, 2020; Marsh, 2022).

The framing of honey bees as victims in this whodunnit invited audiences to see them as real, sentient and suffering creatures which, in turn, developed people's curiosity and empathy for these other lives. It is critical to recognise that the pain caused by CCD, and bee loss more widely, is devastating and deeply felt by many people and for myriad reasons. My exploration of how the stories surrounding CCD framed the crisis as a collective ecological whodunnit does not bypass recognition of the pain caused by CCD, but rather acknowledges that from the darkness of this circumstance came the opportunity for people from all walks of life to expand their knowledge of, and care for, the human-bee connection.

At the birth of a media phenomenon Jerry Hayes, editor of U.S. magazine *Bee Culture*, told *BeeCraft* about his part in the discovery and naming of colony collapse disorder. **"**In 2006, when I was chief of the apiary section of the Florida Department of Agriculture, I had a call from a commercial beekeeper called David Hackenberg. He said his bees were disappearing – not dying but just disappearing. I went along and he was right. His bees weren't dying, they weren't swarming, they weren't absconding – they were just gone. Usually there were only a few bees and the queen left behind in a demoralised condition. I started contacting colleagues in other states and they said they were seeing the same thing. I remember sitting on the floor at 10:30pm talking to folks on the phone and none of us knew what was going on, but we knew it was really significant. We knew the media were going to get hold of the story and that we'd better give the phenomenon some kind of name. So, we came up with the term colony collapse disorder – CCD. We knew from many years' experience that the media didn't ever pay attention to bees or beekeeping and that the story would soon go away. But it didn't. The media went crazy and latched onto CCD and the idea of bees as the canary in the coal mine and that the environment was doomed. The story ran and ran and ran. Many people wanting to save the world took up beekeeping as a result and sometimes their bees died too – but this time usually because they didn't feed them or treat them for *varroa*. But CCD was always at fault. I came to wish we hadn't come up with the term CCD because it became the excuse irresponsible beekeepers used when they didn't want to take the blame."

For a full write up of this research, please see my longer publication on this subject: Portus, R. (2020). An Ecological Whodunit: The Story of Colony Collapse Disorder. *Society & Animals*. 1-19. **https://doi.org/10.1163/15685306-BJA10026**.

One of the bee bricks that is a planning permission requirement for new builds in some areas.

FOOTNOTES

1 Documentary titles include *Colony* (2009), *Vanishing of the Bees* (2009), *Queen of the Sun: What Are the Bees Telling Us?* (2010), *More Than Honey* (2012) and *The Pollinators* (2019).

2 Relevant TED Talks are *A plea for bees* (vanEngelsdorp, 2008), *Every city needs healthy bees* (Wilson-Rich, 2012), *Why Bees Are Disappearing* (Spivak, 2013),and *The Case of the Vanishing Bees* (Bryce, 2014).

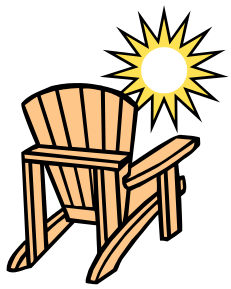
3 Non-fiction works include *The Beekeepers Lament: How One Man and Half a Billion Honey Bees Help Feed America* (Nordhaus, 2011) and *A World Without Bees: The Mysterious Decline of the Honeybee – and What It Means for Us* (Benjamin & McCallum, 2009). Fictional works include *The History of Bees* (Lunde, 2015) and *The Bees* (Paull, 2014).

Rosamund Portus (right) beekeeping with a friend.

REFERENCES

See **tinyurl.com/BC2022-05-07**

Dr Rosamund Portus, research fellow at Bristol UWE, works in the field of the environmental humanities. Her current research examines young people's experiences of climate emergency and climate education. Her PhD considered creative and cultural dimensions of bee decline. She is also an artist.



Life, Death and Stingless Bees in the Peruvian Amazon

National Geographic Explorers Rosa Vásquez Espinoza and Ana Elisa Sotelo

Inside a beehive in a remote Peruvian community of the Amazon Basin. Photo by Ana Sotelo/National Geographic

For centuries, communities in the Peruvian Amazon foraged for the hives of Amazonian stingless bees, *meliponines*, and used their honey and pollen to treat an array of conditions—from bronchitis and flu, to fertility (1,2).

During the COVID-19 pandemic, Iquitos, Peru became one of the hardest hit areas. Hospitals and cemeteries overfilled, and, by April 2020, mass grave sites were improvised to accommodate the dead. As cities became hotspots for disease and death, rural communities turned to traditional healing and knowledge to treat the sick, including using the unique honey of Amazon stingless bees.

For many Amazonian families, such as those in the communities of San Francisco and Chingana, beekeeping brought on much needed economic relief during the lockdown. During the pandemic, the demand and price for honey grew, and families were able to generate additional income from their home (1).

With support from the National Geographic Society, in December 2021, we traveled to outer Iquitos to learn about these bees and the medicinal properties of their honey. César Delgado Vásquez, who has been working with rural beekeepers in the area studying the links between the Amazonian stingless bee and plant diversity and growth, introduced us to a family of local beekeepers and to the magnificent world of Amazonian stingless bees.

As we made our way up the Marañon River toward the town of San Francisco aboard a small speedboat and away from Nauta, the expanse of the forest became more visible, and its size was breathtaking.

In San Francisco, Heriberto Vela, his wife Roxana, and their numerous children welcomed us into their home and showed us their beehives. César has been working with Heriberto and other local families by helping them set up and care for Amazonian stingless beehives (3). Because the bees don't sting, locals are able to have many hives set up behind their homes. Heriberto's children played in the forest and watched curiously as we opened up one of the hives.

The smell was as intoxicating as the shapes, colors and structure. Dark-colored cells make up each layer of the five leveled hives, and each layer serves a specific function: honey storage, larvae growth, disposal of the dead, etc (3). César pointed out the hive entrance, pollen stores, and egg cells, and acquainted us with the way of life of the bees—all the while they flew around us with rapid wing beats, buzzing and harmlessly resting on our bodies.

It has been hypothesized that the bees' honey acquires its medicinal properties from the plants they feed on, so Heriberto's children gathered some of the plants for us. We examined the resin from Sangre de Grado trees (also known as dragon's blood or Croton lechleri) which is used by the bees to build their hives and by locals used to treat diarrhea, infections, diabetes and cancer. We also examined the bright red achiote plant (*Bixa orellana*), which the bees feed on and locals used as a natural dye, for cooking and to treat constipation.

The pandemic devastated the Amazon Rainforest and the com-

Community San Francisco, Nauta, Iquitos, Peru 2021/12/16 – Rosa Vásquez Espinoza, National Geographic Explorer, biochemist and molecular biologist, studies bee hives, with Biologist César Delgado (wearing green shirt) and local farmer Heriberto Vela (wearing plaid shirt), in a remote Peruvian community of the Amazon Basin.

Local farmer Heriberto Vela, holding a beehive in a remote Peruvian community of the Amazon Basin.

A local farmer holding a bee hive in a remote Peruvian community of the Amazon Basin.

munities that depend on it as government vigilance decreased and illegal logging, farming, mining and contamination increased (4,5). Fortunately, the increase in beekeeping also brought on a rise of hard-working pollinizers, much needed in times of environmental crisis.

Previous research has shown that native bees are more effective in pollination of local crops than *Apis mellifera* (6). A recent study led by Peruvian entomologist César Delgado Vásquez in the Institute of Investigation in the Peruvian Amazon (IIAP) discovered that pollination associated with Amazonian stingless bees is directly contributing to an increase in the medicinal plant camu camu (*Myrciaria dubia*), with an up to 44 percent increase in crop yield (7). This result highlights the need to implement and promote meliponiculture practices in the Amazon to facilitate successful reforestation and strengthen agriculture productivity.

With Heriberto, we looked at the camu camu plant—which contains 30 times more vitamin C than oranges (7). By keeping multiple hives, Heriberto was contributing to the availability of these much needed plants in his agricultural crops.

We asked ourselves: Could bees help bring life back to the Amazon? While an increase in bees cannot tackle the damage brought on by incessant deforestation and oil contamination, an increase in bee population is directly linked to an increase in production and maintenance of local plants.

Nowadays, multiple factors threaten traditional Amazonian beekeeping practices: gradual loss of traditional knowledge, deforestation, low production and cost of honey, and an increase in extreme events such as flooding and drought. But by promoting meliponiculture practices in communities, we move the needle in repairing and preserving fragile areas of the Amazon Rainforest that could be critical in combating climate change (1,6). Local beekeeping of native species also creates job opportunities for people who protect and take care of the land, securing economic growth for generations to come.

Successful and long-lasting preservation of the Amazon Rainforest, its flora, fauna and microbial life, requires multidisciplinary and creative action. Supporting explor-

atory science endeavors that deepen our understanding of Amazonian stingless bees and their traditionally used medicinal honey, especially from chemical and genetic angles, is critical. Capturing and portraying this research with an artistic lens that advocates for a more profound appreciation of meliponiculture, and its positive impacts in the jungle and its people, is equally important. Let's advocate for conservation to take place at the intersection of science and art. Supporting Amazonian meliponiculture is an exemplary case of a practical solution with multiple benefits to the local agriculture, reforestation, biodiversity enhancement, and economy. While bees can't fight mass destruction or diseases, in the long term and as a hive, these tiny warriors really can bring life back to the Amazon.

This research was funded by the National Geographic Society, which is a global nonprofit using the power of science, exploration, education and storytelling to illuminate and protect the wonder of our world. Learn more at ***natgeo.org****.*

References:

(1) Delgado, C., Mejía, K. and Rasmussen, C., 2020. Management practices and honey characteristics of *Melipona eburnea* in the Peruvian Amazon. *Ciência Rural*, 50.

(2) Delgado, C., et. al. Traditional knowledge of stingless bees (Hymenoptera: Apidae: Meliponini) in the Peruvian Amazon. Accepted in *Ethnobiology Letters* (currently in final edits)

(3) Delgado, C., Mejia, K., Sahut, A., Amorin, J. 2019. Manual para criar abejas sin aguijón con énfasis en la "ronsapilla" *Meliponea Eburnea*. Instituto de Investigación de la Amazonía Peruana.

(4) Stewart, P., Garvey, B., Torres, M. and Borges de Farias, T., 2021. Amazonian destruction, Bolsonaro and COVID-19: Neoliberalism unchained. Capital & Class, 45(2), pp.173-181.

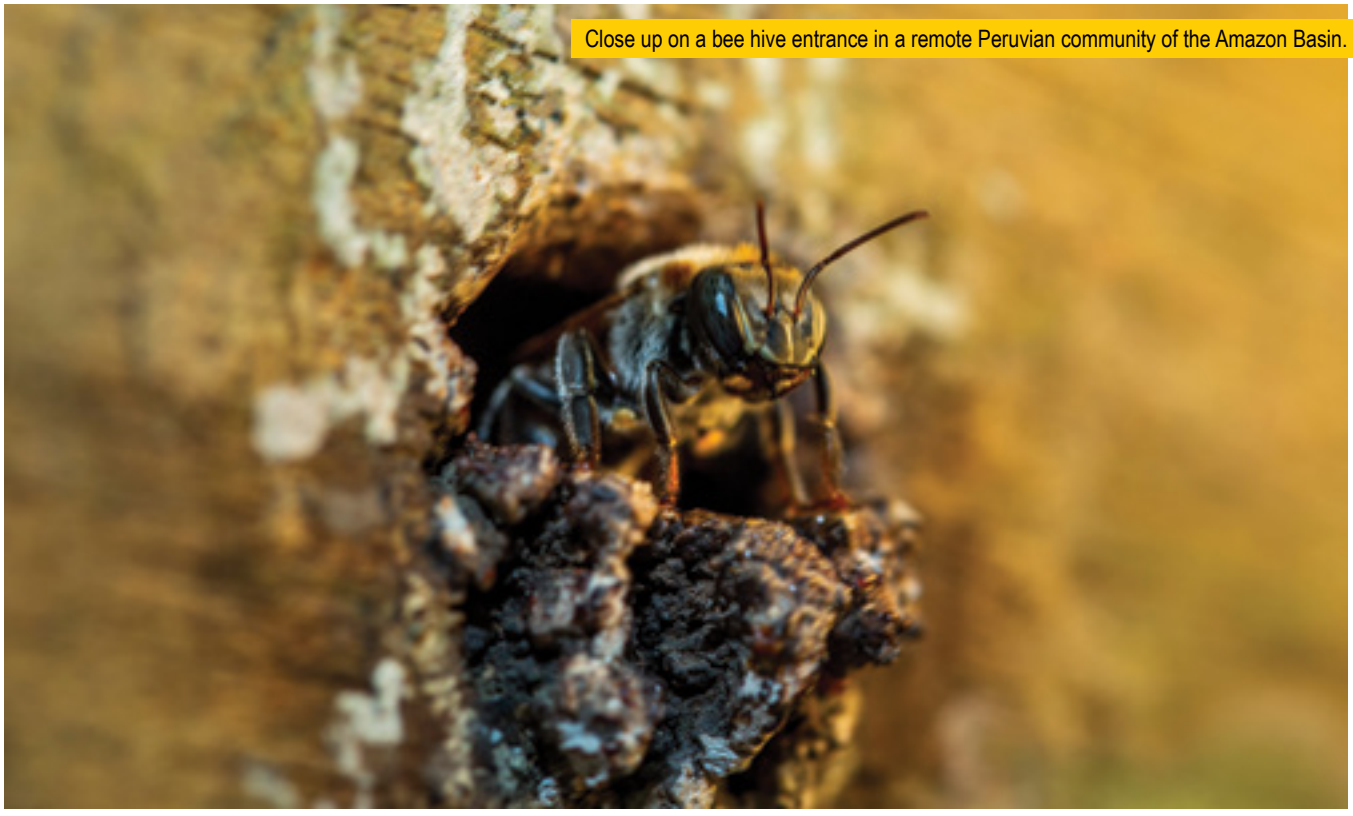
(5) Brown, K. 2020. The hidden toll of lockdown on rainforests. Future Planet BBC.

(6) Garibaldi, L.A., Steffan-Dewenter, I., Winfree, R., Aizen, M.A., Bommarco, R., Cunningham, S.A., Kremen, C., Carvalheiro, L.G., Harder, L.D., Afik, O. and Bartomeus, I., 2013. Wild pollinators enhance fruit set of crops regardless of honey bee abundance. Science, 339(6127), pp.1608-1611.

(7) Delgado, C., Rasmussen, C. and Mejía, K., 2020. Asociación entre abejas sin aguijón (Hymenoptera: Apidae: Meliponini) y camu camu (*Myrciaria dubia*: Myrtaceae) en la Amazonía peruana. *Development*, 32, p.8.

A bee carries dead larvae to the hive cemetery, inside a bee hive in a remote Peruvian community in the Amazon Basin.

Close up on a bee hive entrance in a remote Peruvian community of the Amazon Basin.



Splitting Colonies: Second Edition

David MacFawn

There are multiple ways to increase colonies and control swarming. Splitting colonies is one method to help the beekeeper. Walk-away splits (where you make sure each split half contains less than three-day-old larvae, honey, and pollen and let the queenless split raise another queen) or installing queen cells or a mated queen are additional ways to split a colony for a colony number increase. Demaree (see later in article for explanation) is another technique to simulate a split but keep all the worker bees in the same hive. If you are looking for the queen, she is usually found on a frame with freshly laid eggs.

A generic timeline has been developed for splitting and Spring buildup:

Weeks to Spring Nectar Flow	Event
	Winter solstice / begin Spring buildup
Nine to ten weeks	Start feeding if your goal is to split colonies
Eight to nine weeks	Henbit, maples, dandelions, willow bloom / early bloom in your area
Four to five weeks	Check for purple-eye drones and swarm cells
Four to five weeks	Check for swarming & do early splits or other swarm control measures
Four to five weeks	Earliest start for queen rearing
Two to three weeks	Start queen rearing when drones are walking on comb: conservative approach
Zero	Spring Flow Starts

In the Columbia, South Carolina area, colonies can be split at the end of February/early March at the earliest. Adding empty supers with frames will not relieve the congestion in the brood nest that usually causes swarming. Frames with brood and bees need to be removed in the congested brood nest. If colonies are fed sugar syrup mid to end of January, most colonies will be ready to split from the end of February to the first of March at the earliest (approximately two brood cycles). Usually, only healthy colonies that are well provisioned with honey and pollen build up sufficiently to split. The maples bloom at the end of January to the first of February in the Columbia, South Carolina area. The maples are considered a major pollen source and a minor nectar source. The nectar flow usually starts around the first of April and continues through the first part of June in this region.

Colonies can be split consistently in South Carolina as early as the end of February if fed starting the second half to the end of January. The colony should be split when it starts warming consistently into the upper 30°F to lower 40°F (2°C to 8°C) at night. The split needs enough worker bees to cover the brood. When splitting, each split half should have eggs/less than three-day-old larvae, honey, and pollen. Each split-half should be fed.

The rule of thumb is a colony can be split when there are purple-eyed drone pupa. However, this needs to be qualified. The drone and queen time durations are:

Fifteen-day old purple eye drone pupa with nine days left of the 24-day development time + 14 to 16 days maximum to sexually mature (actually seven to 14 days) equals approximately 23 to 25 days (or about three to three and a half weeks) to sexually mature.

Queens

Sixteen-day development from egg plus four to seven days to sexually mature equals 20 to 23 days, or about three weeks.

Figure 1. Hive on February 16, 2022, in Bishopville, SC, configuration before splitting. The top deep contains a two-gallon pail feeder. (Photo courtesy: David MacFawn)

Figure 2. Note two-gallon pail feeder over porter bee escape hole in the inner cover. In South Carolina we can feed syrup year-round with success due to moderate weather. (Photo Courtesy: David MacFawn)

Splitting the colony should be held off for three to four days after purple-eyed drone pupa are observed. The queen egg takes three days to mature into feedable larvae. This means, that after purple-eyed drones are observed, the beekeeper should wait three to four days to ensure the queen emerges when there are sexually mature drones. Also, there should be a multitude of purple-eyed drones before splitting, not just a few. You want to be on the mature-side average of the purple-eyed drone larvae. A more conservative view is to have adult drones walking around on combs.

Splitting and purple-eyed drone pupa occurs earliest (in January and February) in the deep south/Florida and progresses farther north as Spring approaches in the country. In South Carolina, it occurs from the end of February into March. The beekeeper should consult their local bee association members to determine when splitting, and thus purple-eyed drone pupa, normally occurs.

If a walk-away split is done at the end of February, it takes approximately three weeks to raise a queen, a week or so to mate and start laying, and another three weeks for the first workers to emerge. This puts the first workers emerging mid-April from the queenless split half, with the nectar flow starting around the first of April. Approximately another three weeks are required for the house worker bees to mature into field bees putting the nectar gathering field bees for the walk-away split being ready first to mid-May. The nectar flow is over usually around the first of June, so the walk-away split has missed most of the Spring nectar flow. This means a walk-away split will need to be fed during the Summer dearth that starts mid-June and runs through until around the first of August. If the colony is taken to cotton fields for nectar that blooms mid-July through September or sourwood bloom in the higher mountain elevations feeding is unnecessary. It should be noted that sometimes an inferior queen may result from a walk-away split. A walk-away split queen can be evaluated and replaced if this occurs. Dr. David Tarpy's lab at North Carolina State University indicated from their queen research if the capped queen cells are culled at exactly five days after splitting, results in a reasonable queen. Often the bees will choose an older larva to produce a walk away queen. A walk-away split may be required in South Carolina at the end of February due to a lack of mated queen availability. The split-half with the original queen should continue to build up properly and often you will get a reasonable honey crop. Walk-away split results in the new queen split obtaining the genetics from the local area.

So, a generic walk-away split schedule is:

Figure 3. Outer cover on top of pail feeder chamber made with a sheet of OSB, insulation and another sheet OSB for thermal mass. (Photo courtesy: David MacFawn)

Event	Week
Split	0
Approximately three weeks to raise a queen	3 weeks
A week or so to mate and start laying	4 weeks
Three weeks for the first workers to emerge	7 weeks
Approximately three weeks are required for the house worker bees to mature into field bees	10 weeks

Figure 4. Note the number of bees on the inner cover. This colony was ready to split on February 16, 2022, in Bishopville, SC (purple-eyed drone pupae). (Photo Courtesy: David MacFawn)

Figure 5. Strapping the split and getting it ready to move. (Photo Courtesy: David MacFawn)

Figure 6. A mated queen in a Benton queen cage. (Photo Courtesy: David MacFawn)

When splitting a colony, I usually do not find the queen. I make sure both split halves have plenty of honey, pollen and less than three-day-old larvae. This results in the split that does not have the old queen to start raising a queen and the worker brood from the original queen will emerge in approximately one to two weeks. The split-half without worker brood in approximately two weeks will be the queenless split. It takes a lot of time to find queens. Hence, I minimize my labor costs by not finding the queen. The colony should be monitored for laying worker activity. Usually, you have three to six weeks before laying workers emerge.

One to two days after splitting, queen cell(s) can be installed in both splits. Queen cells are much cheaper than mated queens. This results in an approximate one week head start on a walk-away split. A mated queen can also be installed in the split-half that does not have brood after approximately one and a half weeks.

Whether you do a walk-away split or use queen cells or mated queens or a Demaree depends on what your strategy is. A walk-away split and queen cells can be used to get half your genetics from the local area if you are interested in local area genetics. A mated queen, if not raised from local colonies, can be used to replace 100 percent of your colony genes from the mated area of the mated queen. A Demaree is when all the brood in the bottom brood chamber is moved above a queen excluder and a super with frames. The queen is left on a frame of drawn comb in the bottom brood chamber. In seven to ten days, the brood above the queen excluder is checked for queen cells and the queen cells are destroyed to inhibit swarming. The colony believes it has swarmed and you have retained all your field bees for honey production. After several weeks the Demaree colony can be recombined.

The first of June, at the end of the nectar flow, is also an excellent time to split colonies. There are a lot of bees available right after the nectar flow and mated queens and queen cells are available. One of the issues is getting the colony to draw-out comb over the Summer dearth. Often the colony will need to be put on cotton fields in mid-July or taken to the mountains for the sourwood flow. It should be noted that drawn

comb, especially in the brood chamber, improves overwintering success. Drawn comb is required to ensure the cluster is in the bottom of the hive with plenty of honey and pollen going into Winter. If the colony does not draw out the comb after a June split, the brood nest will remain in the hive areas where the drawn comb occurs. This may be a feed chamber super or honey super. Feeding sugar syrup rarely enhances drawing out comb. Normally a nectar flow is required. The colony normally needs to have about 80 percent comb utilization before them drawing out more comb.

After splitting, the split can be moved three to five miles away or left in the original yard. Moving the split works better since the field bees will stay with the moved split. If the split is left in the original yard, an extra frame of bees and brood should be placed in the split. Often it is better to locate the split directly next to or in front of the original location to minimize losing field bees in the split.

A frame of bees of various ages is best to place in both half splits. This will ensure that you do not have all the same age workers and minimizes the need for a lot of nurse bees initially.

Utilizing swarm cells to place in each split half may also be considered. This will shorten your queen development time by about a week or so. However, some beekeepers believe utilizing swarm cells propagates swarm tendencies. It should also be noted that leaving swarm cells in the half with the original queen may result in a swarm being issued from that split half.

There are several ways to avoid swarming. Making splits and utilizing a walk-away split, queen cells, mated queen or swarm cells all have their benefits. Demaree may also be utilized to simulate a swarm condition in the colony and save all your bees for honey production. Moving the split three to five miles away from the original bee yard works best. Whether you split or not, make sure you get back to what your needs and strategy are. If you need to make increases due to losses, splitting may be the way to go. However, if you want to make a honey crop, then Demaree may be the way to go.

Figure 7. Festooning chain/drawing out comb. (Photo Courtesy: David MacFawn)

Figure 8. A frame of various ages brood. (Photo Courtesy: David MacFawn)

References

ABC and XYZ of Bee Culture, 42nd edition, 2020, ISBN-13 978-0-9846915-3-1 p 460.

David MacFawn (**dmacfawn@aol.com**) is an Eastern Apiculture Society Master Beekeeper and a North Carolina Master Craftsman beekeeper living in the Columbia, South Carolina, area. He is the author of three books:

***Applied Beekeeping in the United States* by David MacFawn, published by Outskirts Press**

***Beekeeping Tips and Techniques for the Southeast United States, Beekeeping Finance* by David MacFawn, published by Outskirts Press**

Figure 9. Swarm cells on the bottom of a frame. (Photo Courtesy: Kathy Carpineto)

***Getting the Best from Your Bees* by David MacFawn and Chris Slade, Published by Outskirts Press**

Bee Culture Subscriber Survey

***Bee Culture* Audience Survey**

Hello! With most of our staff being new, we would like to be able to get an idea of who our audience is, what they like and how we can do better! You are more than welcome to take this survey whether you are a subscriber or not! We want all kinds of feedback. If you aren't a subscriber, why not? What could we offer where you would consider subscribing? If you are a subscriber, what do you like? What can we improve on? If you were a subscriber, why did you stop?

We want to hear everything! The good, the bad, the criticisms. This is the place to do all of that. We are keeping this anonymous but there is a section at the end if you would like to offer your information for contact purposes. Absolutely not necessary, we just want to offer it.

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   d. National
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10. How long have you been a beekeeper? _____
11. How many colonies do you have? _____
12. What type of beekeeper are you? Please circle.
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   d. Clarence Collison
   e. Stephen Bishop
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UC DAVIS RESEARCH SHOWS THAT YEAST CAN BENEFIT BUMBLE BEE SURVIVAL AND REPRODUCTION

Kathy Keatley Garvey

Bumble bees prefer foraging on flowers that contain yeast, but does yeast benefit bumble bee survival and reproduction?

Yes, according to UC Davis community ecologist and doctoral candidate Danielle Rutkowski and her colleagues in their newly published research in the Royal Entomological Society's *Journal of Ecological Entomology.*

The research, "Bee-Associated Fungi Mediate Effects of Fungicides on Bumble Bees," provides direct evidence that fungi can benefit both survival and reproduction in two species of bumble bees, *Bombus vosnesenskii,* and *B. impatiens.* The research also suggests that yeast, commonly found in the gut of bumble bees, may be more important than originally thought.

"Bumble bees are important pollinators that face threats from multiple sources, including agrochemical application," said Rutkowski, the lead researcher-author. "Declining bumble bee populations have been linked to fungicide application, which could directly affect the fungi often found in the stored food and gastrointestinal (GI) tract of healthy bumble bees."

"I tested if fungicides commonly applied in orchard systems affected yeasts and the health of their bee hosts, and if feeding those bees their fungi after fungicide exposure could rescue them," said Rutkowski, who studies with major professors Rachel Vannette and Richard Karban, community ecologists in the Department of Entomology and Nematology.

"*Bombus vosnesenskii* (commonly known as the yellow-faced bumble bee), is native to California and we reared colonies of it from wild-caught queens," Rutkowski said. "In this species, we observed strong negative effects of fungicide and the ability of bee-associated fungi to rescue bees from these negative effects. The other

Bumble bee research in the UC Davis lab shows *Bombus impatiens* and the developing brood. (Photo Courtesy: Danielle Rutkowski)

species, *Bombus impatiens*, is native to the eastern United States, but is commonly produced and sold commercially for pollination. In this species, we did not find any negative impacts of fungicide, but the addition of yeasts was very beneficial for bee survival and offspring production."

Vannette, a co-author of the paper, pointed out: "We knew that bumble bees in the field prefer foraging on flowers that contain yeasts, and that bumble bees have yeasts in their gut; but didn't know how those yeasts affected bees, or how fungicides affected yeast-bee interactions."

"Although most previous work on bee microbiomes has focused on bacteria and their role in bee health, Danielle's work suggests that yeasts – which are commonly found in association with bumble bees – may be more important than previously thought," Vannette said. "This has been hinted at in the literature but rarely tested directly."

Rutkowski examined the interactive effects of the fungicide propiconazole and fungal supplementation on the survival, reproduction and microbiome composition of microcolonies (queenless colonies) using the two species.

Both *B. vosnesenskii* and *B. impatiens* benefitted from fungal addition but in different ways. Fungicide exposure decreased survival in *B. vosnesenskii*, while fungal supplementation mitigated fungicide effects. For *B. impatiens*, fungicide application had no effect, but fungal supplementation improved survival and offspring production.

The research also shows that for at least some bumble bee species, fungi can mediate the effects of fungicides on bee health. "In other words, the fungicide tested here (propiconazole) may harm the bee-associated fungi rather than the bees themselves, and restoring the yeasts (a type of fungus) can mitigate effects on bee survival," Rutkowski said.

"Because the effect of fungicides on yeasts and bees takes a few weeks to observe, it is not detected in short term LD50 trials," Vannette said, "and therefore could be an unrecognized threat to bumble bees and their symbionts."

Other co-authors of the paper are entomologist Eliza Litsey and environmental scientist Isabelle Maalouf.

More research is planned to determine the mechanism by which yeasts can affect bee health, and which fungicides affect bee-associated yeasts.

"I'm currently working on a project to determine the mechanisms behind the positive effects of yeast addition that we observed," Rutkowski said. "In some bees and other insects, fungi can produce nutritionally important compounds for their host, and I'm currently trying to determine if this is the case for bumble bees as well."

"Additionally, I'm planning on following up some of the interesting results on differences between bumble bee species by determining how associated microbial communities differ between wild and commercially-reared bumble bees," Rutkowski said. "In this current paper, we found that the fungal communities associated with the commercially-sourced bees were less diverse and less abundant, and I'm hoping to determine if that's a common pattern."

Rutkowski, who joined the UC Davis doctoral program in 2018, won the President's Prize (first-place) in her category for her graduate student research presentations at the 2017 and 2021 Entomological Society of America meetings. A 2018 graduate of Cornell University, *summa cum laude*, she holds a bachelor of science degree in entomology and biological sciences, with a concentration in ecology and evolution.

Rutkowski's research drew support from her three-year USDA National Institute of Food and Agriculture grant.


Danielle Rutkowski

Identification of a parasite-specific viral infection associated with an *apis mellifera* honey bee colony from the Midwest

Roger A. Moore, Ph.D. & Dave Wick, CEO BVS, Inc.

In this article we present a case study regarding an *Apis mellifera* honey bee colony with a heavy *Varroa destructor* mite infestation. When separated from the honey bees, these mites were examined using the integrated viral detection system (IVDS)[1,2] and found to be actively infected by an unidentified virus. Interestingly, this virus was not found at all in the honey bees that were heavily infested with the mites. This raises the intriguing possibility that the honey bees may have acquired natural immunity to this particular virus while the mites remained susceptible. Such a virus may hold promise for the treatment of mite-infested bee colonies if it were shown to impact mites significantly without harming the bees. If so, this could represent a strategic avenue for treating mite infestations that merits further study.

The *Varroa destructor* mite is considered by many beekeepers to be the most problematic honey bee pest ever encountered[3]. These parasitic mites spend their entire life cycle with honey bee hosts. Female adult *Varroa* mites feed off of the fat of mature honey bees, causing stress, tissue damage and susceptibility to pathogens[4]. They reproduce on the honey bee brood and explode in population under suitable conditions. Female mites are highly mobile, crawling around the honey bee combs and in between adult bees (Figure 1). This mobility optimizes the mite's capacity to act as a reservoir for any viruses that may be present. In many cases, the viruses can be dangerous pathogens. Deformed wing virus for example, prevents bees from flying properly. Not all viruses carried by the mites are equally as damaging to a bee colony. An additional possibility exists that there is a certain subset of viruses that are harmless to the honey bees but highly specific mite pathogens. Here we describe a case study in which we evaluate this possibility.

The mite-infested bees described in this report came from the midwestern United States. The colony was in route to almond pollination in California and were having trouble making the six to eight frame grade. The problem was getting progressively worse. The beekeeper requested help from **BVS, Inc.** with additional investigation regarding this colony. Upon conducting our standard bee examination, the nosema fungal spore count was found to be negative and the average weight measurement was in the normal range of 0.12 grams per bee. Analysis for the presence of *Varroa destructor* mites revealed an infestation of 25 mites per 100 bees.

The first goal was to detect any viruses carried by either the honey bees or the mites. Frozen bees infested with mites were physically separated from one another and manually counted. The integrated viral detection system (IVDS) was used to examine each sample separately. The IVDS method[1,2] involves enriching and concentrating viruses from biological samples according to their unique physical properties and then detecting those viral particles using an electrospray ionization-differential mobility analysis (ESI-DMA) approach. The IVDS strategy was developed and patented[1] by the United States Army in order to detect and quantify all types of viruses and virus-like particles[2]. The goal was to isolate virus particles based upon their physical properties rather than rely upon chemical reactions. This strategy has proven to be effective over many years and is becoming even more practical in the current environment of supply chain disruptions and price inflation. Once virus particles are detected based upon their movement through an air flow and isolated according to their unique sizes, they are then quantified with a condensation particle counter. Our analysis revealed no significant presence of viral or viral-like particles in this colony of honey bees (Figure 2, next page).

We then analyzed 10 mites that were separated from the bees and prepared them for analysis in the same way as the bee samples were prepared. Analysis of the mites was done immediately after physically

Figure 1. *Apis mellifera* honey bee with *Varroa destructor* mite infestation. https://i.cbc.ca/1.3175886.1438368148!/fileImage/httpImage/image.jpg_gen/derivatives/16x9_1180/varroa-mite.jpg

separating them from the bees. The mite tissue was processed using much lower quantities relative to the honey bee's due to their lower biological mass. Therefore, we were concerned about difficulties with limits of detection for comparison purposes in the mites. However, we found the opposite. A very large peak detection was observed in the mite sample with no corresponding peak found in the bee tissue (Figure 2). Thus, it was likely that the difficulties suffered by this colony resulted primarily from the physical stress and tissue damage caused by the heavy mite infestation rather than from an active viral infection. Remaining mites associated with this colony are still available for study.

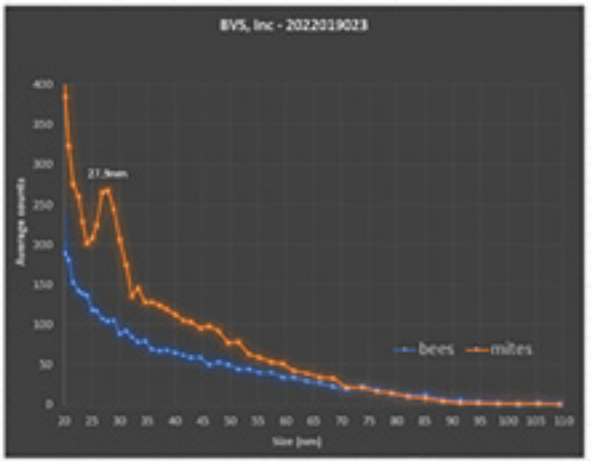
The implication of our observation is that an identified virus could conceivably be specific to the parasite and harmless to the host. Such a finding could point towards a treatment strategy for mitigating or even eliminating *Varroa destructor* infestations from *Apis mellifera* colonies. The idea of achieving biological pest control with pest-specific pathogens that are harmless to the surrounding environment is not a new idea[5]. Scientists at the Tamil Nadu Agricultural University in India have used the Nuclear Polyhedrosis Virus (NPV) with some success to mitigate American bollworm, the tobacco cutworm and the red hairy caterpillar that attacks groundnut crops[6]. Likewise, NPV has been used to combat western tent caterpillars, African armyworms and invasive gypsy moths[7]. It has been proposed that the Southern pine bark beetle in Mississippi could be mitigated using a biological control method based upon naturally occurring viruses[8]. In the Czech Republic, the pine bark beetle *Ips typographus* was treated with the entomopox virus with some success[9].

The aforementioned studies do not represent an exhaustive review of the field, yet it is clear that this approach has barely been explored. More research on this potential mitigation strategy is certainly warranted. Biological pests have natural enemies that are already part of the environment, and it may be possible to use them to our advantage. Such an approach could be part of an integrated pest management system and provide a complimentary method to help eradicate mite infestations. Our goals are directed primarily towards the detection, identification and characterization of naturally occurring viruses. We do not propose to genetically engineer those viruses in any way, given the history of unintended consequences with this approach.

We have already taken a large step forward by detecting a naturally occurring virus that clearly infects the infamous *Varroa* mite at high concentrations, apparently without infecting the honey bee host. We highlight that the IVDS approach is a valuable part of the toolkit for the discovery process. It requires measurement of an actual viral particle rather than detection of genetic sequence that may or may not represent an active infection. Importantly, a viral detection can be made without having to know the identity of the virus prior to looking for it.

Further steps would be to isolate the virus so that it could be sequenced. After that, the development of a mass spectrometry and PCR detection method specific to this virus could be developed. More studies are also needed to evaluate host specificity and any symptomology associated with viral infection.

Figure 2. IVDS peak detection of unknown virus in mite samples.



REFERENCES

1. US Patent 8309029B1
2. Wick, CH, Integrated Virus Detection, Boca Raton, Fl. CRC Press (2015).
3. Rosenkranz P *et al.*, Biology and control of *Varroa destructor*, *Journal of Invertebrate Pathology* (2009).
4. Ramsey, SD. *et. al.*, *Varroa destructor* feeds primarily on honey bee fat body tissue and not hemolymph. *Proc. Nat. Acad. Sci.* (2019).
5. Metcalf CL *et al.* Destructive and Useful Insects, Their Habitats, and Control. New Delhi: Tata McGraw–Hill Publishing Company (1973).
6. **https://www.downtoearth.org.in/news/using-viruses-for-biological-pest-control-30309**
7. Myers JH, *et. al.*, Ecology and evolution of pathogens in natural populations of Lepidoptera. *Evolutionary Applications* (2015).
8. Sikorowski PP, *et. al.* Virus and Virus-Like Particles Found in Southern Pine Beetle Adults in Mississippi and Georgia **https://www.mafes.msstate.edu/publications/technical-bulletins/tb212.pdf**

Weiser J, *et. al.* Biological protection of forest against bark beetle outbreaks with poxvirus and other pathogens. IUAPPA, Section B (2000).

DANCING WITH THE BEES

Greg Carey

You've been handling bees for a while and are feeling very confident. It's a nice day, and you are into one of your strongest Long Lang colonies when the unthinkable happens. You drop a beautiful frame of bees at your feet!

And just like that you are dancing with the bees. No one else can hear music. From afar, an observer would probably suspect that you had discovered gold like in one of those old black and white gold rush westerns. The music finally dies down about the same time as your vocabulary runs dry, and you're stuck standing there looking down at a beautiful pile of honey bees.

What do you do? You have already walked away several times. They are your bees, and no one is going to ask to cut in. First, you light up and blow some smoke in the faces of the older more aggressive dancers. Once the old girls have settled down, you are left with a pile of younger, confused crawlers trying to decide whether to ask you to dance or just chat with their sisters.

Pro Tip: Patience is key to most everything when the colony is open and becomes more important when stuff is going wrong.

I gently picked up the dropped frame and slowly removed all the large debris that was stuck to it. I then replaced the frame into the hive and covered the frame tops with a working cloth. The bees calmed down a bit while I went to get my spray bottle of thin syrup and a frame of slightly drawn foundation.

I sprayed the foundation frame with the syrup and leaned it against the stand leg near the pile of bees. Using the smoker on the distant edge of the pile encouraged them to start in the direction of the bait frame that smelled somewhat of a punch bowl. I then went back to my original inspection and once it was complete, I noted that most of the bees had climbed aboard the bait frame, were lapping up the syrup, and chatting amongst themselves.

I could see some of the bees scenting as they climbed on board, letting their sisters know that there was a free ride back into the hive waiting on them.

I forgot to mention. It is very important that when you're dancing that you put some distance between you and the pile of bees. This is sort of the natural thing to do, but just know that they hate it when you step on their toes.

Anyway, once the majority were loaded onto the bait frame, it was a simple matter to just pick the frame up and put them back into their home, only slightly worse for wear.

If you are wondering, why not just use the frame you dropped? You could do this. In my case there were brood to think about, and I didn't want to add insult to injury by allowing them to cool their heels outside the hive.

I mentioned the working cloth earlier which you can see here. I use our old bath towels for this and rarely wash them. They pick up the hive scent, and when covering the frame tops, I've found that the bees continue about their business like I'm not even there.

Finally and obviously, this was not the first time I've dropped a frame of bees. The first time I was asked to dance in this fashion, I got so excited that I completely forgot that the camera had even been invented. I am not a wall flower and have been on the dance floor before and will probably be there again. I just thought you might like to hear of some of the moves I have picked up along the way.

The bees will choose the music. The older ones seem to like the jitterbug while the younger ones are content to hang out around the punch bowl with their sisters. Our part is to get them back home safely at a respectful time.

Maryland Holds a Honey Show Judging Class

Allen Hayes, EAS Master Beekeeper

Does your state have enough qualified honey show judges? Are the same people asked to judge year after year? Would you like to know more about how honey show entries are judged? If you answered yes to any of these questions, like we did, I think you will appreciate the following:

In an effort to improve beekeepers' knowledge and to encourage some beekeepers to pursue Honey Show Judging Certification, The Maryland State Beekeepers Association, Inc. (MSBA) held a honey show judging class on April 16, 2022. The only requirement was that the students be members of MSBA. A fee was charged to cover expenses and so everyone could receive a judging book. The majority of the students that took the class do not wish to become judges, rather they are interested in learning how show entries are judged so that they can improve their own entries and hopefully win more blue ribbons in the future. However, there are some who are quite interested in achieving certification. Our goal was to fulfill everyone's needs.

The class was an all-day event that was jam packed with expert presentations and hands-on break out sessions where beekeepers learned how to use the judging equipment and see up close how a judge grades entries. The class was limited to 35 participants and was held at the Carroll County Public Library, Westminster, Maryland. This is a freshly renovated facility with four large wall monitors, a built-in audio system and a very helpful staff. The facility was liked by all and the library staff was fantastic to work with. The class was divided into six groups for the breakout sessions. There were six judging stations each staffed by a certified judge with examples of entries, both good and some not so good for comparison. A refractometer and a polariscope were at each station also. The groups rotated to different stations as the day progressed so the students could learn directly from several judges.

Each student was given a copy of the book: *A Handbook for Honey Judges and Beekeepers Exhibiting Hive Products* by James R. Thompson. Jim Thompson is an expert Honey Show Judge and a frequent contributor to *Bee Culture Magazine*. All but one of the presenters are Maryland State Certified honey show judges. The Maryland certified judges were: Lindsay Barranco, Mike Doyle, Jim Fraser, Bill McGiffin, David Morris, Cybil Preston and Bart Smith. The one exception to this was Monica Schmidt. Monica has the distinction of winning the Best in Show award for extracted honey first, at the Eastern Apicultural Society conference in South Carolina in 2019. Then in January of this year she won Best in Show for extracted honey at the American Beekeeping Federation Conference held in Las Vegas. As Monica puts it, "I have the best honey in the country." You can't argue with that. She stunned the audience when she explained step by step how she prepared her entries. It is a very elaborate and time-consuming process. We are grateful to Monica for sharing her knowledge and experiences. This was the icing on the cake for this class.

Jim Fraser built and graciously donated a polariscope; everyone got one ticket for the drawing. At the end of the day, one very lucky beekeeper got to take this very fine instrument home. The students provided feedback and most wanted more class time especially for hands on judging. This is a lot of information to cram in a one-day class.

This was actually the second time MSBA held this class. It was first presented in 2016 and feedback from that first event influenced how the class was setup this time. We were planning to hold this class in 2020 but the COVID pandemic postponed it until April 2022. Alcohol was not allowed in the building, therefore Mead was neither discussed nor judged. At least not inside.

L-R Allen Hayes, Class Coordinator; Maryland Certified Honey Show Judges: Bill McGiffin, Mike Doyle, Bart Smith, Cybil Preston, Jim Frasier, and David Morris. Photo By: Barb Hayes

The Maryland Department of Agriculture certifies honey show judges. This activity is run by Cybil Preston, Maryland State Apiarist. There are a lot of steps one must achieve before applying. Some of those are: you must be a registered beekeeper and have won blue ribbons in both the state fair and a local fair with your own hive products. You can then apply and once accepted you can begin a two-year apprenticeship that

starts on year one at the state fair, and concludes on year three, also at the state fair. Over the next two years you assist certified judges at as many local fairs as possible, including the state fair on year two. Then on year three at the state fair, you will be given categories to judge on your own but you will be asked how and why you judged the entries. That is your "Final Exam."

TOPICS COVERED IN THE CLASS

Judging Philosophy:
Philosophy of judging, taking into account size and prominence of the venue

Refractometers:
Demonstration of use and where to buy

Polarizer or Polariscope:
Demonstration of use and where to buy

Scoring Sheets:
List of the available score sheets, where to obtain copies, similarities in criteria across different exhibits

Honey Containers:
Many exhibits are in containers. How are containers themselves evaluated? (Plastic vs glass honey jars, cut comb containers, honey comb frame holders)
How to evaluate cleanliness, old lids, and damaged or scuffed containers.
Exceptions for first time exhibitors.
Points on improving the entry

Liquid Honey:
Fill; over or under?
Moisture content point scale (introduced in "Refractometers")
Crystals, lint and debris (introduced in "Polarizers")
Points on improving the entry

Monica Schmidt, winner of the Best in Show Award for extracted honey at both the EAS Honey Show, 2019 and the ABF Honey Show, 2022. Photo By: Allen Hayes

Creamed Honey:
Fill; over or under?
Crystal fineness and firmness
Debris and "bloom"
Points on improving the entry

How I won both the EAS and ABF Honey shows: Monica Schmidt

Common Comb Honey Criteria:
Examining honey comb, whether it is in the frame, sections, cut or chunk.
Open (dry) cells vs uncapped (wet) cells, damp or leaking cells
Centered mid-rib, uniformity, white vs watery cappings
Pollen, travel stain, *Braula coeca* larvae tunnels
Points on improving the entry

Cut and Chunk:
Whether it is cut square and in a box, or long and in a jar, cut honey comb have common criteria
Square corners and clean cuts
Loose wax flakes
Full measure of comb

Frames and Sections:
Whether it is in a section (square or round) or in a frame (a really big "section," the criteria are similar, but containers have specific points to look for)
Clean section or frames, not old or propolis covered burr comb

BREAKOUT: Students Judge Honey Exhibits
Students grade exhibits, review grading points with judges and each other

BREAKOUT: Students Judge Comb Honey
Students judge exhibits, review grading points with judges and each other

Beeswax Blocks:
The color, aroma, cleanliness, freedom from blemish and cracks applies to all beeswax categories

Candles:
Molded: What makes a distinctive and outstanding molded candle?
Dipped: What makes a distinctive and outstanding dipped candle?
Rolled: How does one judge something as simple as a rolled candle?
Fancy Wax: What constitutes fancy beeswax as opposed to fancy candles?

Photos:
Elements of composition and technical aspects, treatment of subject, and presentation

Arts & Crafts:
How do you judge completely different objects in the same class?

Certified Maryland Judge, Bart Smith demonstrates using a polariscope to detect crystals in extracted honey. Photo By: Allen Hayes

BREAKOUT: Students Judge Beeswax & Candles

Students grade exhibits, review grading points with judges and each other

BREAKOUT: Students Judge Photos, Arts & Crafts

Mailing Packs:

Can this package actually be mailed? Would you buy it?

Gift Baskets:

Quantity and quality of the hive products versus attractiveness and public appeal

BREAKOUT: Students Judge Mailing Packs and Baskets

If there are exhibits, students will judge the exhibits, discuss with judges and compare with other students

Questions and Review

Judges can review the student scores of the exhibits and discuss how they assigned points, as well as answer questions

HONEY JUDGING EQUIPMENT LIST

Starred items(*) are **essential**. Remaining items are advisable.

Fair passes and maps*
Maryland honey judging forms*
MDA Maryland honey standards
Refractometer*
Spare refractometer*
Polarizer (spare bulb for polarizer)*
Paper towels*
Corkscrew (for mead)*
Paper or plastic cups for mead*
Paper plates for baked goods*
Knife for slicing cakes*
Digital scale*
Spare batteries for digital scale*
Extension cord (polarized plug)*
Pencils, eraser and sharpener*
Wooden coffee stirrers (for sampling honey)*
Water spray bottle*
Three prong to two prong converter[1](A)
Magnifying glass
Ruler
Calculator
Table lamp[2]
Scissors
Reading glasses
Saran wrap
Scotch tape
Flashlight
Spare batteries for flashlight
Cooler with ice and water

[1]Some shows are held in old buildings with old electric systems

Certified Maryland Judge, David Morris explains that the underside of the honey jar lid must be clean and free of debris. Photo By: Allen Hayes

Certified Maryland Judge, Jim Fraser explains what is good and what is not good in a cut comb entry. Photo By: Allen Hayes

The 2022 MSBA Honey Show Judging Class watching a presentation. Photo By: Allen Hayes

[2]A bright light since some shows are in very dark locations
(A)Also known as a grounding adapter

Many thanks to Cybil Preston and Jim Fraser for contributing to this article.

T. T. T. T. (Take Time to Tinker)

Jeff Kennedy

Petro Prokopovych, Founder of Movable Frame Hive Rational Beekeeping.

The Ukrainian beekeeper Petro Prokopovych began his beekeeping endeavor during a time where bees were housed primitively, in hives comprised of sectioned logs. By 1808, he had amassed a collection of 580 colonies and was already contemplating methods that would permit the removal of honey without causing total destruction to the colony's comb and brood nest.

Petro worked tirelessly over the next six years and in 1814, developed the first ever, removable frame beehive. His "Dismountable Frame Beehive" made it possible to manipulate the brood nest and actively manage the colony within. In addition, he is also credited with developing a wooden partition with apertures the size of workers, making it possible to harvest pure honey from the frames.

During his time, Prokopovych was heralded as a gifted researcher and teacher, publishing more than sixty articles on beekeeping. *Bee Culture's* own Amos Root praised Prokopovych's innovations, citing: "His frame has much in common with a modern section frame with openings for passage of bees, the walls of his beehive were joint in the lock. He applied methods, which far outstripped his time."

Patented on October 5th, 1852 (38 years later), Lorenzo Langstroth's "Movable Comb Hive" was a modernized rendition of Prokopovych's seminal work and major contribution to beekeeping. Over the past 169 years, little has changed or needed improved upon in regards to its design, or the way we house our bees. Sure, those of us in a more northerly climate can see the benefits of having a thicker walled hive, something similar to the natural tree cavities of Petro's time, but our hives are already heavy enough, aren't they? I am getting older, and so is my back, therefore I am not willing to take on the additional weight of a thicker walled, wooden hive. Problems require solutions and solutions require innovative people. In recent years, a handful of companies have begun making thicker walled and uber light, polystyrene hives. However, I am a traditionalist in that respect and prefer wood, but I appreciate the innovativeness.

At its core, the Langstroth "Movable Comb Hive" is an improved version of Prokopovych's "Dismountable Frame Beehive," yet most of us are only familiar with the Langstroth name. Perhaps his demographic and his (still) popular treatise *Langstroth on the Hive and the Honey-Bee* are some reasons to which Prokopovych fell off the radar and is rarely mentioned. Perhaps it's confirmation bias.

A More Peaceful Existence

I never set out to be a beekeeper, but here I am, a sideline beekeeper. I've spent the last twenty years working in law enforcement. It's been a mentally demanding career, one in which I have had an immense amount of exposure to complex trauma. When I began keeping bees, I quickly discovered that the constant hum of thousands of bees flying to and fro, the floral aroma infused with warm wood and wax wafting from the hives, the intense focus required to effectively inspect and assess a hive's vitality, all was therapeutic for me. Meditative even.

What I have also learned about myself through healing from trauma is that one of my ways of handling stress is overworking. As for me, this is another benefit of beekeeping because there is always something that needs to get done. Building new equipment, painting boxes, leveling hive stands, cleaning up outyards, repairing old equipment, are all tasks that quickly pile up on the beekeeper's ever growing "to-do" list.

Beekeeping welcomes innovativeness and fuels our creativity. It scratches the inventor itch within us, and prompts us to tinker in the garage during the off season. With the space heater warming us and our cup of coffee, we begin planning for the next season, tweaking our equipment designs, assessing what did or didn't work last year, and researching or brainstorming new management techniques that we might try implementing during the upcoming season. Will these new techniques make our tasks easier? Will we yield more honey as a result? Can repeated frame manipulations cut down on swarming? Our potential can only be restrained by our lack of drive and determination.

Life is Still Beautiful

This time of year affords much clarity. It is the calm before the storm. Most fruit buds have come and gone and clover is on the cusp of exploding after each successive cut. The natural world that surrounds us is pulsating with life. As are we. Take the time to revel in this brief moment of our beekeeping season. As we proceed on in to June, most of us will start to fall behind and will spend the rest of the season trying to maintain stride with the bees.

There is one certainty in beekeeping and that is at times, you will fail. This is a sobering reality with all agriculture endeavors as despite our absolute best efforts, the bulk of the heavy lifting is done by nature.

In a moments time, something can happen that drastically alters the trajectory of one of our outyards or the operation as a whole. Therefore, don't be afraid to try new things. To be inventive.

As we have grown our operation over the last several years, I have had to force myself to pull the reins back on multiple occasions. When we start focusing solely on "growth" we start to lose focus of what drew us in to this remarkable hobby/industry in the first place. When we race around from yard to yard, doing the work that "has to get done," we become disconnected from the bees and nature. We no longer have the time to be present. To REALLY read a brood frame. To take in all the fuzzy rump shaking that accompanies waggle dances during a heavy nectar flow.

The modern world is a scary place, but our bees and their actions remind us that life is still beautiful. We just have to be willing to slow down and take it all in. One bee yard at a time. Take time to tinker. You won't regret it.

Honey is baked in comfort food

Alice Eckles

Everyone was baking. Flour was flying off the shelves. People who never baked a loaf of bread in their lives decided that now was the time to pull themselves together by their apron strings. Pandemic baking, as a Covid coping mechanism, is in the air the same way victory gardens became a way of life in the 1940's with World War II. And indeed 1,003,925 people in the United States have died of Covid as of June 7, 2022 as compared to 405,000 Americans lost in World War II. When people have to respond to a global crisis they do what they can.

People saw that they could stay home and make their own bread. No need risking lives going to the grocery store every day possibly exposing others or being exposed themselves to the disease.

I was making my own sour dough bread years before the pandemic baking craze set in. I started making bread with the intention of saving money, though with our love of fresh baked bread I'm not sure it saved us a cent. We live out in the woods and the day I was struck with the idea of baking our own bread, the only yeast we had was many years old and I didn't trust it so I thought of culturing my own sourdough. Yes, it can be done with nothing but flour, water and time. I consulted King Arthur Flour, using their sourdough recipe and calling their baking hotline when I was confused. At the time we had no electricity, so I was baking bread inside our wood stove which was pretty tricky because it's not designed for cooking and lacks any semblance of temperature control. Baking bread as I do now in a large electric toaster over is much easier, and it's nice having fresh baked bread close at hand. On my call to the King Authur hotline (855-371-BAKE) I was told that baking bread is really more of an art. People find a way of doing it that works for them. But it feels much more secure to follow a recipe, and I tried to follow the Extra-Tangy Sourdough Bread recipe from King Arthur Flour as closely as I could. The recipe called for sugar, not honey, and that's what I used, until serendipitously, a woman buying honey from us mentioned that she needed it for making bread and that it made the bread come out much better than sugar. After that big hint from the universe I started using honey instead of sugar in my bread recipe. And yes! It is so much better.

Avoid getting your hands sticky by working the flour from the outside edges in, turning the dough over onto the flour and pressing it down so that it picks up the flour while you fold it. Some people knead the dough on a floured board but I prefer to knead it right in the mixing bowl for easier clean-up.

The dough, after it has been kneaded long enough, is smooth like skin, fleshy even. I imagine the story of the gingerbread man may have come from how bread dough comes to seem humanly alive with that glowing smooth texture of skin. Note the change in appearance from when it was merely mixed to when it's been kneaded to perfection.

I found that the addition of honey made the dough mix together more smoothly, and the bread was moist and sweet in a nice way. Generally, honey in a recipe protects the moisture in baked goods, keeping them from drying out or getting stale in storage. While it's typically recommended that you reduce the liquid in the recipe and halve sweetener if using honey instead of sugar, I don't do any of that and simply replace honey for sugar, one for one, in the recipe. Sometimes I even double the honey amount for added sweetness. I also like to use a greased measuring spoon for the honey so that it slips out of the spoon without any waste. Not that honey sticking to a spoon need be wasted since honey residues can always find a home in my tea cup.

Before you make sourdough, you must have a sourdough starter. It's not that hard to make your own and I highly recommend it. I think it's easier than trying to buy sourdough starter, unless you have a friend or family member who has some starter to share. The process of making starter is really quite simple, and takes about five days.

Sourdough Starter Recipe

Ingredients:

Flour
Water
Time

How much your dough rises may depend on temperature. Ideally you want a consistently warm temperature without drafts during rising times. Alas we have no such conditions in our home kitchen and the bread still comes out nice.

Day one:

Use a two quart jar for your container and add a ½ cup water to a scant cup of flour and let it sit at room temperature with a loose cover over the mixture. A scant cup is a one cup measure that's a little concave, as opposed to level or rounded.

Day two:

Feed the starter with one scant cup flour and a

½ cup water, stirring vigorously to mix completely. You may see bubbles developing and that's a good sign. Keep starter at room temperature, on the kitchen counter, the top of the refrigerator or someplace like that throughout this five-day process.

Day three:

Feed the starter again just like the day before. Today your starter should be visibly larger in volume.

Day four:

Feed your starter again just as before, leaving it out at room temperature loosely covered. Your starter should be doubled in size and a bit more liquidy.

Day five:

Check your starter. It should be looking very bubbly, even frothy, and doubled again in volume as compared to before. If it seems activated in this way, it's ready to use and you may need to read up on the care of your new pet. Your starter will need at least weekly feedings. If your starter doesn't seem activated keep repeating the steps until it does.

Now, finally you can begin the art of sourdough bread making. I've learned over the years how to customize the recipe so that it works for me. Beekeeping is an art too. What we mean by this is that no two people will do it exactly the same way. Each practitioner adapts their process to their circumstances, preferences and sensibility. Some directions, methods and recipes aren't meant to be followed to the letter. That said here is my sourdough recipe, think of it as a guideline:

Ingredients:

Flour
Starter
Water
Salt
Honey

I like a three day process; although the process can be compressed into two days.

Day one:

Start in the afternoon or evening.

Put your entire starter in a big bowl and add 1 cup flour and ½ cup water. Mix thoroughly. Return half of the starter to its container and store in the refrigerator until you're ready to make bread again. To the starter left in the bowl, add three cups flour (I like to use white, whole wheat or rye in various amounts and combinations) and 1½ cups water. Stir vigorously to mix. Put a lid on the bowl and set aside overnight.

Day two:

Start in the morning. Add two cups flour, 2½ teaspoons sea salt and a tablespoon or two of honey. Use your hands to scrape around the sides of the mixture so that the flour coats the dough on all sides. Knead the dough into a smooth consistency. This takes time. Keep kneading until all the flour is fully incorporated and the dough is smooth. Oil the sides of the bowl and outside of the dough just enough so that it doesn't stick to the bowl, especially after sitting overnight. Put a lid over the bowl and let it sit overnight.

These loaves are ready to go in the oven. I like cast iron bread pans because they distribute evenly.

Day three:

Start in the morning.

Oil two bread pans. I use cast iron bread pans. You could also use a cookie sheet for a rounder, somewhat flatter bread. Instead of oiling the pan you can also use beeswax to keep your bread from sticking. Simply heat your cookware and rub a chunk of beeswax over it. Divide the dough in two and shape it to fit the bread pans, without handling it too much. Cover the dough with a plastic bag or something to keep the dough moist. The bread needs about five hours to rise, but if you let it rise too long it can fall. Bake the bread in the afternoon at 350° for 45-50 minutes, or until the crust is golden brown and the middle is cooked through.

For a delectable treat try a piece of bread toasted, buttered and spread with crystallized honey, then dot with fresh blueberries for "instant blueberry pie."

Alice Eckles is the author of *The Literature Preferred by Wild Boar*, a novel. While she sometimes assists in beekeeping, she mostly handles the value added parts of the beekeeping business she shares with Ross Conrad and has fun exploring the intersection of beekeeping and art via her artist business **AliceEcklesStudio.com**

Sometimes for variation I add chunks of cheddar cheese and a sprinkle of hot pepper flakes to the bread dough, or cinnamon and raisins. The time to mix in such additions is in the beginning when you add the starter. It's easiest to mix in the chunky things like cheese or raisins when the dough is in its wetter form, before adding the additional flour.

HONEY BEE STINGER

An Evolutionary Marvel

Ed Erwin

To appreciate the uniqueness of the female honey bee stinger, it's important to understand how this complex and distinct appendage evolved. The first bee evolved from wasp-like ancestors who were predatory hunting insects which were abundant during the Jurassic Period, beginning approximately 201.3 million years ago to the beginning of the Cretaceous Period, approximately 145 million years ago. The Cretaceous was a warming period of the earth with many changes in biological diversity including the first mammals and the first true flowering plants. During the Jurassic Period, most of the plants reproduced by transferring pollen through the effects of wind. Like most of the flowering plants of today, the flowering plants of the Cretaceous period needed help in transferring pollen. To take advantage of this protein source, the wasp began to evolve into a pollen-carrying bee.

As the earth warmed during the Cretaceous Period, and the warmer climate created flowering plants which needed to be pollinated, the bee was evolving to become the perfect pollinator. This early bee was different than the honey bee we know today, which evolved around 25 million years ago. The modern honey bee was one of the first bee species to live in a group and not in solitary isolation. Along with this unique adaptation came the evolution of the honey bee stinger, which is a unique feature, suggesting that this evolved once the honey bees became a distinct genus.

The stinging apparatus of the honey bee is a modified ovipositor (egg laying tube) with associated venom glands that all bees have. In most insects, the ovipositor is used to lay eggs.

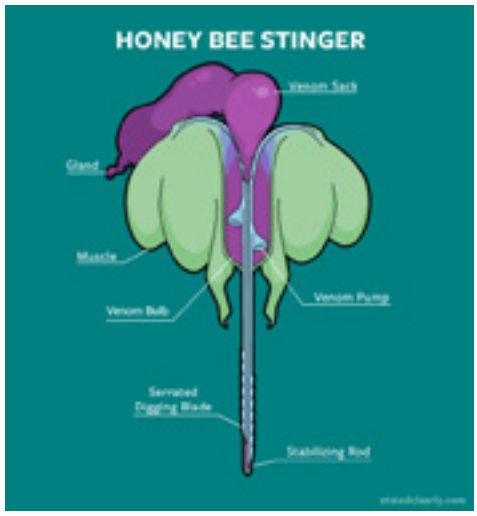
The ancient wasps, like the wasps of today, use their stingers as a weapon to paralyze or kill their victims. The honey bee stinger is a complex structure made of many parts and is used as a weapon to defend the hive or the bee itself.

Male bees, also known as drones, are larger and do not have stingers at all. The queen bee has a smooth stinger, which she can use as a weapon.

When a honey bee stings, it grips its prey with its legs and pushes backward, pointing the sting shaft at its victim. This action forces the rigid stinger to a vertical, downwards angle.

The female honey bee stinger is a complex structure. The honey bee stinger is composed of several distinct parts that work in unison. The stinger consists of three key parts: a sharp sting shaft, or stylus, with two paired, barbed lancets at regular intervals running backwards and forwards located along opposite sides of the stylus. The bee does not push the stinger in but it is drawn in by muscular articulation that controls the movement of the barbed slides. The lancets move alternately up and down the stylus. When the barb on one side engages and retracts so that the barb of one slide has caught and retracts, it pulls the stylus and the other barbed slide into the wound – effectively sawing into the flesh. As the other barb catches, it retracts up the stylus pulling the stinger further in. This movement is repeated until the stinger is fully engaged to its maximum depth. This process continues even if the stinger is detached from the abdomen.

The stinger's lethal venom, known as apitoxin, is a cytotoxic and hemotoxic bitter colorless liquid containing chemical compounds of proteins located in the venom gland, venom sack and bulb. Venom is 88 percent water, with fructose & glucose (sugars) and phospholipids (fat cells). The venom of the honey bee also contains histamine, mast cell degranulating peptide, melittin, phospholipase A2, hyaluronidase and acid phosphatase. The main component of bee venom responsible for pain and itching is the toxin melittin, a basic peptide consisting of 26 amino acids. These small protein molecules rupture red blood cells and bursts other cells in the blood vessels and skin. Although melittin is the main component and the major pain producing substance of honey bee venom, histamine is also released and causes inflammation by dilating blood vessels causing swelling and redness. An enzyme known as hyaluronidase is also released. It digests and breaks down the tissue in the flesh. This causes an increased rate at which the venom can diffuse. The three proteins in honey bee venom,



which are important allergens, are phospholipase A2, hyaluronidase and acid phosphatase. When the bee injects the apitoxin into the victim, alarm pheromones are also released into the air alerting other bees to join in attacking the threat.

Bee venom is slightly acidic, and in most people causes only mild pain. However, more severe allergic reactions may occur in people with allergies to the venom components. Serious life-threatening anaphylactic reaction occurs in 0.8% of the population.

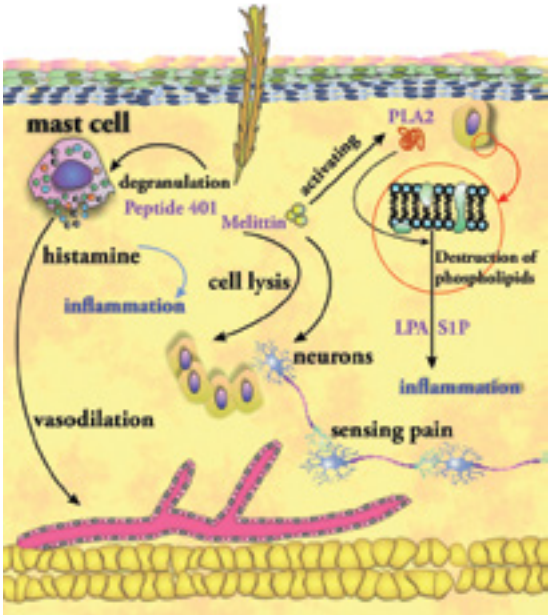
Several large muscles are used to facilitate the delivery of venom via the two pumps inside the venom gland. They, along with the venom storage sac, deliver the toxic venom to the stinger itself, which is only one or two millimeters in length. The sac contains about 1/50,000 oz of liquid venom. Depending on how long the stinger is allowed to pump venom, the amount injected is usually less than the 1/50,000 oz.

When the hive is attacked by other insects, bees can sting their foes multiple times, injecting venom and then removing the stinger safely after each stab. When a female honey bee stings a person, or an animal with flesh, it cannot pull the barbed stinger back out. As the honey bee flies away, the stinger tears off the body along with the venom sac, the muscular pumping mechanisms, parts of its abdomen, the digestive tract and nerves. The bee is disemboweled and massive abdominal rupture kills the honey bee. Although the bee is no longer connected, the stinger remains and continues to pump venom into the victim for 30 to 60 seconds.

Although there are thousands of species of bees, honey bees are the only bee species to possess barbed stingers and die after stinging.

Beekeepers know the main reasons bees become aggressive; include the need to protect their hive and honey, irritation of stormy weather and thunder, sensitivity to electromagnetic radiation, lack of nectar during the dearth, when a good honey flow stops abruptly and others, including Honey Bee Genetics. Beekeepers know that some hives are simply aggressive, which is usually the result of the genetics passed on by the queen to the entire colony of worker bees – a perfect example: Africanized Honey Bees. When bees become aggressive or need to defend their hive they use their stinger. Beekeepers know honey bees foraging for resources, such as nectar or pollen, rarely sting. The exception is if they are stepped on or feel threatened – so don't swat foraging bees.

When people meet a beekeeper their first question is usually "have you been stung?" For most beekeepers the response is "Do you mean today?" For beekeepers, being stung on occasion is just part of the experience of beekeeping.



Pathophysiologic effects of bee venom biochemicals on a variety of cells

A Different Kind of Bee

Jim Thompson

If you have read some of my articles, you know that my postcard collection influences some of my articles and this is no different.

A long time ago, wheat was loaded on to a wagon and hauled to an area where neighbors would get together and harvest it. The event was called a **Threshing Bee** and would be somewhat like a free carnival. Men would do the work with the wheat, women would help with the food for those working and children would help with the horses and carry items like food and water. The machine used was called a threshing machine and was usually powered by a steam engine. The threshing machine would separate the stalk and stems from the wheat. The event usually took a full day and then it might be held again at a neighbor's place.

Threshing Bee

Where I grew up, people called it a thrashing bee. I never paid it any difference, but when my uncle got a combine, he let me ride in the grain hopper when the wheat or oats were harvested. Parts of mice and snakes would be dumped into the hopper along with the grain. It was truly a thrashing machine.

However, the event was still called a threshing bee, as it was a social event of neighbor helping neighbor.

In different parts of the world this help or fund raising activity is called:

Africa
- East Africa – Harambee
- Rwanda – Umuganda
- Sudan – Naffir
- Liberia – Kuu

Asia
- Indonesia – Gotong-royong
- Philippines – Bayanihan
- Iran – Basij
- Turkey – Imece

Europe
- Finland and the Baltics – Talkoot
- Russia, Ukraine, Belarus, Poland – Toloka
- Hungary – Kaláha
- Ireland – Meitheal
- Asturias – Andecha
- Norway – Dugnad
- Serbia – Moba

North America
- Cherokee – Gadugi

Latin America
- Mexico – Tequio
- Zapoteca Quechua (including Peru, Ecuador, and Bolivia) – Mink'a
- Brazil – Mutirão
- Chile – Mingas
- Panama – 'Junta' party

The earliest use of the word "bee" in colonial North America was found in the *Boston Gazette* in October 16, 1769, where 20 ladies held a Spinning Match or what is called a Spinning Bee. In Australia the term used is a "working bee."

A **Spinning Bee** was originally a way to produce homespun cloth to reduce dependence on British goods and a way to protest British policies and taxation. Spinning bees not only were the spinning of yarn but also weaving it into cloth. The participants of the early spinning bees were usually young, unmarried women because they had the spare time for such work. Eventually it became a social event and women of many ages became involved.

There are all kinds of bees, such as: an Apple Bee, a Drinking Bee, a Husking Bee, a Logging Bee, a Quilting Bee, a Roofing Bee, a Sewing Bee, a Spelling Bee and others. Don't forget the barn raisings or as they call it in the United Kingdom, a barn rearing. The "barn raising" could include churches.

Apple Bee – was a social event where the farmers helped gather the apples and prepare or process the fruit for drying.


Drinking Bee

Drinking Bee – has been replaced somewhat by binge drinking. Get the cheapest beer, the best beer funnel, a four-in-one beer opener and

try to remember where the party is. However some may get in trouble by getting underage guests, so observe the laws. Now not everyone can afford to go to Germany or France where the drinking age for beer, wine and wine-like beverages starts at 16. However, there are ten countries where there is no stated minimum age. But when you find these countries, there are other restrictions, such as the drinking must be in private.

Husking Bee – is an older practice of cutting, shocking and husking corn. It would take a farmer several weeks to harvest his crop alone so he would ask the neighbors for help. He might not own all the equipment. Besides doing the crop, there were contests, such as who could husk a basket of corn first, and what young man could find a red ear of corn and kiss a girl before dinner? Today the farmers have machinery to do the picking, husking, shelling and drying. So I guess there are no girls to be kissed.

Logging Bee – one definition of a logging bee is another name for log rolling, but the original logging bees were the favorite way to clear space in the forests for the planting of crops. It was a social event and might take several days at each location. Again, we have bull dozers that replace axes, shovels and teams of horses or mules.

Quilting Bee – was a social gathering to make quilts or to hold competitions. The quilting bee was usually held in a large room where two quilting frames could be assembled and the women could finish several quilts in one day. Upon the ending of the session, a supper of roast chicken or turkey was prepared and the men would arrive for the feast, singing and dancing.

Roofing Bee – was an event where friends would come to your place and build, replace or repair your roof. Today it seems that this activity doesn't exist. People are in the business to fix your roof for a fee, but will give you a choice in which color you would like and what type of material to use.

Sewing Bee – a social occasion where people get together to make or mend clothes and other things with a needle and thread while engaging in conversation. Today there is a television show, "The Great British Sewing Bee," which is an elimination of a contestant each week. There are stores by the name Sewing Bee, that sell sewing supplies.

Spelling Bee – The earliest spelling bee dates back to 1825 however it had names like: Trials in Spelling, Spelling School, Spelling Match, Spelling-Fight, Spelling Combat and Spelldown. It was different from the other bees as it was an entertainment event. I also figure that the winner was the person that got the easiest word to spell. So it was the luck of the draw.

References:

Barn raising – Wikipedia.pdf

Communal work – Wikipedia.pdf

Why is it called a 'Spelling Bee' Merriam Webster.pdf

Primitive spelling bees

Five Ways Companies are Helping Native Bees Worldwide and How You Can Help, Too

Sienna Malik

Bees on purple coneflowers

Beekeepers needn't be told about the importance of bees as pollinators, or about the threats to the global economy and food security associated with a drop in domesticated honey bee numbers. Less discussed, but equally important, are the threats posed by a decline in wild, native bees. A **2021 review of population data** suggested that, since the 1990s, native bee species richness may have decreased by 25% worldwide because of factors such as habitat loss and pesticide use. Reversing this loss is critical to preserving overall biodiversity and will require a concerted effort to replenish and protect their habitats, with an emphasis on planting wildflowers and other native blooming plants.

Wildlife Habitat Council (WHC) has operated at the intersection of business and biodiversity for three decades, supporting and certifying conservation work on corporate lands. Given the ubiquity of bees and relative ease of creating pollinator habitat, many WHC-certified programs address the needs of native bees. Here are five of the many ways that WHC member companies are contributing to the conservation of bees and other native pollinators — and what you can do in your backyard, at your workplace or around your beehive:

1. **Supporting Honey bees in Their Native Range** – Honey bees are native to Eurasia and Africa, where in the wild they typically build hives in hollow trees and pollinate a wide range of flowers in search for food. The body of research on wild honey bees in their native range is markedly smaller than that of their domesticated counterparts (leading to the IUCN listing them as **"Data Deficient"** on the **Red List**). The studies that have been done, however, suggest that wild honey bees are threatened by the challenges all bees face, as well as hybridization with domesticated and feral subspecies, which have been bred for human utility rather than survival in the wild.

   To support honey bees and other pollinators native to Central Asia, employees at the General Motors (GM) facility in Tashkent, Uzbekistan have planted an apple orchard on their property. Apple trees, which are believed to have originated in the region, are especially attractive to honey bees because of their easily detectable nectar and pollen. To ensure that the bees have access to food after Spring apple blossom season, GM has also planted flowers such as meadowsweet and guelder-rose. Many pollinators, primarily honey bees, in the orchard and natural honeycomb, have been observed throughout the site. With this increased presence in pollinators, it has been noted that the apple trees are producing more fruit, indicating that this conservation work has facilitated a mutually beneficial relationship between on-site flora and fauna.

   What you can do: With help from guidebooks, local conservation groups and/or an agricultural extension, research native bees in your area and their preferred foods, and create a pollinator habitat. Whether a small pot planted with native seeds on an apartment balcony, or a vast meadowland of wildflowers, native plantings provide critical resources for pollinators in decline.

2. **Supporting Pollinator Diversity** – As the world faces unprecedented drops in many pollinator populations, it has become increasingly important to promote pollinator redundancy. Planting a wide range of native plants, whose flowers have different shapes, sizes, colors and bloom times, can attract a diversity of pollinator species (including not only bees, but also butterflies, moths, beetles and hummingbirds), helping to ensure local resiliency should a species disappear from the area.

Michigan-based utility company DTE Energy operates the Washington 10 Compressor Station, 40 miles north of Detroit. Employees transformed a turfgrass area into a thriving wildflower prairie and landscaped pollinator garden that provide habitat for a diverse array of native pollinators, including endangered butterflies like the karner blue, regal fritillary and powesheik skipperling, as well as a variety of bees, moths and beetles. By planting vegetation for both specialist species (e.g., milkweed for monarch butterflies) and generalists (e.g., black-eyed Susan, coreopsis, blazing star), the team has been able to increase on-site pollinator diversity, attracting a wide range of solitary bees among other beneficial insects.

What you can do: Research and plant a range of native plants that will attract a variety of species. Beetles, for instance, are attracted to sturdy, bowl-shaped flowers that produce a lot of pollen, whereas moths are attracted to light-colored blooms that open around dusk.

3. **Contributing to Research** – Across the world, research on honey bees as livestock has largely outpaced research on native bees, making it difficult to gauge population stability or distribution. Collecting more data on native bees will make it easier to track native bee loss or recovery and will allow bee advocates to make a stronger case for the conservation of at-risk species.

The research that is done on native bees is not evenly distributed — the amount of data collected on native bees in northeast Mexico, for instance, has been markedly lower than that collected in bordering regions of Mexico or in the neighboring U.S. state of Texas. Covia, a multinational provider of minerals and material solutions for the industrial and energy markets, supports researchers in this part of Mexico at its Planta Lampazos facility in Nuevo León. Employees have collaborated with local biologists to manage 17 acres of desert habitat for bees and have collected monitoring data since 2018. So far, 77 different bee species have been counted on-site, a record number for the region.

What you can do: Report native bee sightings to a citizen science project like **Bumble Bee Watch** or iNaturalist's **Native Bees of North America** project. These initiatives allow researchers to understand and track the population distribution of bees and to identify high-risk species.

4. **Providing Shelter –** While bees native to North America don't live in hives, they still need proper shelter to raise their young. Most bees on the continent are solitary species that nest underground, burrowing under bare, loose soil to create their shelters. Others are cavity-nesters that lay eggs in deadwood or hollow stems. Both types are threatened by habitat loss, as urbanization has resulted in more impervious surfaces, soil compaction and a tendency to remove dead trees from our properties. Providing native bees with nesting habitat can be as easy as leaving bare ground available for them or purchasing or constructing a simple bee block (a structure filled with reeds or a


Bumble bee

wood block with holes drilled in it to replicate the cavities found in nature).

Global pharmaceutical manufacturer Bayer manages the Muscatine Plant and Big Sand Mount Nature Preserve in eastern Iowa. The site features a one acre pollinator garden adjacent to a 40-acre prairie, both of which contain native wildflowers. In addition to this food source, both beehives and bee blocks have been installed on-site as part of local youth initiatives. Monitoring indicated that bees moved into the blocks within months, and a wide range of bee species have been seen around the site.

What you can do: Consider the ways your yard or workplace can provide nesting habitat for native bees. The **U.S. Forest Service website** describes methods for making a simple nesting structure. If you have patches of bare soil around your yard, avoid standing or walking on it, or construct a path so that any soil compaction is concentrated in one area.

5. **Spreading the Word** – Many companies have committed to not only planting their own pollinator gardens, but also to involving community members in these efforts. By organizing planting events that are open to the public, hosting in-person or virtual educational events, or posting informative signs in the gardens, companies can turn site-level projects into collective action, empowering employees and the greater community to address biodiversity loss while also contributing to company community relations goals.

Waste Management (WM), a North American provider of integrated environmental solutions, operates a landfill in Bucks County, Pennsylvania, north of Philadelphia. The site features a 17,000-square-foot wildflower meadow and a nearly 5,000-square-foot demonstration garden whose flowers provide nectar and pollen for both native bees and honey bees living in four nearby hives. These habitats serve as the backdrop for a pollinator education initiative that reaches about 700 community members per year. From training citizen scientists, to hosting insect hotel workshops, to conducting group planting sessions, the WM team has engaged participants of all ages in hands-on conservation work. The experiences have inspired many attendees to start gardens in their own homes, increasing the amount of habitat available to local pollinators.

What you can do: If your knowledge on native pollinators is limited, seek out and attend community events (or virtual ones with relevance to your region). WHC hosts a pollinator-themed webinar each June in observance of Pollinator Week, a yearly celebration in support of pollinator health. Visit the **Pollinator Partnership website** for a list of aligned virtual and in-person events related to Pollinator Week. In addition, a local conservation group, extension office or municipal office may be able to tell you about events happening year-round.

If you already have a good understanding of native pollinator's needs, share your knowledge with family, friends and colleagues or consider participating in a **Master Gardener program** that will teach you to you train others in your community on supporting pollinators.

Given the critical role native bees and other pollinators play in global biodiversity and our economic systems, immediate and widespread action is needed. Luckily, there are many ways that anyone can contribute to pollinator recovery. To learn more about companies that have started successful pollinator conservation projects, or for inspiration on starting a pollinator garden in your yard or at your workplace, visit **https://www.wildlifehc.org/pollinators**.

Common Eastern bumble bee – *Bombus impatiens*

Student bees

Planning and Planting Your Pollinator Garden

Alyssum Flowers

Hydrangea Blooms!

A garden should have a mixture of annuals, perennials and woody ornamentals to provide seasonal interest, height and structure. Adding a few bushes or even a small tree will enhance the garden's dimension as well as create habitat and protection for small birds, or butterflies that need to escape a sudden downpour. One lovely addition could be a hydrangea! Two species that are especially attractive to pollinators are *Hydrangea paniculata* (panicle) and *H. anomala* (lace cap).

Panicle or Peegee hydrangeas are a favorite in the landscape due to their dependable Winter hardiness, versatile multi-stem habit and graceful arching branches. Depending upon the variety, it can grow from three to eight feet tall and spread about the same. Plant it for privacy, as a hedge, or a focal point in the garden. From July through September, each branch ends in panicles of lacey white petals. As temperatures drop in the Fall, the petals fade to creamy yellow or pink while the leaves turn bronze-yellow.

Another reason that the panicle hydrangea is popular is that it is drought tolerant and can grow in a range of soil textures. It can be planted in Zones four to eight and grows well in the shade but can take partial sun as well. Prune this species in the zfall as the flower buds develop on Spring growth. Very few pests or diseases affect this plant, yet it fits into many landscape spaces.

The climbing or lace cap hydrangea is a strong climber that can be grown on gazebos, arbors, or even brick walls. In its native range of the Himalayas, China, this deciduous climber can reach 60 feet, but is usually maintained at six to 10 feet. Grown without a tall support, it will form mounds and spread laterally. It climbs with twining branches as well as aerial rootlets that are visually appealing. The bark is reddish and sheds strips of red colored bark (exfoliating) which is stunning in the Winter. Fragrant, creamy white flowers appear in early Summer and last for several weeks in shade or partial sun. In late Fall the glossy green leaves eventually turn yellow, adding to seasonal beauty.

It is also Winter hardy to Zone four but although it will grow in clay soil, it prefers a loamy, well drained soil texture. Climbing hydrangea requires strong support to keep it upright. It is mostly pest and disease free but is harder to establish than other hydrangea species. Despite some drawbacks it is an outstanding addition to a landscape and will attract many pollinators.

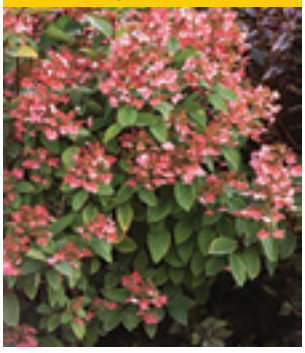
References

https://plants.ces.ncsu.edu/plants/hydrangea-paniculata/

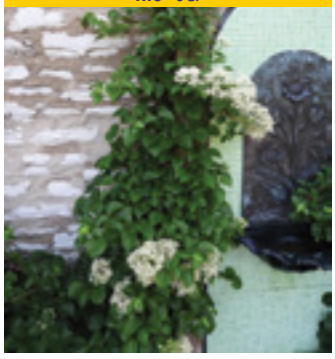
https://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=274441

https://landscapeplants.oregonstate.edu/plants/hydrangea-anomala-var-petiolaris

H. paniculata "Quick Fire" **https://www.monrovia.com/quick-fire-174-hardy-hydrangea.html**



Hydrangea anomala **https://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=286935&ispro-file=0&**



H. paniculata "Little Lime." **https://www.monrovia.com/little-lime-174-hardy-hydrangea.html**

"Bobo" Hydrangea paniculate grown at A.I. Root Company **https://www.whiteflowerfarm.com/63157-product.html**

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Kim Skyrm: Chief Inspector of Maine Department of Agriculture

Barbara Bloetscher: Ohio Department of Agriculture State Entomologist/Apiarist

Joan Gunter: Past president of ABF, Commercial Beekeeper

Anne Marie Fauvel: Bee Informed Partnership (BIP)

Tracy Farone: Professor of Biology at Grove City College in Pennsylvania

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Jackie Park Burris: Jackie Park-Burris Queens, Inc.

Julianne Grose: Associate Professor in the Department of Microbiology and Molecular Biology at BYU

Dorothy Pelanda: Director of the Ohio Department of Agriculture*

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Each speaker will give two talks. One will be on their journey in beekeeping up until where they are now. The other will be on what they are doing now within the bee field.

**Dorothy Pelanda, as the keynote speaker, will only give one talk.*

ROOT

A PACKAGE BEE QUEEN

A novel experience that only adds to my indecision

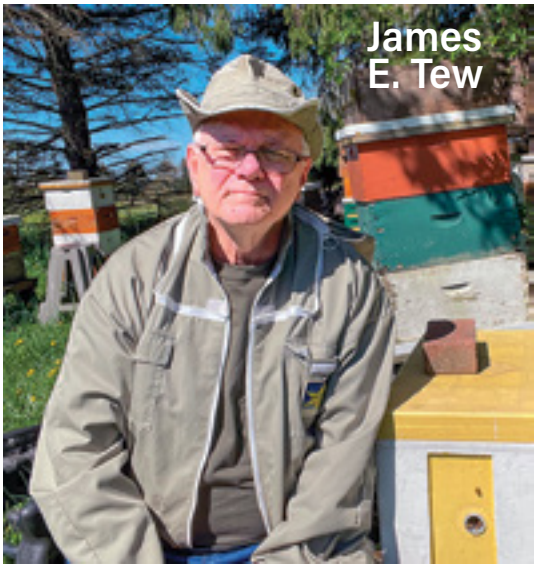
Any time and no time

Any time and *no time* are both common times to write about adventures with package bees. Packages must be ordered months in advance. So, I should write about package bees in December? Right? No, that seems early. Well, maybe I should write about them in late April when they ***are*** already here. Such an article would seem to be too late to be much help then. The packages are already out in the garage and *"all systems are a go."* So, apparently the best time to write and discuss package issues is just after the releasing event has happened? It is generally too late to get packages now, so writing about installing them at this point seems like yesterday's news. But that's what I'm writing about here. Maybe that's why my comments feel a bit like *"leftovers."*

First and foremost – package queens

The queen is every bit as important as the package bees to the new beekeeper. Those of us who are older in beekeeping and have other colonies and some extra equipment can possibly recover from package mishaps, but new beekeepers, starting a new package colony, absolutely must have both *bees* and a *living queen*.

It's a quiet fact. A dead package queen is a true headache – for any beekeeper. You will need to decide just how large of a headache is at hand. If you bought at least two packages, your headache may only be an inconvenience. Most likely, after combining with your other package, you're about to have a six-pound package swarm with a new queen to head it. Within just a few weeks, that double colony's population will explode. So, in just a short time, you can split it back into two colonies. One would hope that, by then and without much fanfare, you have procured a new (living) replacement queen.



For those of you who only bought one package, and the package supplier is maybe something like forty miles away – that's going to be a bigger headache. Indeed, even if you can make the trip, does the supplier even have any extra queens? The immediate problem for the queenless package bees is that they will drift toward developing a laying worker problem if a frame of open brood – at least – is not provided to them within, maybe, five days or so.

In this situation, the confusion lurks in the details. What to do with this new swarm package that has no queen? You have three choices: (1) Get a queen from somewhere, (2) Get some open brood – from somewhere – into the queenless colony, or (3) Combine the queenless bees with a queenright colony. There is a fourth option, but it is distasteful and does not have a happy ending.

But in this article, this is one point where I want to get to… *"What if I have a queen that is alive and accepted within the new colony but is producing a disappointing brood nest population?"* I am not trying to convince you that I am a package bee-installing-marvel, but in my bee life, I have had the opportunity to install a lot of packages. I have found that, in a strange way, a dead queen – or maybe a queen that just flies away when you release her from the shipping cage – or maybe a queen I accidentally crushed in the colony – is an easier problem than having a marginal functioning queen that is established within the colony.

If your package has no queen – simple problem – you must get another queen or combine the colony with another. But if the colony has a marginal queen on the job, what then? *"Well, I'll give her more time."* And then a bit later, *"Well, I will give her even more time."* Yet, all the while, the Spring season is passing. Just like a natural swarm, this colony, headed by a marginal queen, needs to build up population and gather honey stores. Only you, the beekeeper, can decide when enough is enough with a marginal queen. I can tell you that it will be a very uncertain call.

Figure 1. Does she look like a poor queen to you?

Briefly explained, what is a marginal queen?

No matter where she is, a marginal queen is one that is not getting the job done or only barely getting the job done. A productive queen in the early Spring should have brood frames everywhere – full, organized frames of developing rather than (mostly) full frames of brood. My *marginal* queen had spotty patterns about the size of my hand that were haphazardly positioned here and there. Also, she was producing some drones. Not too many, but why produce drones at all if there is a paucity of workers being produced. Her output was not good, and her brood balance was off. I kept telling myself, *"I need to replace this queen."*

So, ask me, *"Jim, why did you not replace her?"* Reason #1 – getting a replacement queen is just as contorted a process as I described above. I

Figure 2. A nice looking queen with an unexciting Springtime brood pattern.

kept thinking I would, but I just never made the trip. Reason #2 – and ironically probably more important than Reason #1, I need to write here that she was a gorgeous queen. She was regal, and calm on the comb, and was endowed with a fully formed large, orange abdomen. Though her brood output was marginal, her personal appearance was superb. If nothing else, she was photogenic.

Figure 3. This is a photo of what I wanted the brood pattern to look like.

All queens are not great queens

When talking or writing about queens, I have frequently admonished others to consider that fact – all queens are not great queens. Some of our queens will just be average – or even below average. I had that adage in mind as I kept justifying why I didn't do something with this underpowered queen.

Time passed. I was distracted by other events in life. Somewhere during the Summer months of 2021, I had a quick look to see if the lagging colony had any hope of surviving the upcoming Winter. Upon looking in the colony, I did not expect to find this. During my absence, and for whatever reason, the underperforming queen had come into her own. She had brood everywhere and her slovenly brood pattern had improved to the point of perfection. For me, it was a very pleasant surprise. I'm the guy who always writes articles about the things that go wrong. I had every intention of replacing this queen and – for whatever reason – I just didn't. *No matter. This colony will die in the Winter. It seems that they always do. So, Jim, don't get too excited.*

The Winter season of 2021

My Ohio Winter of 2021-2022 was typical as was my bee colony die-off. I generally lose about forty percent of my wintering colonies. As Winter ended, I was amused to note that one of my survivor colonies was the one that had the dubious queen from the previous Spring.

Pessimistically, I told myself that this colony was not home yet – but it had made it much longer than I expected. I just could not let myself bond with this unusual colony. But it kept living and living. The Spring turned very cold again. *"Well, there goes that colony."* As the weather warmed, I had a look, and it was still alive. This package colony had surprised me, surprised me again and then again, all from a queen I meant to replace.

The Spring season of 2022

If you are still reading, you know where this ramble must be going. The Spring season had clearly arrived, and this colony could safely be said to have survived the previous Winter when others had not. The little queen that barely could, had just kept going and going.

True story – as I stood there watching the intensive activity coming from this colony, a large swarm began to take flight. At first, I just thought the activity was intensive play flights, but it quickly became clear that this was a 1:00 pm swarm departing. *"Well, there goes my special queen,"* I mused.

The activity from a swarm always unnerves me. Neighbors and the community in general watch me as I watch the bees. I am not in control of this situation. I fully expected the swarm to "pitch" high off the ground and taunt me for days. Nope. After a short hour, the whole gang returned to the parent hive. I had been given a reprieve, and I immediately cleared my calendar for the next morning. This colony was definitely going to swarm again.

From one, now four

Swarm control – this was what I had written about last year when I droned on and on about my plans for keeping smaller colonies. I lived with the indignity of writing for you that I would need to accept lost swarms from my downsized colonies. Now the swarming was happening from a colony headed by a queen that I meant to replace – a colony that I thought would have been long dead. I just could not stand by as this swarm happened.

The next day at mid-morning, I was on the job, veiled up with smoker fully fired. I was brutal. I divided that colony down to nothing. The parent colony was in two deeps. Swarm cells were common. Try as I might, many ripe cells were destroyed as I pulled brood frames from the hive.

I made three five frame splits. Each split got three to four frames of brood, and I made certain that each split got some of the ripe swarm cells[1]. I left the parent colony with a single paltry frame of capped brood. That downsizing must have been a shock for that prosperous colony.

[1]Yes, I am aware that using swarm cells for producing queen, propagates swarming in my future colonies. I guess I am thinking that I will deal with that when I must. The cells are free, and, importantly, I have them, so I shamelessly used them.

Figure 4. The splits taken from the parent colony.

And yet… There's more

I returned about an hour later to see how things were settling. For the most part, the nucs looked pretty good. Hmmm, they were showing some flight activity. *Bee Culture* readers who have done this craft for a while would know that most of those active bees will fly back to the parent colony. The nucs would be left with young bees and even younger bees that hatched from capped brood left in the split. Few surprises on this part of the saga but wait – there's more.

A small clump of bees

The parent colony was reasonably agitated. Why would it not be? I had just divided it into obliteration. But still, it was acting too odd. I don't have the words to describe the odd feeling. It was just a vibe.

Figure 5. The remnants of the small cluster that had been covering the queen.

As I neared the colony, there was a *golf-ball* sized clump of bees about three feet from the colony on a low bush. Yep, the queen was right in the middle of that little bee clump. Go ahead – ask. I have no idea why she was out. Did I bump her from the frames as I pulled them out? Possibly? Being "*swarmy*," did she fly from the frames as I removed them? Possibly. Was she out already when I started the process? Possibly, but that is not my option of choice. Readers, bottom line, *I don't know why she was out of the parent colony.*

Experienced beekeepers have these moments, too. I grabbed the queen before she took off (*hence no photos of her in the small cluster).* Then with my non-dominant hand doing all the clumsy work while gently holding the queen in the other, I dashed to my barn to try to find a cage. I caged her and put her back into the colony.

Why cage her?

If she was the queen from that colony, why cage her? It was unusual to find the queen outside the colony. I have already admitted that I don't have a precise answer to that specific question. While it appeared to be the same queen, but *"what if?"* At that instant, I relived the following memory.

I had been keeping bees for exactly one year. Everything beekeeping was new and exhilarating. I loved the craft. Every day – as soon as I could finish my student employment work – I dashed to the edge of town to my bee yard.

On one afternoon in question, I arrived to find a nice swarm hanging from a sagging tree limb just above one of my three colonies. I had no equipment, and I had no experience. I had nothing. Not wanting to lose the swarm, I made the decision to clip the limb and shake the swarm directly back into the colony from whence it came. Except "whence" it had not come from that colony. Readers, I put a three pound swarm directly into another colony. I opened that unsuspecting colony and just shook the swarm in. To this day, the bee fight I caused remains one of my largest. I had no smoke. I had no way to stop the carnage. It was brutal. My mismanagement killed a lot of bees that day.

That, Bee Culture *readers, is why I caged the queen. I was just being careful. From all indications, she came from that colony… but just in case, I caged her. Three days later, I released her.*

At this point…

Right now, I have the potential of having four colonies from a queen that I meant to replace. My experience with this queen will only add to my confusion and indecision when I make future queen-replacement decisions. Obviously, this queen proves that sometimes a marginal queen needs another chance. But when and for how long?

Isn't that some of the enjoyment of beekeeping? Just doing the best you can. Best guesses. Trying to win more than you lose. I hesitated when I thought the queen needed replacing. I was there when the colony swarmed. I made the colony splits. I noticed the ball of bees around the outside queen. In this situation, I did more right than wrong. *Good job, Jim.* For now, this story has a happy ending. I truly appreciate you reading my pieces. Thank you.

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Weekly podcast at: **www.honeybeeobscura.com**

Apple Cinnamon Bread

Shana Archibald

Ingredients

- ☐ 1 cup honey
- ☐ 4 cups all-purpose flour
- ☐ 2 tablespoons baking powder
- ☐ 1 teaspoon salt
- ☐ 1 tablespoon cinnamon
- ☐ 2 eggs
- ☐ 2 cups milk
- ☐ ⅔ cup vegetable oil
- ☐ 1 large apple peeled and diced

Directions

Step 1
Preheat oven to 350°F.

Step 2
Combine flour, baking powder and salt. Set aside.

Step 3
Beat honey, eggs, milk and oil until combined.

Step 4
Gradually add dry mixture to wet until moist.

Step 5
Add apple and cinnamon.

Step 6
Grease baking dishes and pour mixture an inch below the top to compensate for rise.

Step 7
Combine cinnamon and sugar.

Step 8
Sprinkle a mixture of cinnamon and sugar onto each loaf and swirl in with a knife.

Step 9
Bake 40-50 minutes or until a toothpick comes out clean.

CALENDAR

♦ALABAMA♦

Alabama Master Beekeepers Program will be holding their 2022 program on July 28 - 30 at the Clanton Conference and Performing Arts Center.

Please visit their website **www.alabamamasterbeekeepers.com** for more details about the program.

♦NEW YORK♦

EAS is having their 2022 Conference *Beeing Social, Again* at Ithaca College in Ithaca, NY on August 1-5.

A short course will be offered from Monday to Wednesday. The main conference will be Wednesday through Friday. A roster of excellent speakers is being assembled including Dr. Tom Seeley, Mike Palmer, and Dr. Dave Tarpy.

Details will be forthcoming on the Conference Page of the EAS Website: **easternapiculture.org**

♦PENNSYLVANIA♦

Introduction to Beekeeping has been lengthened by popular demand from one weekend to two, spanning July 16-17 and 23-24 from 9am-4pm.

Topics include honey bee biology and behavior, building an apiary and harvesting honey, apiary equipment and supplies, and management practices for each season.

This course is taught by Master Beekeeper Vincent J. Aloyo, PhD. It will be held at Delaware Valley University in Doylestown, PA.

For more information or to register, see: **http://vincemasterbeekeeper.com/courses/**

♦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.

Registration opens in August.

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

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Image Contest - Splitting Colonies

We've started an image gallery! This month, we want to see any and all pictures you have of **Splitting Colonies**. 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.

How To Submit:

Email your images to **Emma@BeeCulture.com**
Use the subject "**Image Gallery**"
Please include in your email:
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- 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.

It's a snowy 3 a.m. on May 4 here in western Colorado. Can't sleep. My head is filled with honey bee dreams, the worrying kind.

I had something of a bad day with the bees yesterday in Palisade. At one location all was well. But at the other my 16 colonies looked pathetic. They were making honey two weeks ago, when I pulled nucs from the strong ones. Yesterday nearly all of them had a severely diminished numbers of bees. Most had ample food stores, but they'd made little if any new honey. Some of the brood looked spotty. I did sugar shake tests on four colonies and couldn't find a *Varroa* mite.

There were no dead bees on the ground outside the hive entrances, but I suspected pesticides nonetheless.

I hauled these bees 65 miles down the road to Palisade in late March for the apricots and plums and sweet cherries. Palisade is famous for its peaches, but most varieties are self-fertile and don't require a pollinator. I used to have four pollination customers in the vicinity, but one in nearby Grand Junction lost his cherry trees to a freak October 2020 freeze. The mercury dropped to single digits while the trees were still in full leaf. By Spring, they were mostly dead. So he doesn't need my bees anymore.

A gentleman who's hired me for 20 years for apricots called at the last minute to cancel. The blossoms came five days sooner than he had predicted. He did warn me to come early, just in case, but I couldn't make it. There were only two days of full bloom combined with good bee weather before weather moved in, and I missed it. *Mea culpa!* Fortunately for the grower, there were 200 commercial colonies a couple of miles down the road. So he'll probably do all right.

What I've done before is fetch my Palisade bees as soon as the bloom is finished, so as to avoid the pesticide applications that begin in earnest at peach petal-fall, when dandelions are still in bloom. A commercial guy told me years ago that his Palisade bees "just don't build up right," and he blamed insecticides. I took this to heart. "Get 'em in, get 'em out!" has been my strategy ever since, until now. They'd spend three weeks or so in the orchards and usually come home stronger than I sent them.

But this year I talked to another migratory beekeeper, who also drops off bees to Palisade in the Spring on their way home from the California almonds. He sometimes leaves them deep into May, until the dandelions raise their golden heads on their Summer pastures on higher ground. He said he had pretty good luck doing that.

You see, here in Colorado, climate is elevation-sensitive. As you go higher, it's like heading north. Dandelions bloom in Palisade at 4700 feet in early to mid-April. As you come up the Colorado River and Roaring Fork valleys, they flower in New Castle at 5500 feet in late April, then in early May in Carbondale at 6200 feet, finally reaching Aspen at 7900 feet in late May and heading up into the high mountain valleys in June. If things go just right, I can give my bees two or even three helpings of their favorite Spring flowers, as I move the little darlings to higher ground.

I had a choice with my 20 hives in Palisade. I could pull them in April while the dandelions were still in full bloom – like I always have – or I could take my chances with the spraying and leave them be until an opportune moment to move them to a Summer yard at higher elevation. I opted for the latter and evidently paid the price.

For beekeepers, the prudent path isn't always obvious. Pesticides can be harmful, sure, but so can starvation. I try to never move bees if they're making honey. Cool Spring weather or wind or rain or snow will shut off a honey flow, and if bees fail to make honey on dandelions, they can eat up all their honey. Of course I can feed them sugar or corn syrup, but I hate to do it. It costs time and money, and it gets my fingers all sticky.

On my way home from Palisade, as I came down off East Orchard Mesa, on an impulse I took the meandering road through the Vinelands that runs close to the Colorado River and roughly parallels U.S. Highway 6. Spring frost is always problematic for Palisade growers, but the Vinelands are considered a choice location, since downstream winds coming out of Debeque Canyon can blow out the cold air that naturally collects along the river bottom.

I was driving along minding my own business when I took a wrong turn. Suddenly the road ended, and I found myself heading into somebody's driveway. A crudely painted sign read, "If your G.P.S. got you here, my G.U.N. will make you leave!" This didn't strike me as very neighborly, but I was more than anxious to oblige.

OK, it's still 3 a.m., but it's a different morning. I just don't sleep in the wee hours anymore. I got a hot report on the dandelions at a yard up the road. I just need to re-build the solar-electric bear fence before I haul those sick Palisade bees up there.

I can't prove they got hit by pesticides, but I do know one thing: If they don't make it, it'll be my fault.

Ed Colby

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