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January Features . . .

- | | |
|--|---|
| MINDING YOUR BEES AND CUES 28
<i>Resolutions and resources for your bees.</i>
Becky Masterman and Bridget Mendel | BEATRICE KAMAU 52
<i>A.W.I.B. African women in beekeeping.</i>
Beatrice Kamau |
| THE A.I. ROOT POLLINATOR GARDEN 30
<i>Liatris for all!</i>
Alyssum Flowers | 2 MILLION BLOSSOMS 56
<i>The journey.</i>
Kirsten Traynor |
| KENTUCKY APIARY INSPECTOR 33
<i>What's going on in Kentucky?</i>
Tammy Horn Potter | BUILD A SYRUP DISPENSER 64
<i>Put the quart pitcher away.</i>
Ed Simon |
| HIVE ZEN MASTER 36
<i>Come into the beeyard.</i>
John Miller | A HONEY BEE DRIVEN MID-LIFE CRISIS 66
<i>Part of life's journey.</i>
Jim Masucci |
| BVT HONEY BEE DELIVERY SYSTEM 41
<i>Better than sprays.</i>
Ian Collinson | GOUACHE PAINT 68
<i>The mixture includes honey.</i>
Alice Eckles |
| THE LATEST BUZZ ON USDA POLLINATOR EFFORTS 44
<i>USDA exists to ensure Americans have access to healthy food.</i>
Scott Hutchins & Elizabeth Hill | ALL ABOUT THE QUEEN, PART III 74
<i>Old queens and laying workers.</i>
Tina Sebestyen |
| THE BEEHIVES THAT DON'T HOLD BEES, PART 1 48
<i>There are all kinds of 'beehives.'</i>
Jim Thompson | MAYAN AND MELIPONA BEE LOVE AFFAIR, PART 1 77
<i>This tiny bee is exalted and revered by the Mayans.</i>
Bel Woodhouse |
| | BEEKEEPING CAN BE A PAIN 79
<i>. . . in the shoulder.</i>
Scott Hotaling |

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*It's Winter
in northeast
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(Hayes photo)*



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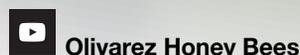


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FOUND IN TRANSLATION 24

Over-sharing by honey bees.
Jay Evans

NEW FOR YOU 26

Rayonier new web page; CIVAN Extractor; ApisProtect hive monitoring.

NEW WINTER READING 27

Bee Hive to Beekeeper, Bees, Beekeeping Organizations, Authors and Research; .

BEE VET 34

What Vets can do for beekeepers. Part 2

Tracy Farone

A CLOSER LOOK – COLONY STRESS 37

Most organisms are constantly faced with environmental changes and stress.
Clarence Collison

THE NUC BUSINESS 59

From start . . . to finish.
Jennifer Berry

PREVENTING WAX MOTH DAMAGE 71

It's all on you!
Ross Conrad

BLOOM WHERE YOU ARE PLANTED 83

Winter blooming plants in California.
Connie Krochmal

BIGGER PICTURE 87

Never underestimate the power of beekeeping.
Jessica Louque

PROCESSING HONEY IS NOT KEEPING BEES 89

Honey extracting is a sticky aspect of bee husbandry.
James E. Tew

BOTTOM BOARD 96

A well behaved bear.
Ed Colby

In our November issue we published an article titled 'Healing Wounds!' The article was actually written by Dr. Japa Volchok. Below is a bit about the doctor.

Dr. Japa Volchok DO is a General and Vascular Surgeon and the VP Operations at Vohra Wound Physicians. Dr. Volchok trained in General Surgery at Berkshire Medical Center, a University of MA Affiliate. After residency, Dr. Volchok pursued vascular surgery training at Eastern VA Medical School in Norfolk, VA. His vascular surgery training provided a strong base in wound care and the management of wound comorbidities which later led him to work with Vohra Wound Physicians as a physician in long-term care.

Dr. Volchok has trained and certified in healthcare compliance and completed an executive management program at the Harvard Business School. He has published and presented nationally on a variety of topics.

In Every Month –

Honeycomb Hannah 9

What's going on in the hive.

Mailbox 10

From The Editor – 14

Honey Market Report 16

Managing Varroa and changing.

Next Month 17

What should you be doing?

It's Summers Time! 19

Happy New Year.

All Around The Beeyard 31

Tips from other beekeepers.

Calendar 94

HONEYCOMB HANNAH

By John Martin



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Ignorance+Bravery = A Knucklehead Moment

Spring of 2019 within the 7:00 a.m. hour, I was outside of my dormitory admiring the thriving rose blooms (red, pink, yellow) and enjoying the pleasant aroma of the Rosemary.

Suddenly I noticed a wasp nest with about 10 wasps attached to a rose bush. I decided to take a closer look at each plant and I found two more nests. One was about the same size of the first. The Rosemary had a big nest with about 20 wasps on it.

Out of *ignorance* I thought of wasps to be major enemies of the ladies! I thought, 'I've got to get rid of them!' *Bravery* kicks in. I got a big cup of hot water. I dash the nest with the hot water and all the wasps fell to the ground. Then I disattached the nest with my hand.

I thought "That was easy?" I go get another big cup of hot water and did the same as the first. No

Problem! Now the big nest inside of the Rosemary. *Knucklehead Moment*: I get another big cup of hot water and dashed the big nest. It worked, the nest was empty! So I reached inside to disattach the nest and Bam, Bam, Bam! Three on my hand and two on my lip! They were hidden within the bush!

I calmly went to the restroom to look in the mirror, hoping that it didn't look as bad as it felt. I look in the mirror and I looked like I got punched in the lip. My hand wasn't as puffy. I took six Ibuprofen.

I woke up my friend, Daniel. Seeing my big fat lip he asked, 'What happened to you?' I said, 'They got me!' Daniel thinking I got jumped asked, 'Who?' I told him. Daniel asked, 'Did it occur to you I would have liked to watch?' I said 'I got two out of three!' Daniel said, 'Go try again so I can watch.' I said, 'No I'm good.'

Since then I have left the wasps alone and observed the wasp closer with the ladies sharing the same flowers. I have not seen any fights between the two but I have seen them meet on the same flower and quickly buzz away.

Now I am continuing to learn more and more thanks to our great *Bee Culture Magazine*. In the May 2020 issue is a great article, *Friend or Foe* by Ann Harman, that taught me some great knowledge. Also the June 2020 issue has two great articles – *Not The Murder Hornet*, by Kathy Keatley Garvey and *Venom Allergy* by Ed Simon.

Much love to our *Bee Culture* family. Keep up the awesome work!

Mark Carruba
Elmore, AL

Tanging

To Jim Tew – I have followed your articles in *Bee Culture* for years and enjoy reading each one. I was pleased to meet you at the Western NY Honey Producers meeting a couple of years ago.

While talking with you I questioned the practice of pounding on pans and kettles to make a swarm of honey bees cluster and land. I mentioned that somewhere in my beekeeping library I read that European beekeepers would follow a swarm of bees while banging on pans and kettles until the bees landed and he could capture the swarm.

If the swarm landed on neighboring property and the neighbor was attempting to hive the swarm, the bees were given to the one following the swarm. The banging sound was to alert the neighbors that the original bee owner was following his swarm attempting to capture them and return them to his apiary.

Recently I stumbled across an old book called *Bee Hunting* by John Lockard, written in the 50s. He suggest that customs were that 'bee trees' were the property of the property owner. The swarm belonged to the original owner as long as he could identify them.

I'm hoping for a future article on this topic.

Walt Dahlgren
Jamestown, NY



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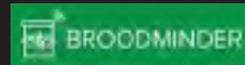
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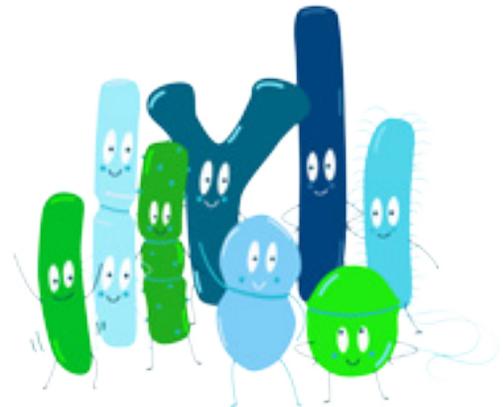


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*Peghaire et al., 2020. A *Pediococcus* strain to rescue honeybees by decreasing *Nosema ceranae*- and pesticide-induced adverse effects.

In this third part of my series on the Honey Bee Health Coalition, I'd like to walk through the tools and resources that the Coalition has developed for farmers and pesticide applicators and what we've done to try and mitigate effects from pesticide exposure. The next and final installment of this series will be on the work the Coalition is doing on Forage and Nutrition and something we call the Bee Integrated Demonstration Project.

As I mentioned previously, the Honey Bee Health Coalition's work is focused around the four Ps — pests and pathogens, pesticides, and poor forage and nutrition. You may know that the Coalition now involves about 50 organizations, companies and agencies including beekeepers, farmers, researchers, federal government, agribusinesses, conservation groups, and consumer brands. One of the founding ideas behind the Coalition was to bring together all these disparate voices that all have a role to play in improving bee health and start working together instead of separately or even in opposition. Since the Coalition doesn't have boots on the ground, we need to develop good information and rely on these 50 entities to connect the resources to those farmers and beekeepers who can make changes to improve bee health.

One of the first things the Pesticide Working Group did was discuss what a beekeeper should do if they suspect a pesticide-related bee kill incident. It turns out that the process is a little different in each state in terms of who one should call and the regulatory process that the call begins. The Coalition keeps the Incident Reporting Guide updated and it is a good resource for beekeepers that may suspect a pesticide-related acute kill has occurred.

Next, in 2016, the Coalition held a joint workshop with the EPA and NASDA — the National Association of State Conservation Districts — and invited state Department of Agriculture staff to help get them set up with an MP3 — a Managed Pollinator Protection Plan. These plans, mandated by the EPA, are meant to be

developed by every state and tribe to provide effective means of mitigating exposures to foliar applied pesticides at bloom. To date, almost every state has one and they are all slightly different depending on the needs and circumstances of the state.

We also began thinking about what growers and beekeepers need to know as bees are being put on or adjacent to ag lands. We created the Grower and Beekeeper Roles Flyers to serve as quick and handy guides to what to communicate to each other and when, what types of agreements to set up, and what to do if there is an incident or mishap. While a case of honey and a handshake



are still often the foundation of the relationship, there are some things to set up when bees are being placed on a farmer's land and these guides give both growers and beekeepers some good information.

The Coalition also has a number of crop associations as members.

These associations represent growers across the country who want information on how to protect bees while also having productive crops. To date, the Coalition has produced three Best Management Practice Guides; guides for corn, soybean, and canola growers. These guides follow the growing cycle from planting to harvest and identify the times within that cycle when bees are most at risk and how to mitigate that risk. They also go above this do-no-

harm ethic and discuss the benefits of planting forage on the farm and where to put it safely.

We also know that a lot of times, especially in larger operations, the farmer isn't the one applying the pesticide. The Coalition began digging into the pesticide issue further and found that information on what a farmer buys for what pest, when and how to apply it, and other parts of the puzzle comes from USDA extension, as well as crop consultants and applicators. Applicators and consultants must be certified at the state-level and keep certifications current by taking courses every three years. Like many industries, they do this by obtaining CEUs — Certified Education Units. The Coalition partnered with the National Pesticide Safety Education Center to create a bee-specific CEU that teaches certified crop consultants and certified pesticide applicators how to keep the bees safe while doing their jobs. The module is now being provided to these folks across the country.

While much work still needs to be done in reducing or eliminating pesticide exposure to bees, the Honey Bee Health Coalition will continue to be a conduit between growers and beekeepers at the national level. Truly it's one of the only places where these relationships are being made, trust fostered, and issues being actively worked on. As always, the tools and resources are all free and can be found on the Coalition website.

Jerry Hayes

Learn more at honeybeehealthcoalition.org

From The Editor —

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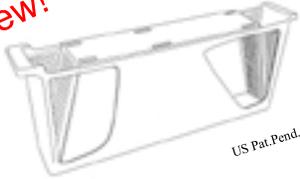
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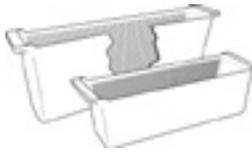


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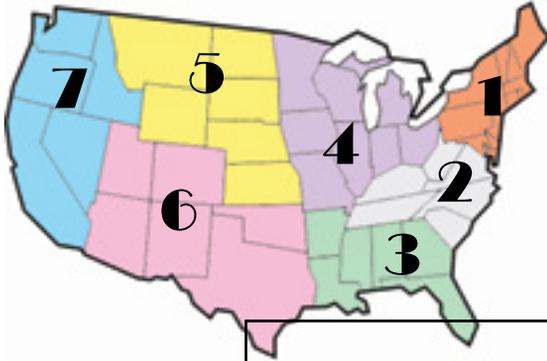
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60# Light (retail)	214.86	192.70	210.00	175.00	165.00	214.86	215.00	120.00-325.00	207.21	3.45	211.40	198.21
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1# 24/case	166.19	135.90	141.70	113.89	152.50	127.33	144.00	84.00-300.00	140.38	5.85	145.03	130.11
2# 12/case	142.33	110.20	125.08	102.12	111.84	114.00	132.00	72.00-246.00	125.67	5.24	129.29	119.88
12.oz. Plas. 24/cs	111.42	110.50	109.99	90.80	83.76	101.40	114.00	66.00-172.80	103.44	5.75	108.96	99.56
5# 6/case	153.95	116.25	160.20	134.75	113.16	105.00	153.95	80.00-240.00	147.90	4.93	136.63	138.38
Quarts 12/case	180.22	169.42	132.70	125.29	185.04	155.70	183.00	95.00-300.00	162.94	4.53	160.80	153.61
Pints 12/case	99.93	104.20	75.00	85.91	139.00	108.00	96.00	60.00-140.00	99.86	5.55	104.61	93.58
RETAIL SHELF PRICES												
1/2#	5.88	5.32	4.94	5.50	3.80	5.88	5.88	3.50-9.00	5.51	11.02	5.35	5.23
12 oz. Plastic	7.26	6.75	6.50	6.11	5.10	5.96	5.70	3.79-12.00	6.62	8.83	6.54	6.17
1# Glass/Plastic	9.69	7.94	8.88	7.11	8.48	7.82	8.33	4.79-17.00	8.48	8.48	8.56	8.33
2# Glass/Plastic	15.19	13.10	15.50	11.68	13.90	11.53	15.00	6.59-25.00	14.59	7.29	14.36	14.40
Pint	11.14	11.95	9.30	10.00	15.00	9.65	9.60	6.00-16.00	11.29	7.52	11.44	11.00
Quart	19.59	19.84	17.45	16.25	21.13	15.67	19.30	9.25-32.00	18.56	6.19	19.06	18.72
5# Glass/Plastic	35.92	28.94	38.00	26.50	28.10	33.00	35.92	17.99-62.00	31.85	6.37	29.63	29.68
1# Cream	11.96	8.45	20.00	10.10	7.50	11.96	14.00	6.00-20.00	10.92	10.92	10.86	10.88
1# Cut Comb	14.49	14.57	14.49	13.87	15.00	14.49	14.49	6.00-24.00	13.99	13.99	13.89	12.98
Ross Round	11.86	7.13	11.86	15.00	11.86	11.86	13.75	7.00-17.00	11.73	15.64	11.15	11.21
Wholesale Wax (Lt)	7.20	5.92	5.00	6.53	7.20	6.33	7.75	3.00-12.00	6.91	-	7.50	6.66
Wholesale Wax (Dk)	5.28	5.08	3.78	4.75	6.00	2.75	5.28	2.00-9.00	5.06	-	5.79	5.79
Pollination Fee/Col.	105.54	66.67	65.00	91.67	105.54	105.54	125.00	35.00-200.00	93.57	-	87.68	91.56

Survey For 2021 Success

1) What is your step by step plan to manage *Varroa* in 2021?

Region 1

- Monitor *Varroa* with alcohol wash, sampling every six to eight weeks
- Split for break in brood cycle
- No more than 25 colonies in a yard
- Treat when *Varroa* reaches three or more mites per 100 bees in alcohol wash
- Breed from Winter survivor colonies
- Use screen bottom boards as part of IPM
- Powder sugar dust weekly
- Follow HBHC 'Tools for *Varroa* Management Guide'.

Region 2

- Treat after Honey supers removed in July and again in November.
- Treat in early Spring before honey flow and after late flow in early Fall
- Use OA in January during Broodless period for best OA results and no colony damage
- Alcohol mite wash sampling every eight weeks.
- I don't sample, I just treat and cross my fingers
- Formic Acid strips once in spring and once in Fall
- Treatment free management. Let Darwin figure it out. Buy more packages

Region 3

- Do more alcohol wash sampling/monitoring
- Be more timely after sampling with treatments
- Use ApiGuard first as it causes less

- damage to bees.
- Treat in Spring and Fall
- Fog with mineral oil and spearmint

Region 4

- Limit hives in a yard. The more in a yard they more they share mites.
- Use two to three different mite treatments in a year to stop resistance.
- Sample after treatment to see if treatment actually worked. If not pick another treatment.
- Brood break and splits help
- Use OA dribble in late Winter one time. Vaporization is too hard on hives
- Alcohol wash every 30 days March thru October

Region 5

- Sample more often using alcohol wash than I did in 2020
- OA dribble in April and November

Region 6

- Formic Pro in Winter, splits in April
- Sample for mites, alcohol wash in early Spring
- Treat if mite counts are above 3-4 per hundred bees.

Region 7

- Restock Deadouts with splits from survivor colonies
- OA dribble in January
- Sample and treat as mite counts shows in August
- Sample, Treat, Sample again to see if it worked
- Use VSH Queens for splits and requeening
- Mite count every 30 days from April through Sept.

- Requeen with VSH Queens to get mite counts to one or less per 100 bees

2) If you could change one thing in your individual beekeeping world, what would it be in 2021?

Region 1

- Palletized hives
- Warm Winter
- Stay small
- More time to manage
- Stop farmers from using pesticides
- Control mites smarter and better
- More than 24 hours in a day
- Downsize
- Keep others away from my yards
- Be more profitable so I could expand
- Have local beekeepers value honey more and raise prices
- Less *Varroa*

Region 2

- How are International Beekeepers handling same problems we have?
- Better control of swarming
- Change perception of value of honey bees as pollinators
- Stop suburban sprawl
- Get rid of *Varroa*
- More hours in a day
- More nectar
- Good Queen prices lower
- Lower beekeeping expenses
- If I had more time I could make more money at beekeeping

Region 3

- Whatever I say won't happen. Just hang in there
- No more HURRICANES!!
- Put hives on pallets

- Impose tariffs on fake Chinese honey
- Get rid of two medium brood chamber and go to 1 deep brood chamber

Region 4

- Have beeyards not close to pesticide contaminated fields
- Build a detached honey house
- *Varroa* disappear and forge improve
- Eliminate adulterated honey from Asia.
- Build horizontal hives
- Less pesticides and more forage.
- Raise honey prices

Region 5

- More bees, more time, more time, more bees
- Make extracting process more streamlined
- Buy queens that will last more than nine months
- Find a better, faster, cheaper way to treat for *Varroa*.

Region 6

- Find a smart, experienced mentor
- Joined State organization but got more help locally
- Less pesticide use in the environment
- Find dependable local help as business grows
- Re-Queen to get rid of nasty African Bees

Region 7

- Stop competitive beekeeper honey price cutting
- Less Winter
- Split hives, don't buy packages, raise queens
- Better *Varroa* controls

NEXT MONTH

Region 1

- Make sure electric fence is working
- If a break in the weather do alcohol mite wash.
- Sleep in
- Treat with OA dribble
- Build new equipment
- All my bees died in October
- Feed bees as needed
- Be sure hive wraps are in place
- Fondant in all hives
- Check upper ventilation
- Move South
- Read *Bee Culture* magazine
- Order Queens

Region 2

- Build new frames, insert foundation
- Check hive weight. Feed if necessary
- Clear entrances of dead bees
- Sample for mites
- Check wind blocks
- Cross fingers
- Feed, feed, feed

Region 3

- Check hive weight
- Assemble equipment
- Feed
- Sample for mites
- Feed Sugar Syrup
- Repair equipment

Region 4

- Do they have enough food stores?
- Sample and treat if weather allows
- OA dribble if weather cooperates
- Build horizontal hives
- Nothing – Bees are in California
- Repair equipment
- Check Wind breaks

Region 5

- Pray
- Check entrances for clogging with dead bees or snow
- Food reserves
- Make sure Winter wraps are secure

Region 6

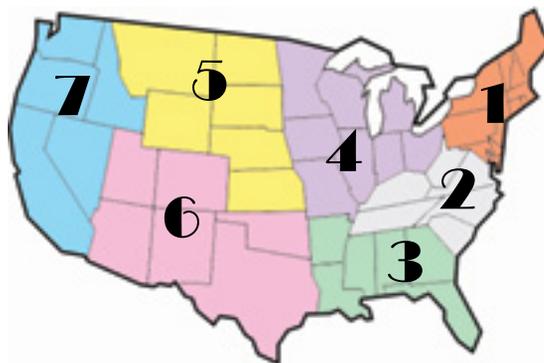
- Sample for mites
- Check food stores
- Clean old equipment
- Clean out entrances
- Hope COVID goes away
- Sample for mites and treat.

Region 7

- Check food stores weather permitting
- Sample and treat for mites per *Tools for Varroa Management Guide*'.
- Gear up for almond pollination
- Check hive weights. Feed if needed.
- If you prepared correctly – Leave Them alone!

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It's Summers Time -

Happy New Year!

I know we're all looking forward to the New Year - but my mother used to say 'Be careful what you wish for!' But we're going to be hopeful, right? We beekeepers are a sturdy lot and we know what uncertainty is like. Every year we go into Winter hoping that we did everything we were supposed to do, hoping our bees - at least some of them will still be alive come April.

It's easy to get caught up in what we missed out on this year and feel sad about it. And sometimes you just need a day to sit and be sad and then get up and move on. I'm sure that our lists of things we missed in 2020 would be very similar. I'd have to say that hugs were at or near the top of my list. My friends and family are a 'huggy' bunch of folks and that's been hard. Especially with our children.

I'm glad I don't have to deal with school and kids - that's been hard for folks. If you're one of them my heart goes out to you. I don't think I'd have the patience.

As far as the staying at home - I'm pretty okay with that. I can do 90% of my *Bee Culture* work from home. The pictures here are of my home work space. Thanks to Kim we have plants year round. In the Winter we almost always have something blooming. Sitting here I can look out and see the birds at the feeders and I have a tiny little squirrel friend that comes around once awhile. And then there's the old cat that will wonder in from her chair, just wanting to be petted for a minute. And when the weather's bad I don't have to drive in it. I go into the office once or twice a week, mostly so Jerry doesn't forget what I look like.

I've also become quite the online shopper. You can get almost everything you need online and have it show



up on your front porch. Kim has become pretty good friends with the UPS and FedEx folks. And even my grocery shopping has gotten more efficient. We only go about every three weeks, rather than randomly stopping by on the way home from work.

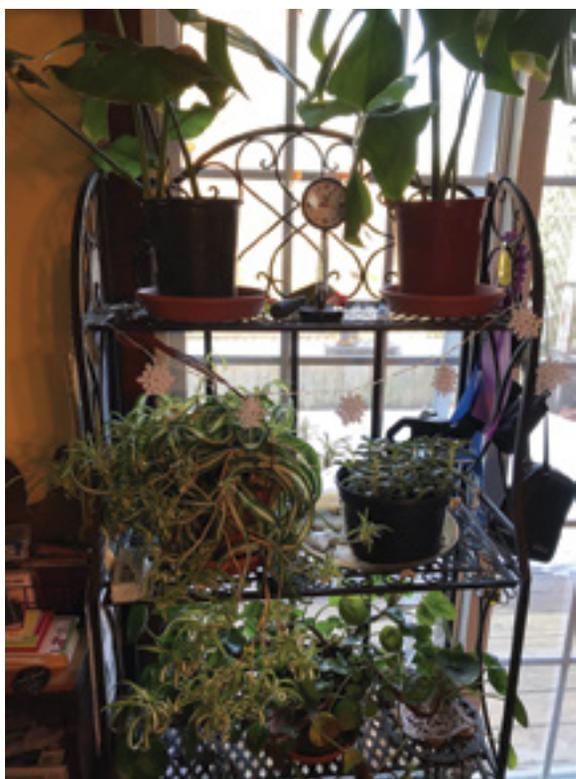
If you live up north like we do, the next three months are sometimes the hardest part of the year. Winter can really set in and the holidays are over and what do I do now. I'm always hoping to tackle some of the many books I've accumulated. I never have enough time to read everything I want. And now we've got another book for you to tackle. And it's a big one!

ABC & XYZ is finally done. As I write this it is scheduled to land on our loading dock tomorrow. It's been a challenge, but the 42nd edition is ready for you. Take a look at the ad on **page 92** of this issue and it will tell you how to order - online or send a check. We hope you enjoy it. It was definitely a *LABOR* of love for all of us involved.

Let's all keep a good thought about 2021. I hope we get to start having some bee meetings and that we get to see many of you that we haven't seen for over a year now.

Happy New Year. Blessings to you and your family. Keep in touch.

Stacy Summers



BEE TALK



Send us your questions, we'll find the answers. Our regulars and our guests will share what they know. Send your questions to Jerry@BeeCulture.com, with BEETALK in the subject line.

I just hope that these new beekeepers learn how to properly manage/treat their hives so as not to add to the mite numbers and the resulting weakness and impact on other hives. When I hear that places like Costco are selling equipment I worry that people think you can simply get a "good deal", set up a hive and become a beekeeper without any Edu. They will surely end up adding to the parasite/disease problems - so are these numbers misleading rather than encouraging? Without preparation in the way of Edu, they are doomed to fail. I've only kept bees for 11 years, learn new things every year, attend meetings, consult with more experienced keepers, and it is still challenging- keeping bees is really both science and art, and some luck. *Margot*

The majority of 'NEW' beekeepers are 55+ years old, the kids are grown, they sold the SUV, they read the Mother Earth News in the 1970s and now having some time want to save the world with honey bees. They want to be green and natural and never sample for *Varroa* or even look in the colony. Colonies die every year. They blame the farmer down the road for crop protection tools used and then buy packages or nucs every year. All the while importing mites from all over the country and facilitating *Varroa* bombs.

Am I gloomy or what? *Jerry*

Unfortunately, just realistic. Thanks again. *Margot*

Yellowjackets QUESTION

I have a beekeeping friend that called me and told me about his son in PA who is a hobby beekeeper as well having this experience. He looked at one of his colonies and couldn't see any honey bees coming in or out of a hive. He opened it up and it was full of yellowjackets. I have never heard of that before.

ANSWER (I went to someone smarter than I am about wasps, Dr. Jeff Harris) – Hmmmm. It depends on how frequently the beekeepers vis-

ited the bees from the time they last remember seeing a healthy colony and when the horde of yellowjackets was discovered. I earned money as a graduate student trapping paper wasps and yellowjackets for pharmaceutical companies trying to make anti-venom for wasp stings. I had discovered that nuc boxes (in particular) and those swarm traps made from the brown cartons that were used to pot large plants were attractive to wasps looking for a place to overwinter. Perhaps the remnant odors of honey bees attracted them, but if I put empty boxes or cartons out in wooded areas, I could get thousands of wasps to gather into just one container. On a cold day (less than 40°F), the wasps could not fly, and I could harvest them. I would store them in a refrigerator, offering water and a little bit of sugar syrup on a sponge. I could store them alive like this for months.

So, my point is that the wasps may not have killed the bees. They may be female wasps that sought to overwinter in the hive body. I am not sure why *Polistes* and Yellowjackets will overwinter in groups, but it was not unusual that several species could be found in a single trap. In my area, the red paper wasp (I think it is *P. annularis*) dominated. It kind of goes against the notion that mated females of these species with annual cycles tend to overwinter individually in hibernacula.

Now, if the Yellowjackets overran and killed a colony, that is something that I have never heard of before. Of course, I have seen Yellowjackets "rob" colonies and attack bee brood – but usually this happens in very weak colonies of honey bees.

Will My Bees Remember? QUESTION

I have an old 8'x8' chicken coop approx. 50' from where my two hives are now located. I plan on moving the hives into the coop when the temperature drops for the Winter. Each colony will have their own east facing door opening. This will become their permanent location. My question is: will the bees have forgotten the old hive location over the three or four months of a

Expansion Of Colonies In The U.S. QUESTION

Are the increased numbers of colonies in the U.S. due to new beekeepers starting new hives, or actual increases through natural growth and reproduction, as from experienced beekeepers splitting hives? Do you know if the percentages of *Varroa* mites are about the same? Thanks

Margot Monson

ANSWER – It is two things running in parallel. Commercial beekeepers splitting and dividing colonies more overall knowing that they will lose 30%+ each year so they build in extra inventory so they can meet pollination contracts and honey production volume. Then there is the new hobby/backyard beekeepers who add to the smaller number of colonies but increase the number of beekeepers.

Varroa mites are in 100% of colonies in North America. It all depends on how well the beekeeper manages the colonies to keep *varroa* numbers below three per 100 bees. This takes sampling consistently which many beekeepers are very poor at doing. *Jerry*

Wisconsin Winter, and not return to that old location in the Spring?

Ken Sikora

ANSWER – Remember than honey bees start clustering together when temp gets about 57°F. And if you bounce and bump them around and break this cluster apart and they can't regroup they may die sooner as temperature gets lower. So, yes you can move them but be super smooth. *Jerry*

Why an East facing entrance? Wouldn't Southern exposure for Winter be better on long dark days?

Most all of the old foragers who had an imprint of where the colony was located will be dead by Spring.

Ken

Too shaded towards the south. Thanks.

Jerry!!

Treating For Varroa QUESTION

In August I noticed some of my mite counts were getting high, so treated many of my hives with Apiguard for the first time. I'm impressed. Mite counts now are very low. In some cases my sampling shows 0 mites on 300 bees. The hives that had lower mite counts in August and were not treated, now show manageable but higher mite counts than the treated hives.

My question is this, normally I do a OA vapor cleanup treatment in late November. I still plan to do so for any hive that showed mites in it's sampling count. For the hives that had 0 mites in the sample, should I still treat with the OA? I know there has to be some mites still in the hive, but don't want to needlessly stress the bees with a treatment that's not needed.

Appreciate your thoughts.

Bill

ANSWER – Why don't you treat with ApiGuard for ALL the colonies? Obviously some will get a second shot but it doesn't have mite resistance issues like some other Varroacides or collateral damage like Oxalic Acid. And when you treat ALL the colonies at the same time then mite dispersal/sharing is lessened.

What do you think?

Jerry

Thanks for the quick response.

I like that idea and wish I had done it earlier. ApiGuard was new to me, so I was tentatively trying it. My concern to treat with ApiGuard now is temperature. I live in northern Maryland and over the next two weeks we'll have few day temps above 60°F. 60°F is the minimum temp listed on the label. Have you had any positive experience with treating with day temps in the 50s?

Bill

Yes you are on the border line but it is either gamble with that or burn the antennas of the Queen and the workers with Oxalic Acid. Your call, Sir.

Jerry

Hygienic Behavior QUESTION

Looking in one of my colonies I saw on a brood comb worker brood that had been uncapped and the pupae are dead. But the weird thing is it looks like the bees are trying to make drone cells or comb out of it as the rebuilt partial caps are extended up like a volcano. What the heck is going on?

Barb

ANSWER – What you are probably seeing is the results of some level of 'hygienic behavior' by some of the worker bees in this colony. They' think they have IDd Varroa in a capped cell. Some of these bees have an enhanced gene to open the cell. Then if there might be others bees with the gene to remove the

contents and subsequently kill the varroa mites in that cell reproducing. Then there are others bees with another gene to recap the cell if they can. This is what you are seeing.

Jerry

Nectar Producers

QUESTION

The pictures are of African Blue Basil, I have 1000 plants this year. The bees do not get pollen from it. It starts blooming the last of June and blooms to the killing frost which is the last of October in central Arkansas. Can you tell me how this plant ranks as a nectar producer, the bees work it all day long. It does not make seeds so it must come from cuttings. Can you suggest any other plant that does as well.

Thank You, Emmett Junkin

ANSWER – African Blue Basil is self-sterile so cuttings is one way of human assisted reproduction. It is very attractive to honey bees and other pollinators. Nectar production is one attractant but it does not produce a significant surplus in most years for honey bee conversion to honey and storage in the hive. It is 'deer resistant' which is a great thing in some areas. Other honey bee friendly flowering plants are Lavender, Thyme, Rosemary, Mint, Oregano, Borage, Bee Balm and Anise Hyssop.

Jerry



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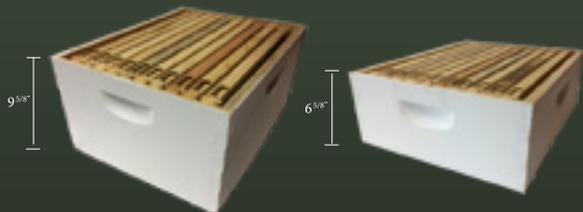
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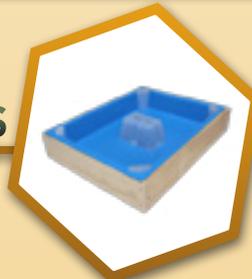


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FOUND IN TRANSLATION

Over-Sharing By Honey Bees

Jay Evans, USDA Beltsville Bee Lab

My middle child stood accused of biting the six-year-old birthday boy at a party. Awkward. Especially because, in the back of my mind, doubt raged. Not bold enough to ask to see bite marks, I humbly apologized and dragged him home. I have a similar reaction upon hearing allegations that honey bees have adverse effects on other pollinators. I am attached personally and professionally to honey bees and their keepers and awed by all the goodness these insects bring. Still, I seek out and read scientific studies that test for any negative effects of honey bees on their surroundings. On the whole, I am left feeling it is a wide world out there with space for many. I also feel that honey bee advocacy, and the bees themselves, have been a boon for other insects, let alone plants. Nevertheless, reputable colleagues have reported some annoying bites over the years and this had led to useful dialogue.

All creatures thrive on food, safe shelter, and freedom from disease. Honey bees are big eaters thanks to their numbers and can deplete resources in and around apiaries at times, but their foraging bouts from yard- or road-bound hives generally leave a lot of geography for others. Similarly, honey bees compete with their own pests for housing but not with other pollinators, since the honey bee housing market is provided by

humans for the most part. That leaves disease, and many scientists are actively testing for signs that diseases carried by honey bees might impact other species, or vice versa. For disease organisms ranging from bacteria to fungi and gut parasites there seems little 'spillover', if any, from honey bees to others. This has led to an intense focus on the well-studied viruses carried by bees. Could viruses now raging in honey bees make the leap to unsuspecting



hosts of other species? If so, how would that impact those species? For over a decade it has been known that injecting the viruses of honey bees into the bodies of other bee species causes harm. It is also known that honey bee viruses are found on the bodies of other bees, and perhaps in their guts, when foraging on the same flowers. What is less clear is the extent to which viruses at relevant levels truly infect and impact other



bee species. Two studies this month give the comforting view that the predominant virus of honey bees, Deformed wing virus (DWV), is perhaps not a mortal threat to co-habiting species.

The first study used a technical trick and highly controlled lab and cage trials. Here, Olesya Gusachenko and colleagues (Evidence for and against Deformed wing virus spillover from honey bees to bumble bees: a reverse genetic analysis,

Scientific Reports (2020) 10:16847, <https://doi.org/10.1038/s41598-020-73809-3>)

used genetically tagged versions of DWV to see if a prescribed infection of bumble bees resulted in infection and disease. They confirmed prior studies by showing that injections of high doses (up to 100 million copies) of viruses directly into bumble bee pupae could induce virus growth, albeit at thousand-fold lower levels than similarly treated honey bees. They did not see deformed wings in bumble bees from these trials, but did so for honey bees. Similarly, larval bumble bees fed

100 million viral particles when young had persistent virus presence after five days but '*virus levels were comparable to the amount initially administered*' and no mortality was found. Adult bumble bees, those most likely to be exposed to viruses on flowers, proved to be even less hospitable to DWV. Seven days after receiving a large dose of virus in sugar water, worker bumble bees carried 100–200-fold fewer viral particles

than were ingested and showed no health impacts. Finally, the authors fed three bumble bee nests for four to six weeks with enough virus for each bee to receive 100 million copies/day. At the end of the experiment neither workers, pupae, nor larvae showed detectable virus levels. In closing, the authors state *“The results obtained from this study provide a strong indication that oral acquisition of virus from a contaminated environment does not represent an effective DWV transmission route from Apis to otherwise healthy Bombus (bumble bee) individuals.”* That’s a relief for both parties.

In the second paper, “RNAseq of Deformed wing virus and other honey bee-associated viruses in eight insect taxa with or without *Varroa* Infestation” (*Viruses* (2020) 12, 1229; doi:10.3390/v12111229), Laura Brettell and colleagues followed up on virus levels after the disastrous introduction of *Varroa* mites into the Hawaiian Islands. Not surprisingly, both *Varroa* mites and DWV levels

have increased substantially in honey bees in the years since *Varroa* arrived, with average DWV levels >10-million-fold higher in honey bees from islands where *Varroa* is established. What was surprising was that DWV levels in co-occurring bees, wasps, ants, and flies did NOT show an increase in *Varroa*-heavy populations, despite the presence of these highly infected honey bees. The authors conclude that *“whilst the introduction of Varroa to Hawaii (by extension to the Western world) has had a strong effect on honey bees by causing a dramatic increase in low-diversity DWV, the effect appears to be largely restricted to honey bees, with no corresponding increase in DWV in other insects.”* They do provide the caveat that bees that were severely impacted by DWV might not have shown up from their survey, but representative species across a range of insects in contact with honey bees seem unaffected by honey bee viral loads. Their techniques also allowed

glimpses into dozens of additional virus species and they found these to be holding at low levels in both Hawaiian honey bees and other co-occurring insects. Again, good news for all insects, and those of us who are honey bee parents.

And my kid, the birthday biter? An incident with his cousin months later makes me think the impossible was true. He is fully reformed and applying to colleges now, so let’s keep that news on the down-low for a few months at least. Please. As a disclaimer, I have reviewed two brand-new papers from an active field and these studies cannot absolutely rule out impacts of honey bee diseases on other species. I should add that important regulatory bodies are looking at this question and I do not intend this essay to be a definitive statement on those decisions by myself or my employer. It is instead a shoutout to recent innovative work and a victory, perhaps momentary, in my goal to not be ‘that’ parent. **BC**

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ANEL is a Greek based company which produces high quality hives and accessories for the industry. Formerly selling through a well-known beekeeping retailer, ANEL sales dropped in the USA when that company went out of business.

At Apimondia, Mustafa Civan (CIVAN Extractors) introduced Giorgos Lykogiannis to Southeast Bee Supply. Now, in 2021 ANEL is once again ready to tackle the US market, but this time with a bigger selection of products.

The polypropylene hive is being introduced this month by Southeast Bee Supply dealers. It is a hard bodied, fully insulated 10-frame hive. With an R-4 rating, it is four times the insulating value of wooden hives. The color offered is yellow, with ventilated or solid bottom boards and a fully insulated lid. The entire hive locks together with snap-on clasps.

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For more information www.southeastbee.com.

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New Winter Reading –

Bee Hive to Beekeeper, Bees, Beekeeping Organizations, authors and Research by Andrew Gibb and Ann Harman. Published by Bee Craft Limited, UK. ISBN 978-0-900147-20-3. 176 pgs., color throughout, 6.25" x 9", soft cover \$32.50 plus post.

In the UK, there is a Master Beekeeper program that is significantly different than any Master program in the U.S. It has eight Modules that cover the basics of honey bee management, honey bee products and forage, honey bee biology and behavior, breeding and history. There is an individual exam for all of these, and only a select few are given each year, administered by the British Beekeepers Association. The publisher recently released a study book, *Bee Space to Bee Hive. Hives, beekeeping equipment and beekeeping methods*, that covers the first seven modules.

After passing modules 1, 2, and 3 and one other from 5, 6 and 7 you are awarded the Intermediate Theory Certificate and after passing all modules you are awarded the Advanced Theory Certificate. The last exam you take, which this new book looks at in detail, looks at the history of Bees, Beekeeping Organizations, Authors and Research. When you pass the eighth exam you become a Master Beekeeper.

What's in this new book is pretty incredible. The history of bees in the UK looks at the introduction of two of the most common bees – Italian and Carniolan, and discusses a bit about Cyprian bees. But, of course, the Buckfast bee was developed in the UK, and receives it due amount of space.

Several UK, and International beekeeping organizations and businesses started in the UK. There's the British Bee Journal, the British Beekeepers' Association, EH Taylor, Ltd., a beekeeping supply business, the IBRA and the BIBBA, the Bee Improvement and Bee Breeders' Association. All looking at their respective businesses.

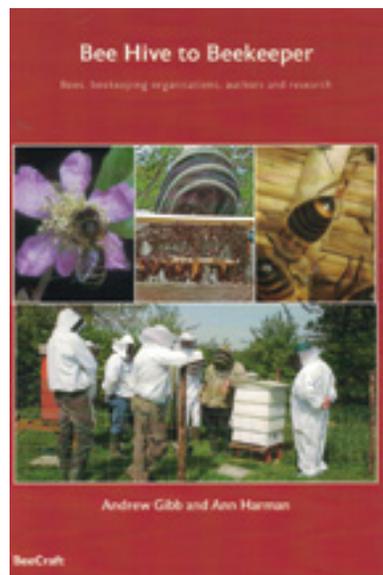
There's a lot on the research that has been carried out on bees in the UK and elsewhere, like mating, behavior, swarming and the

like, and especially the people who did the research. And finally, the last chapter looks at the authors who have been influential in honey bee research. Starting with the Revd Charles Butler and his *Feminine Monarchie*, to A.I. Root, to Dorthey Hodges and her pollen loads book, Eva Crane and her library of books and finally James and Carol Gould, and their book *The Honey Bee*.

The 19 authors covered in this final chapter pretty much cover the history of beekeeping on this planet. Even if you will never take the Master's Exam in the UK, you should own this book.

Norman Carreck, Associated now with the IBRA notes in the Foreword that for discoveries to be made, first there has to be an understanding of basic honey bee biology (knowledge), then they have to be able to tell people about it (communication), and finally, a manufacturer to be able to make the discovery available (available). This book covers this process wonderfully.

It is sad to note that Ann Harman, good friend and long time contributor to *Bee Culture* was one of the authors of this book and unfortunately, she passed before this book was published. I would have so liked to give her a congratulatory hug for her work here. *Kim Flottum*

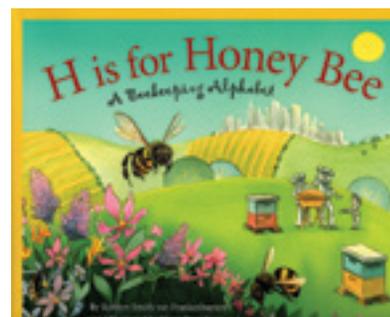


H Is For Honey Bee: A Beekeeping Alphabet. Written by Robbyn Smith van Frankenhuyzen, Illustrated by Eileen Ryan Ewen. Published by Sleeping Bear Press. ISBN 978-1-53411-070-0. 9" x 11", 32 pages, lavishly illustrated in color throughout, hard cover with dust jacket. \$21.99. Available wherever books are sold.

This publisher has a whole series of science and nature alphabet books, and this is their newest. Each page has a short rhyming verse filling 2/3 of the page, the remaining is a side bar with a ton of in-depth information about the subject of the letter. The author is a beekeeper and wildlife rehabilitator and the artist has illustrated many children's books.

Each letter of the alphabet explains some aspect of bees, beekeeping or beehives. A few samples – F is for flowers – When the bee leaves her hive, she's got one thing on her mind: the food she'll collect from the flowers she finds; or, P is for propolis – Every nook, cranny, and crevice is glued tight with propolis. Trees provide this sticky sap that bees can use as a mouse trap; or, W is for wax – On the underside of a bee (though it is rather hard to see) is a gland for making wax for building comb and sealing cracks.

This book is aimed at the six to 10 year-old audience, and their parents of course, or perhaps a local helpful beekeeper, and would be a perfect book for STEM lessons on environmental issues, conservation, bees, beekeeping or for nature lovers in general. On the last page there is a wealth of information on helping bees, fun facts about bees and how to become a beekeeper, where the author encourages readers to do just that, and to have fun. It's a very rewarding hobby, she adds, and it's my favorite thing. – *Kim Flottum*



Minding Your Bees And Cues

Resolutions And Resources For Your Bees

Becky Masterman & Bridget Mendel

January is the perfect month for backyard and sideline beekeepers to carve out time for planning a successful apiary season. You might want to think about last year's beekeeping cues (and clues) when making decisions for how to make 2021 your best beekeeping year yet.

Cue: *Your bees consistently do not produce surplus honey by the Fall.*

Resolution: If you can't change the landscape and plant abundant bee flowers within foraging distance of your hives, it might be time to move your bees to a new site. What is planted in sight of your bees is not what is critical for their nutritional success, but instead it is what they can source within two or so miles of their home. If your bees are telling you year after year that there isn't enough food, make a change. Note that a new package of bees on foundation often does not produce surplus honey in year one.

Resources:

These two websites have ideas for increasing bee habitat: <https://www.beeandbutterflyfund.org/>; <https://www.beelab.umn.edu/flowers>

Cue: *Your colonies tend to swarm.*

Resolution: Spring swarming is the way a healthy colony reproduces. If you can split your bees prior to their initiation of the swarming process, you can increase your apiary size, honey production and the possible stress of explaining the swarm of bees in your neighbor's tree or wall siding.

Resources:

- Connect with your local beekeeping organization for help with identifying the timing of swarm season in your area.
- Prepare all of the equipment that you need to split your colonies before spring.
- Have extra equipment on hand in

case you encounter a swarm. If you can't prevent it, prepare for it!

Cue: *It's been years since you've bought or built frames.*

Resolution: Contamination by pesticides and disease lead many experts to recommend brood comb replacement every three to five years. Spring is the perfect time to ask your bees to draw out new frames of comb. Note that wax naturally darkens over time, so wax color is not a reason to replace frames. Instead, mark your frames with the year, and go by age, tossing those that have served their term. Also replace brood frames that look disgusting, frames with dead brood, or frames with entombed pollen, a possible sign of a pesticide problem.

Resources:

Wu JY, Anelli CM, Sheppard WS (2011) Sub-Lethal Effects of Pesticide Residues in Brood Comb on Worker Honey Bee (*Apis mellifera*) Development and Longevity. PLOS ONE 6(2): e14720. <https://doi.org/10.1371/journal.pone.0014720>
vanEngelsdorp, Dennis, Evans, Jay D. Donovall, Leo, Mullin, Chris, Frazier, Maryann, Frazier, James, Tarpy, David R., Hayes

Jr., Jerry, Pettis, and Jeffery S., Short Communication, "Entombed Pollen": A new condition in honey bee colonies associated with increased risk of colony mortality (2009). **Journal of Invertebrate Pathology, Volume 101, Issue 2**, June 2009, Pages 147-149.

Cue: *Your bees are confusing and you have asked yourself if you should hang up your veil.*

Resolution: Regardless of what brings people to beekeeping, there is something that many new beekeepers have in common: quitting. If your bees die each year, you might question whether you should try again. If you decide to commit, a sustainable apiary, regardless of its size, should be your #1 priority. Prioritize colony access to abundant nutrition (flowers!), learn disease and parasite diagnostics and connect with a successful beekeeper mentor who will help you make key local management decisions. If your mentor's bees also tend to die over the Winter, it's time to get a new mentor.

Resources:

Connect with your local Extension office or visit <https://bee-health.extension.org>
Check with local beekeeping clubs and university bee programs

Despite having some sealed honey in the top left corner, this frame is a prime candidate for culling. The dark cells are pollen filled, yet 'entombed' in propolis by the bees. The strange brood pattern is a result of a drone layer queen. (Masterman photo)



for educational and mentoring opportunities.

Visit the honey bee health coalition for management and varroa guidance. <https://honeybeehealthcoalition.org/>.

Check out www.hivetracks.com for help monitoring your hive inspections.

Build or buy your mite monitoring kit before you need it.

Cue: *You are worried about the potential impacts of non-native honey bees on the health of native bees.*

Resolution: Commit to actively supporting all bees. Plant a native garden to provide food and habitat for native bees, and share resources and information with your beekeeping club about how to help native bees through planting or community science. Most importantly, keep your honey bees healthy through mite and disease monitoring and management to diminish the negative effects they could have on other honey bees and native bees.

Resources:

<https://www.xerces.org/publications/habitat-assessment-guides/habitat-assessment-guide-for-pollinators-in-yards-gardens>
<https://www.bumblebeewatch.org/>



Rotating out frames every three to five years is recommended by many apiculture experts. Keeping track of the age of your frames is as easy as using a permanent marker to note the year of initial use. (Masterman photo)

Cue: *You have the nagging feeling that you could be doing more to support bees.*

Resolution: Have you connected with your state and federal government representatives to let them know that you are a beekeeper and worried about bee health, specifically a lack of flowers on the landscape? Does your local beekeeping organization have a pollinator habitat committee? Should it? Are you seeking out and supporting bee research?

Resource: Yourself. Seek out your political representatives and encourage your fellow beekeepers to do the same. Establish a pollinator habitat committee (or join it!) within your beekeeping organizations. Reach out to your regional bee research universities and ask them how you can help their efforts (transparency note: the authors both work at the University of MN Bee Lab). **BC**

Acknowledgement

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

Authors

Becky Masterman led the UMN Bee Squad from 2013-2019 and currently alternates between acting as an advisor and worker bee for the program. Bridget Mendel joined the Bee Squad in 2013 and has led the program since 2020. (Photo of Becky and Bridget from 2014, before social distancing).



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The A.I. Root Pollinator Garden

Alyssum Flowers



The A.I. Root Co., and Bee Culture, The 'Magazine of American Beekeeping' will always be connected to the amazing history of Honey Bees and their Keepers. At our company headquarters we recently updated our pollinator friendly garden area in front of the offices along the main thoroughfare into our hometown of Medina, Ohio.

Over the next several months we will share with you how it is coming along and to highlight individual plants in the garden.

Liatriis, also known as blazing star or gayfeather is an excellent perennial to add to your pollinator garden, cutting garden or any area where you want to add color. Closely related to boneset (think Joe-Pyeweed), like most members of the Sunflower Family (*Asteraceae*), it produces highly nutritious nectar that is favored by bees, butterflies, hummingbirds and other pollinators.

These two to four foot-tall columnar treasures grow in clumps with long, slender leaves and flower spikes on the top. The flowers are fluffy balls of petals that range from blue to lavender to magenta. These perennials are great for naturalizing because they are tough, native to North America and are deer resistant.

Three species are available to grow in the United States, each with a slightly different flowering form and growing conditions but they are normally Winter hardy from zones 3-8.

Rough blazingstar *Liatriis aspera* is native to the eastern states (except for Pennsylvania and the New England states) with short, stiff hairs on the stem and basal leaves and is shorter than other blazingstars growing two to three feet tall. The flowers grow on tiny stems on alternating sides of the flower stalk, forming a zigzag pattern. Because of this it is often called Button Snakeroot. Plant this beauty in medium or dry, well drained soils or even sandy and rocky soils

Liatriis spicata, known as dense blazing star, is native to Missouri and does well in all eastern states from New York to Florida. Although it tolerates heat, drought and clay soil, it can also tolerate moist soil and high humidity.

Flowering continues in tight spikes from July through August.

Prairie Blazingstar, *Liatriis pycnostachya*, also known as Kansas gayfeather, and cattail blazingstar is native to Central United States and grows well from Minnesota to Texas and eastward to Pennsylvania. It grows well in moist soil and clay. The flowers grow tighter on the stalk than dense blazing star and blooms from early July to August.

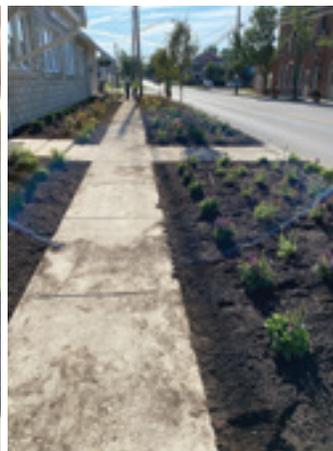
Liatriis ligulistylis, known as Meadow blazingstar, rocky mountain gayfeather, meadow gayfeather and Northern plains blazingstar is our western species that can be found all the way to the Pacific coast, does best in rich or at least evenly moist soil. This species grows five feet tall with each flower on tiny pedicels. Unlike the other blazing stars of which the flowering stalks bloom from the top down, these magenta flowers cover the stems all at once.

Blazingstar can be started from seed, but planting the corm (bulb) is often more successful. If you want to collect the seeds, wait until the flowering stems have turned a fluffy tan then cut the entire stalk and air dry them indoors. Once the flower stalks are completely dry, shake them into containers or water tight bags, and store them in the refrigerator. In order for the seeds to germinate, they need to be scarified (nicked or scratched) and stored at 40°F for three months. The corms and plants are also available in nurseries and catalogues. Plant several together for the best effect.

Because these hardy plants are tough and resilient, they will soon be a favorite in your landscape. Clump forming, they can fill empty spaces with color and texture as well as serve as a magnet for birds, hummingbirds, bees, butterflies, moths and many other pollinators. **BC**

https://www.wildflower.org/plants/result.php?id_plant=lisp
<https://www.illinoiswildflowers.info/>
<https://michiganflora.net/genus.asp?id=liatriis>

Liatriis aspera, Rough blazingstar





Number 1 Tip of the Month – Cooling Towel

My name is Dan Brantner. I am a certified Texas Master Beekeeper and I would like to share my idea that won the "Gadget of the Year" award at the 2020 Annual Texas Beekeepers Association convention.

Beekeepers know that working in the apiary with a full beekeeping suit on in July and August can be absolutely brutal due to the heat. It is critical that beekeepers manage their body core temperature in order to avoid heat exhaustion, and even more serious heat stroke, which is considered a medical emergency and can lead to loss of consciousness. One method that many people who work outdoors in hot weather use to combat overheating is the Cooling Towel. Cooling towels work through evaporative cooling. The towel is immersed in cold water and then wrung out and placed on the user's head and/or neck. Not only does the wet towel feel pleasant because it is cool, but the temperature differential between the damp towel and the user's body temperature will help transfer heat from the body to the towel. The heat is then lost through evaporation causing a cooling effect. In order to effectively use a cooling towel in the apiary, I created a device that is comfortable, simple to use and will hold a cooling towel in place under a beekeeping veil by modifying a readily available off-the-shelf full brim hard hat.

A standard full brim hard hat does not fit well under a beekeeping veil. In addition, the full hard hat shell inhibits the evaporative cooling potential of a cooling towel by trapping the heat between the top of your head and the shell. In order to solve these two problems, I developed a simple solution – cut off the top of the hard hat. By cutting off the top portion of a standard, readily available hard hat, the remaining lower portion of the hard hat fits within a beekeeping veil. Cutting off the top portion of the hard hat also allows air to circulate

and the evaporative benefits of the cooling towel to work. The remaining lower portion of the hard hat, which includes the brim, suspension webbing, ratchet wheel for size adjustment and sweat band holds the cooling towel in place under the beekeeping veil. Another important benefit of using this modified hard hat as a cooling towel headgear is that the brim serves as an ideal spacer to keep the mesh of the beekeeping veil away from your head and thereby provides additional protection from bee stings.

Dan Brantner – Plano, Texas



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Kentucky Apiary Inspector



Tammy Horn Potter

- **Short History of your state Apiary Program:** The State Apiarist position was created by the State Legislature in 1986, but the position was not filled until Phil Craft was hired in 1999. Sean Burgess was hired in 2012. Tammy Horn Potter was hired in 2014.
- **2-3 Interesting facts about your program:** Since it is a non-merit position, the State Apiarist has a lot of flexibility. Tammy Horn Potter has prioritized hive health, and that decision has led to grants that help with virus identification, queen production and diversity, and the USDA Honey Bee Health Survey to establish a baseline of hive health.
- **Overview of beekeeping in your state – Honey production, crop pollination etc.** Mirroring the national profile of beekeeping, Kentucky beekeeping is primarily hobbyist, with approximately 92% having hives in backyards, a sidliner group that is approximately 6-7% aimed at specialty markets, and then the commercial beekeepers make up the remaining 2%

that pollinate watermelons, pumpkins, strawberries, and other crops.

- **# of Beekeepers:** 2500 approximately
- **# of Colonies:** 50,000 approximately
- **Upcoming (or recent) events in your state:** Covid-19 has forced many cancellations
- **Share a short story from an exciting day on the job- (could be a best, worst or anywhere in between)** A goal of mine is to help beekeepers know what they are putting in the honey bottles, and know what is going on inside their hives. I have worked on four grants with different agencies or beekeeping associations. The most recent grant with a lot of potential to help beekeepers in Kentucky is a KY Agriculture Development Board grant that funds University of KY Dr. Clare Rittschof to provide virus information to beekeepers. There is a research component to this grant, since it is also tied to the floral resources through the agricultural season. This grant was just awarded in Feb. In the past year, I have been able to work with four different groups to have four grants awarded: one for honey marketing, one for queen diversity, one for honey testing, and now the virus-testing lab. **BC**

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BEE VET

Diagnostic Approach

Part 2

Dr. Tracy Farone



In my high school and early college days, I had the privilege of shadowing several James Herriot types of veterinarians. From flying over the country-side in some old jalopy to the next dairy farm (with no GPS) to rattling off mile-long prescription drug names, I can remember innocently (and somewhat naively) marveling at how they could possibly know and do “everything”. I wondered if they received some special bolt of knowledge from the heavens upon graduation from vet school. After 21 years of being a veterinarian, the idea and expectation of knowing “everything”, just makes me laugh. So how does one approach the diagnosis of all diseases in all animals? Well, veterinary school and life experience has taught me a few things . . .



Examination of healthy brood frame.

Allow me to share some insight that you may find amusing. In veterinary school, I was introduced to the DAMNIT diagnostic system, a mnemonic acronym and perhaps a somewhat sarcastic commentary on the way docs may feel regarding the task of searching for diagnoses that may be illusive, vague, deceptive, life-threatening, and even unknown. Each letter in DAMNIT stands for a certain category of disease and is meant to direct us through a systematic, scientific, diagnostic method for every animal and every disease situation we encounter. The categories are as follows:

Degenerative
Anomaly, Anatomic
Metabolic
Nutritional, Neoplastic
Infectious, Immune, Idiopathic,
Infarct
Traumatic, Toxin

With the exceptions of Neoplastic and Infarct categories, I believe the other categories could apply to various honey bee pathologies. Note that “Idiopathic” is a major category. “Idiopathic” literally means the disease makes an idiot of us. CCD sound familiar? Unfortunately, even with our modern medical technologies some diseases in human and animal medicine remain unknown. Bee maladies are no exception, but we keep learning each day.

These DAMNIT categories allow doctors to first consider widely the possibilities and then narrow the focus on what may be causing the disease. We will develop what is called a “differential diagnosis” list or a list of diseases we consider to be the most likely cause or causes of the issue at hand. We will then decide which diagnostic tests will be helpful in ruling in or ruling out possibilities on our differential diagnoses list. Many diseases in humans and animals, including bees, have similar clinical signs and presentations. Performing diagnostic tests are objective ways to obtain data that will support the most accurate diagnosis or diagnoses, which will hopefully lead to the best treatment, recovery, economic savings, and/or course of action.

One hard rule I learned early on as a veterinarian, is that there is no rule that says there must be only one problem, one diagnosis, one pathogen causing the animal’s disease. This fact, of course, further complicates

the diagnostic process, but complete and accurate medical diagnosis is not easy. In honey bees it is certainly not uncommon to see multiple stressors and pathogens contributing to the collapse of a hive. For example, if a beekeeper says their hive died of starvation or “Winter” . . . ok but why did they die of starvation? If bees simply died due to Winter, we would have zero bees left after one year. There were likely other underlying cause/s.

An objective diagnostic approach can even be helpful during a post-mortem exam of a hive, or what we would call a “necropsy.” A necropsy exam can be performed, and diagnostic samples may still be taken to determine the cause or causes of the hive’s demise. Finding a definitive diagnosis will be helpful in taking steps to preserving any remaining hives and may guide the beekeeper on necessary management changes.

Of course, experience working hives measured in both years and “mileage” can be invaluable in making the most accurate hive assessments. Combining beekeeping experience with the best objective data gathering is a win-win for beekeepers, bees, entomologists, and veterinarians. Much data we currently have about hive death is based on survey data, often utilizing non-specific diagnosis categories, and educated guesses from a variety of levels and types of beekeepers. Continuing to “team up” on ways to obtain the most accurate data will improve our collective ability to assess what is objectively happening to our hives.

Diagnostic tests

Diagnostic tests can be performed in the field or in a laboratory setting. Field tests are performed first and may be good for screening for disease and/or developing tentative diagnosis/ses,



Dead bees at a hive entrance warrants further investigation.

but they rarely absolutely confirm a diagnosis. Confirmatory and gold standard tests are typically sent out to a laboratory.

Field tests

Field tests start in the beeyard with exams or hive inspections. The exam itself is a diagnostic test and a very valuable one. Exams in honey bees start with a visual inspection of the exterior of the hive. Much can be learned without even opening the hive, including, the strength/population of the hive, hive activity/behavior, normal morphology of adults, the presence of dysentery and/or any abnormal dead bees at the entrance. If scales are utilized, hive weight and hive weight patterns over time can be assessed.

Very few diseases have what is called a “pathognomonic” sign. A pathognomonic sign is a clinical sign found on a physical exam that is absolutely diagnostic for a specific disease. A couple of bee diseases do have pathognomonic signs, one is “Chalkbrood”, caused by the fungus *Ascophaera apis*, is seen at the entrance of hives as discarded, white, mummified brood.

After a thorough exterior exam, an internal exam should be performed. Ideally, internal exams should be avoided in harsh or cold weather conditions. Four major items should be assessed while in the hive: nutritional status, queen status, brood status, and adult bee status.

The hive should be assessed for adequate stores, both honey and pollen. Brood frames should be evaluated for an even and seasonally appropriate patterns to assess both the health of capped brood, open brood, and the queen. Adult bees should be observed for normal behavior and anatomy as well. As much of the hive as possible should be examined to gain an adequate and thorough evaluation of the hive’s health status. Many brood diseases and viral diseases, affecting both brood and adults, can have similar clinical signs. *Varroa* mites should always be considered as a primary, underlying, or contributing cause of hive abnormalities.

If brood disease is suspected based on hive assessment further diagnostics should be performed. The Match Stick test and Holst Milk tests are field tests that can be

performed quickly with few materials to help determine if AFB is to be suspected. Commercially available antibody tests for EFB and AFB are also available and can be performed in the field.

Varroa mite count should be performed on a routine basis (monthly to every other month during the beekeeping season) during regular inspections and with sick hives. Alcohol washes are the preferred method for accuracy. Nosema spores can be detected by collecting whole adult bee samples for later examination in the lab. Whole honey bee samples are macerated and then viewed under a microscope to detect Nosema spores.

Confirmational tests

Confirmational tests are sent out to laboratories. The USDA Bee lab in Beltsville, MD provides testing for foulbrood as well as antibiotic resistance screening on samples. A few university animal diagnostic labs (Penn State University) are starting to offer AFB testing as well. Viral testing can be found at a few university labs in the U.S. and Canada (see reference links below). The Bee Informed Partnership certainly offers a variety of diagnostic opportunities including testing for *Varroa* and Nosema. Turn around time for these tests should be considered when deciding on the initiation of treatment.



Field tests can be very helpful in developing a diagnosis.



Beautiful bee entrance with normal activity and behavior.

Treatment – what if it cannot wait?

Ideally, it is best to have a proven diagnosis before treating any disease. Using drugs/chemicals haphazardly can lead to further harm to the bees and can lead to drug resistance. However, there are a few exceptions, namely, American Foulbrood. If AFB is suspected in the field immediate action and treatment should ensue. The state apiarist should be contacted, and state and federal laws should be followed for treatment.

Veterinarians are permitted to start treatments immediately based on a tentative diagnosis if they find it appropriate. State apiarists, the beekeepers and veterinarians can all work together to be sure that proper treatment is initiated and samples are also sent off to a lab for confirmation of AFB.

In the final portion of this article series, I will address in more detail the development of treatment plans as we make our way full circle back to the best treatment: prevention. **BC**

Some bee laboratory resources for confirmatory testing:

<https://bee-health.extension.org/usda-ars-bee-labs/>

<https://www.ars.usda.gov/northeast-area/beltsville-md-barc/beltsville-agricultural-research-center/bee-research-laboratory/>

<https://www.ohiostatebeekeepers.org/2017/announcements/news/nagc-launches-beecare-testing-for-honeybee-diseases/>

<https://www.gov.mb.ca/agriculture/animal-health-and-welfare/vds/pubs/vds-lab-manual-honey-bee.pdf>

<https://beeinformed.org/>

HIVE ZEN MASTER

John Miller

Fellow Travelers: My career in beekeeping is in Commercial beekeeping. It's sort of what my family does, has done, will do. We keep bees. In varying degrees, Miller's relationship with bees is a way to make a living. It's not an easy way to make a living. However, folded into my career is a fascination with bees. I'm no James Tew; who writes inspired beautiful pieces.

I'm not Randy O. whose mind and curiosity leaves me wondering when he sleeps.

For 2021, I want to devote one piece to the hive Zen Master. No one has met the hive Zen Master. If you share my fascination with bees – I have a few questions – Join me?

“Walking into an apiary is intellectually challenging and emotionally rich, sensual and riveting.

Time slows down.

Entering an apiary has its own rhythm and ritual.

I slip into my coveralls, put on my veil, light the smoker to calm the bees, all routine preparations imbued with deeper meaning because they herald the transition from whatever I had been doing into bee mode.

Lighting my smoker, I am totally in the present but also connected to memories of friends, fellow beekeepers, and innumerable long days in other apiaries when we shared periods of tedium, hard physical labor, and occasional glimpses of wisdom.

These moments of understanding, penetrating the complexity of our usually unfathomable natural world, still take my breath away.”

Bee Time – Lessons From the Hive, Mark L. Winston, Harvard University Press, 2014.

I can't explain this intimate relationship with bees – but I like it & never tire of it.

When I open a hive, I open myself to everything the hive has to share – There is no Cunning, no Deceit in a hive. Lean in. Learn. Observe what cannot be observed.

Who is the Zen Master? The su-

perorganism is capable of sensing and responding to multiple, interrelated conditions – utilizing, optimizing individuals within the superorganism.

Question:

How is abundance and scarcity perceived by the superorganism?

Field bees, those intrepid scouts return [mostly] with positive and negative news:

Disturbance: Impact/Smoke/
Hail/Home Security

Nectar

Pollen

Water

Propolis

Pesticides

Parasites

Pathogens

Hives maintain interior temperature at [about] 92°. When temperatures soar – serious cooling via fanning air across gathered water drops occurs – but who dispatches the appropriate number of individuals prior to temperature spikes to gather water? July weather conditions change dramatically from 10:42 a.m. until 5:42 p.m. Conversely – a coming cold snap demands serious muscle vibrations from serious numbers to generate heat. Who marshals the needed individuals to generate the heat?

Who has the anticipation insight? Out here, surplus honey arrives around June 25. The arriving bees have never seen North Dakota, not one of them [with the exception of a few queens – who haven't been outside the hive for a year . . .] Yet! The hive expands rapidly [assuming adequate feed] from May 25 to June 25, all in anticipation of abundance not one honeybee in the hive has ever tasted. July 20, brood rearing slows.

First frost around September 21, who intuits through shorter days and scarcity “We need to lose 40,000 mouths in the next 40 days”. Multiple generations of bees have lived through, experienced, and perished in a single year – conditions not encountered by the prior

generation or to be encountered by succeeding generations. Yet – bees persist; gathering and providing for a half-sister she will never meet. How does that work? If bees can be dismissed as instinctive insentient, and have over many years evolved and developed a near utopian superorganism – um, what's that say about human's evolution and [lack of] progress?

Say the primary resources are nectar and pollen – and foragers return with none – how is that information shared; at 8:30 a.m. The 8:30-taken sample represents conditions that change by the half-hour; the length of time a bee can be absent from the hive – [your mileage may vary]. Different information arrives during different parts of the day from different foragers. How is that information unpacked, metabolized and shared – beyond a figure-8, three-dimensional dance?

In the brood chamber, nurse bees instinctive response to pheromonal sensing of larvae feeding/care is a wonder. We know when a nurse bee is a nurse bee – and we think we know why. Some bees ‘sniff’ the gas-permeable wax cap of the pupae for distress – opening, and removing the impaired. Who empowers those sniffers to summarily abort a half-sister?

How does the hive sense if sufficient stores exist for the winter? No bee in that hive has experienced Winter [with the exception of a few queens – who haven't been outside the hive since Spring], yet morphometrically – Winter bees are reared by the dwindling number of Summer bees and these Winter bees are provisioned by half-sisters they never meet.

Lastly, I can take you into a pitch black building on January 5, 2021 in Gackle, ND where the temperature has not varied, the humidity has not varied, the CO2 levels have not varied [much] for 60 days since November 5, 2020 – and beehives have commenced brood rearing anticipating Spring – few bees inside that building having ever seen – sunlight.

I can't explain this intimate experience with bees – but I like it.

No one gives instructions. Everyone obeys.

“I Contain Multitudes” – Dylan, 2020.

“The biological concept of stress originated in mammals. The concept of stress is useful in understanding the physiological and behavioral responses of honey bees to harmful situations. There are three stages to an organism’s acute stress response: it first detects the stressor with sensory organs, then responds to it by defense or escape. Finally, if the stressor cannot be avoided and is sustained, the organism enters a state of exhaustion. Physiological response mechanisms to stress in insects have recently been studied. Such responses involve biogenic amines (octopamine, dopamine), neuropeptides (allatostatin corazonin) and metabolic hormones (adipokinetic hormone, diuretic hormone). Even et al. (2012) proposed a hypothetical integrated honey bee stress pathway involving the brain, and, particularly the neurohemal organ corpora cardiaca and peripheral targets, including energy storage organs (fat body and crop). They discussed how this system can organize rapid coordinated changes in metabolic activity and arousal, in response to adverse environmental stimuli.”

“There are a variety of factors that negatively impact the health and survival of managed honey bee colonies, including the spread of parasites and pathogens, loss of habitat, reduced availability or quality of food resources, climate change, poor queen quality, changing cultural and commercial beekeeping practices, as well as exposure to agricultural and apicultural pesticides both in the field and in the hive. These factors are often closely intertwined, and it is unlikely that a single stressor is driving colony losses. There is a growing consensus, however, that increasing prevalence of parasites and pathogens are among the most significant threats to managed bee colonies. Unfortunately, improper management of hives by beekeepers may exacerbate parasite populations and disease transmission. Research continues to accumulate results that describes the complex and largely harmful interactions that exist between pesticide exposure and bee immunity (O’Neal et al. 2018).”

“Most organisms are constantly faced with environmental changes and stressors. In diverse organisms, there is an anticipatory mechanism during development that can program adult phenotypes. The adult phenotype would be adapted to the predicted environment that occurred during organism maturation. However, whether this anticipatory mechanism is present in eusocial species, such as honey bees, is questionable because eusocial organisms are largely shielded from exogenous conditions by their stable nest environment. Wang et al. (2016b) tested whether food deprivation during development of the honey bee can shift adult phenotypes to better deal with nutritional stress. They subjected fifth instar worker larvae to short-term starvation, then measured nutrition-related morphology, starvation resistance, physiology, endocrinology and behavior in the adults. They found that the larval starvation caused adult honey bees to become more resilient toward starvation. Moreover, the adult bees were characterized by reduced ovary size, elevated glycogen stores and juvenile hormone (JH) titers, and decreased sugar sensitivity. These changes, in general, can help adult insects survive and reproduce in food-poor environments. Overall, they found for the first time support for an anticipatory mechanism in an eusocial species. Their results suggest that this mechanism may play a role in honey bee queen-worker



A Closer LOOK



COLONY STRESS

Clarence Collison

Studying Physiological Response

differentiation and worker division of labor, both of which are related to the responses to nutritional stress.”

“Juvenile hormone (JH) regulates caste determination in immatures and division of labor in adult workers. However, it is not clear whether JH titers change significantly under stresses commonly experienced by workers in experimental manipulations. Lin et al. (2004) determined the effect of caging and cold-anaesthesia on JH titers in both nurses and foragers. The JH titers of nurses and foragers kept in cages at room temperature or anaesthetized on ice, for up to 24 hours were determined at various time intervals. Nurses displayed a significant and sustained increase in JH titers by one or two hours in two out of three colonies, regardless whether being cold-anaesthetized or caged. Nurses in four out of four colonies showed remarkable JH titer elevations 24 hours after being caged. The increase ranged from 3-142 fold compared to their initial baseline JH titers. In foragers, changes in JH titers depended on their initial JH titers: foragers with low JH titers increased while those with high JH titers decreased. These results suggest that

nurses and foragers respond to stress differently. The fact that JH did not always increase under stress conditions suggests that JH apparently does not function as a “stress-hormone” in honey bees under the two conditions they studied.”

“In a rapidly changing environment, colonies are increasingly exposed to diverse sources of stress (e.g. parasites, pesticides, climate warming), which represent a challenge to individual and social homeostasis. However, bee physiological responses to stress remain poorly understood. Bordier et al. (2017) therefore exposed bees specialized in different tasks (nurses, guards and foragers) to immune and heat stress or pesticides and they determined changes in the expression of genes linked to behavioral maturation (vitellogenin- *vg* and juvenile hormone esterase- *jhe*) as well as in energetic metabolism (glycogen level, expression level of the receptor to the adipokinetic hormone- *akhr*, and endothermic performance). While acute exposure to sublethal doses of two pesticides did not affect *vg* and *jhe* expression, immune and heat challenges caused a decrease and increase in both genes, respectively, suggesting that bees had responded to ecologically relevant stressors. Since *vg* and *jhe* are expressed to a higher level in nurses than in foragers, it is reasonable to assume that an immune challenge stimulated behavioral maturation to decrease potential contamination risk and that a heat challenge promoted a nurse profile for brood thermoregulation. All behavioral castes responded in the same way. Though endothermic performances did not change upon stress exposure, the *akhr* level dropped in immune and heat-challenged individuals. Similarly, the abdomen glycogen level tended to decline in immune-challenged bees.

Altogether, these results suggest that bee responses are stress specific and adaptive but that they tend to entail a reduction of energetic metabolism that needs to be studied on a longer timescale.

In summary, stress response did not change according to task specialization. Immune and heat stress affected the expression of task related genes (*vg* and *jhe*). Sublethal exposure to pesticides did not modify the expression of *vg* and *jhe* genes. Energetic metabolism tended to decrease upon stress exposure.”

“Among honey bee stresses, temperature is a fundamental ecological factor that has been shown to affect honey bee survival. Yet, the impact of low temperature stress during capped brood on brood mortality has not been systematically investigated. In addition, little is known about how low temperature exposure during capped brood affects subsequent adult longevity. In this study capped worker brood at 12 different developmental stages were exposed to 20°C (68°F) for 12, 24, 36, 48, 60, 72, 84 and 96 hours, followed by incubation at 35°C (95°F) until emergence. Wang et al. (2016a) found that longer durations of low temperature during capped brood led to higher mortality, higher incidences of mis-orientation inside cells and shorter worker longevity. Capped brood as prepupae and near emergence were more sensitive to low-temperature exposure, while capped larvae and mid-pupal stages showed the highest resistance to low-temperature stress. Their results suggest that prepupae and pupae prior to eclosion (emergence of adults) are the most sensitive stages to low temperature stress, as they are to other stresses, presumably due to many physiological

changes related to metamorphosis happening during these two stages.”

“Recent large-scale mortality of honey bee colonies is believed to be caused by multiple interactions between diseases, parasites, pesticide exposure, and other stress factors. To test whether a dual challenge has an additive effect in reducing survival, Köhler et al. (2012) experimentally stimulated the immune system of caged honey bee workers from six colonies by injecting saline or *Escherichia coli* lipopolysaccharides (LPS), and additionally fed them the alkaloid nicotine (0 µM, 3 µM and 300 µM in 0.63 M sucrose). Workers did not increase their sucrose intake to compensate for the immune system activation, and those injected with *E. coli* LPS decreased their intake on the highest nicotine concentration. In the single challenges, injection and high nicotine doses negatively affected survival. All injected worker groups showed reduced survival. Without nicotine, survival of the saline and *E. coli* LPS worker groups was similar, but survival of *E. coli* LPS-challenged workers dropped below that of the saline groups when additionally challenged by nicotine, with bees dying earlier at higher nicotine concentrations. In the dual challenge of saline injection and dietary nicotine, a reduced effect on survival was observed, with lower mortality than expected from the summed mortalities due to the single challenges. However, additive and synergistic effects on survival were observed in workers simultaneously challenged by *E. coli* LPS and nicotine, indicating that interactive effects of simultaneous pathogen exposure and dietary toxin are detrimental to honey bee fitness.”

“Pesticide residues have been linked to reduced bee health and increased honey bee colony failure. Most research to date has investigated the role of pesticides on individual honey bees, and it is still unclear how trace levels of pesticides change colony viability and productivity over seasonal time scales. To address this question, Colin et al. (2019) exposed standard bee colonies to chemical stressors known to have negative effects on individual bees, and measured the productivity of bee colonies across a whole year in two environments: near Tucson Arizona and Sydney Australia. They exposed hives to a trace amount of the neonicotinoid imidacloprid and to the acaricide thymol, and measured capped brood, bee and honey production, as well as the temperature and foraging force of the colonies. The effect of imidacloprid on colony dynamics differed between the two environments. In Tucson they recorded a positive effect of imidacloprid treatment on bee and brood numbers. Thymol was associated with short-term negative effects on bee numbers at both locations, and may have affected colony survival at one location. The overall benefits of thymol for the colonies were unclear. They concluded that long-term and colony-level measures of the effects of agrochemicals are needed to properly understand risks to bees.”

“Many complex factors have been linked to the recent marked increase in honey bee colony failure, including pests and pathogens, agrochemicals and nutritional stressors. It remains unclear, however, why colonies frequently react to stressors by losing almost their entire adult bee population in a short time, resulting in a colony population collapse. Perry et al. (2015) examined the social dynamics underlying such dramatic colony failure. Bees respond to many stressors by foraging earlier in

life. They manipulated the demography of experimental colonies to induce precocious foraging in bees and used radio tag tracking to examine the consequences of precocious foraging for their performance.

Precocious foragers completed far fewer foraging trips in their life, and had a higher risk of death in their first flights. They constructed a demographic model to explore how this individual reaction of bees to stress might impact colony performance. In the model, when forager death rates were chronically elevated, an increasingly younger forager force caused a positive feedback that dramatically accelerated terminal population decline in the colony. This resulted in a breakdown in division of labor and loss of the adult population, leaving only brood, food, and few adults in the hive.”

“Most pollination in large-scale agriculture is dependent on honey bee colonies. More than one million hives are transported to California each year just to pollinate the almonds, and bees are trucked across the country for various cropping systems. Concerns have been raised about whether such “migratory management” causes bees undue stress; however, until recently there have been no longer-term studies rigorously addressing whether migratory management is detrimental to bee health. To address this issue, Simone-Finstrom et al. (2016) conducted field experiments comparing bees from commercial and experimental migratory beekeeping operations to those from stationary colonies to quantify effects on lifespan, colony health and productivity, and levels of oxidative damage for individual bees. They detected a significant decrease in lifespan of migratory adult bees relative to stationary bees. They also found that migration affected oxidative stress levels in honey bees, but that food scarcity had an even larger impact; some detrimental effects of migration may be alleviated by a greater abundance of forage. In addition, rearing conditions affect levels of oxidative damage incurred as adults.”

“Honey bee population declines have been linked to multiple stressors, including reduced diet diversity and increased exposure to viral pathogens. Despite interest in these factors, few experimental studies have explored the interaction between diet diversity and viral infection in honey bees. Dolezal et al. (2019) used a mixture of laboratory cage and small semi-field nucleus hive experiments to determine how these factors interact. In laboratory experiments, they found that high-quality diets (polyfloral pollen and high-quality single source pollen) have the potential to reduce mortality in the face of infection with Israeli acute paralysis virus (IAPV). There was a significant interaction between diet and virus infection on mortality, even in the presence of high virus titers, suggesting that good diets can help bees tolerate virus infection. Further, they found that extreme stress in the form of pollen starvation in conjunction with IAPV infection increase exiting behavior from small experimental hives.”

“Huang (2012) reviewed several lines of evidence pointing to the importance of pollen nutrition in honey bee health. In laboratory studies that used caged honey bees, poor pollen nutrition led to a reduction of worker bees’ resistance to the microsporidian, *Nosema apis*, an increase of bee’s sensitivity to pesticides, and an increased titer of bee virus. On the other hand,

polyfloral pollen made bees more resistant to stresses by enhancing their immune related enzyme activities. At the colony level, good pollen nutrition increased honey bee’s resistance to *Nosema ceranae* or the ectoparasitic mite, *Varroa destructor*. The effects of both transportation and habitat changes on honey bees seem most likely mediated via decreased diversity, or amount of pollen to the colonies.” **BC**

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A honey of an idea

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Bee vectoring vs. spraying

Here's how BVT stacks up to spraying, illustrated below with an example from strawberry production in Florida, USA: it takes four kg of spraying chemical pesticides to do the same work as only 0.02 kg of BVT biologicals. BVT's proprietary bee delivery system and Vectorite™ with CR-7 is used in two hives per acre, with CR-7 trays replaced every five days. Compare that to ten

BVT

Honey Bee Delivery System

— Ian Collinson

sprays of Switch fungicide at a rate of 14 oz. per acre, per spray. That's a dramatic savings and comes with a much lower environmental impact when you consider that 98% of the sprayed product doesn't make it to the right place (directly on blooms).

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In August 2019, BVT was granted US regulatory approval through the Environmental Protection Agency (EPA) for its biological fungicide (*Clonostachys rosea* CR-7), for use as a fungicide on commercial crops. The EPA has also granted CR-7 a residue tolerance exemption under the Federal Food, Drug and Cosmetic Act (FFDCA), which indicates high human safety with no expected adverse effect from dietary exposure.

The company's Vectorite with CR-7 has Organic Materials Review Institute (OMRI) approval for use with organic producers. The OMRI listed seal indicates a product has passed their review process and is compliant with organic standards. Certified organic farmers count on this verification to maintain their organic status.

Natural precision agriculture contributes to sustainable agriculture

The sustainable agriculture movement is gaining momentum worldwide. And BVT's natural precision agriculture system is gaining traction in the agriculture industry. BVT just completed its first commercial growing season post EPA-approval in the US, implementing the system with strawberry and blueberry growers across America.

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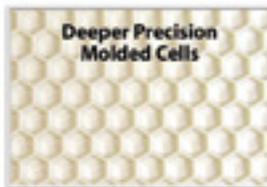


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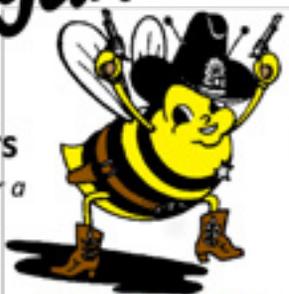
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Left – A BVT honey bee dispenser system at a sunflower field. Right – A BVT bumblebee system on-site at a strawberry field.

controlling disease. The BVT system has been incredible to help control disease on blooms,” says Winn Morgan, co-founder of Major League Blueberries and a leading blueberry expert. “2020 is our third year using the BVT system and I am very pleased with the results. Everyone wins with this system – both growers and mother nature, it’s ingenious and very good at what it does.”

The company recently announced that it has secured

2021 grower commitments in October exceeding the entire 2020 growing season. The sales cycle for the 2020 growing season began in the US Southeast where the bloom starts first; and will now expand into the Midwest, Pacific Northwest and the Northeast where blooms start later in the growing season. **BC**

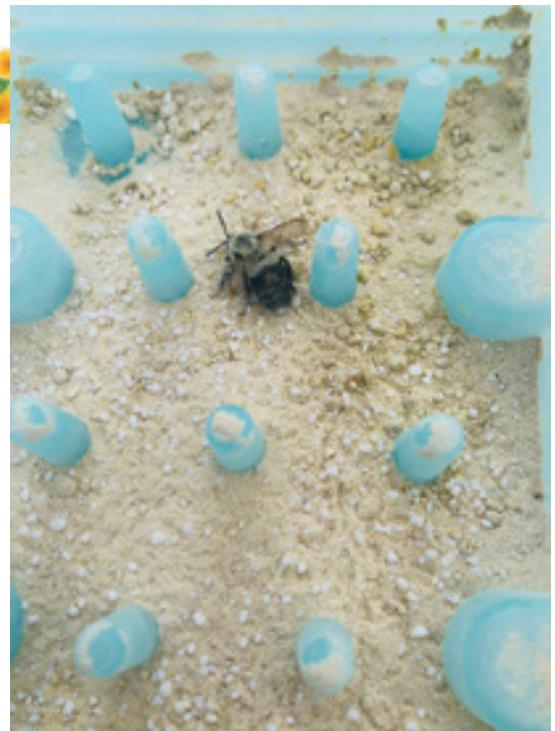
This article first appeared in the November 2020 edition of Alberta Bee News.



The BVT technology (precision bee vectoring) is completely harmless to bees and allows minute amounts of naturally-derived pesticides (biologicals) to be delivered directly to blooms by bees.



BVT staff sets up its natural precision agriculture system on-site in a blueberry field at the start of the growing season and blooming period – location is southeastern U.S.



THE LATEST BUZZ ON USDA POLLINATOR EFFORTS

— Scott Hutchins & Elizabeth Hill

Pollinators are a vital part of the agricultural production landscape and USDA plays a critical role in monitoring pollinator health and ensuring they thrive. Our efforts are extensive, but focus primarily on factors that influence pollinator health, crop production, and conservation. Ultimately, USDA exists to ensure Americans have access to a variety of fruits, nuts, and vegetables needed to support a healthy diet.

Efforts to support pollinator efforts can be seen across an array of Department of Agriculture programs. In all, **14 USDA offices and agencies** contribute substantially to pollinator initiatives. It's easy to imagine that synchronizing actions across so many offices and agencies in a Department employing more than 100,000 people can be challenging.

We know the stakes are high from an economic perspective alone, with USDA estimates for annual production of honey bee products valued at **\$700 million**. More than 100 U.S. crops, with an **annual production value of \$18 billion** depend at least in part on pollinators – not including the **40 crops that rely on pollinators for seed production**. Given the breadth and critical importance of pollinator-related activities happening at USDA, Congress recognized the need for enhanced honey bee and pollinator activity coordination, as outlined in the 2018 Farm Bill. During the Trump administration, USDA created a coordinator position within USDA's Office of the Chief Scientist to work across USDA to help ensure that research, extension, education, and economic activities related to pollinators are done in a focused and harmonious way. USDA's pollinator coordinator aims to integrate the input and needs across USDA offices to aid in establishing annual pollinator strategic goals and research priorities.

So, what does this all mean?

For starters, USDA has never had cross-cutting coordination working across every office and agency with the pollinator portfolio. The impact from simply creating opportunities for pollinator-centric employees to come together has had major payoff in and of itself. Offices that typically work solely on pollinator policy now have a way to easily connect with research-oriented offices, and vice versa – information that is of interest to multiple offices is being shared more quickly and easily. This may not seem intuitive, but with 14 offices, multiple sister federal agencies, and dozens of outside stakeholder groups with an interest in pollinators, having a hub to connect, coordinate, and share information quickly and easily across each of these nodes is critical to successfully addressing pollinator health. That means valuable information makes it to our customers and stakeholders more quickly.

But taking things to the next level – that is, developing these new relationships to work cohesively

as a unified team in establishing Department-wide pollinator strategies – has been an extraordinary effort and success. To date, we have over 60 federal employees that are working together on strategic planning. They share a collective vision and common goals to help the greater public good. We have also made concerted efforts to engage and garner contributions and ideas from more than 100 external stakeholders in the managed honey bee, research and crop production realms. USDA is using this information to help shape its priorities for 2021 and onward. We plan to disseminate information on approximately 15 research priorities in the coming months. These priorities will be shared with funders of pollinator research, researchers, and the general public – including beekeepers such as yourselves.

More details to come, but to keep abreast of ongoing efforts and other pollinator initiatives taking shape at USDA, visit our new pollinator landing page: <https://www.usda.gov/pollinators>. **BC**



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Dr. Scott Hutchins, Deputy Under Secretary for USDA Research Economics, and Education, and Elizabeth Hill, USDA Pollinator Coordinator

Additional USDA Resources:
NASS Highlights, Honey Bees:
https://www.nass.usda.gov/Publications/Highlights/2019/2019_Honey_Bees_StatisticalSummary.pdf

Pollinator Infographic:
<https://www.usda.gov/sites/default/files/documents/pollinator-week-infographic-06.25.2020.pdf>

Free Bee Disease Diagnosis Service
<https://www.ars.usda.gov/northeast-area/beltsville-md-barc/beltsville-agricultural-research-center/bee-research-laboratory/docs/bee-disease-diagnosis-service>

What's all the buzz about?

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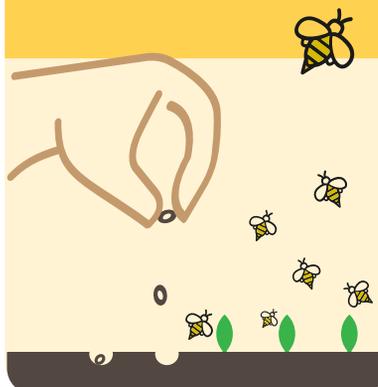


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The Beehives That Don't Hold Bees, Part 1

Jim Thompson

I collect bee paraphernalia and two of my tokens prompted me to write these articles. The first token is a civil war token dated 1863, good at Tyler's Beehive Dry Goods, 2 West Washington St., Indianapolis. The other token was good for one cent in trade at C.H. Pilger, Bee Hive Grocery, Norfolk, Neb. If the stores existed today, I would bet that they would be honored at their face value.



What were Beehive stores? The ones that I have found don't seem to be a chain store like Wal-Mart or K Mart, but there were/are a lot of buildings, businesses, and objects with the "Beehive" name.

Beehive Augusta Tavern constructed in 1769 has been a private residence, a general store, a pharmacy, an office for the ferry to Boudes Landing, and currently a tavern. In 1862 the building was set on fire (Civil War). After the flood of 1937 the building continued to deteriorate until in early 1970s, the Augustans saved it and other



Bee Hive August Tavern

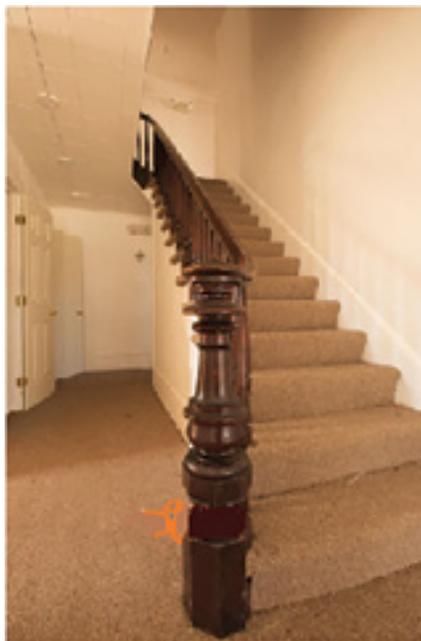


row houses by putting them on the National Registry of Historic Sites. In 1985, Luciano "Sean" Moral bought the building and renovated it. It was named the Beehive, for the large beehive found in the basement during the renovation. In 2017, Lance and Lalani Bates bought the building and have tried to keep the interior and structure as original as possible.

Sutton's Beehive was built in 1854 and was once the Methodist Church, the Holbrook house, and the Sutton Center Apartments. This building was originally on a site on the west end of the Town Common. Eleven preachers served in the Methodist Church in different years until 1869 and the building was sold



Original Site of the Sutton's Methodist Church, i.e. Beehive.



Stairway in Sutton Beehive

at auction to Stephen B. Holbrook who disassembled and moved it to the corner of Boston Road and Singletary Avenue in Sutton, Massachusetts. In the rebuilding it became a residence, an old fashioned store, and the Post Office was in the basement. Hot and

cold water were plumbed throughout the house. Wilder S. Holbrook kept the store and Post Office in the building until 1888. The building sat on four and one quarter acres, but in 1908, one and six tenths of an acre was sold to the town of Sutton for a High School. The building was owned by Herbert Ray who moved the Grocery Store and Post Office to a Brick Building for about eleven years. Then there was a succession of owners; Ernest P. Putnam, Wallace F. King, William H. Davis, John Hebert and Frank H. Paine in 1936. November 1945, Alfred and Barbara Beaton purchased the property and the top two floors were converted into four apartments and a four car garage was added. In 1946, the ground floor was converted into a grocery store and operated by George Grandchamp. In 1947, the store was replaced by two apartments and thus the six apartments became known as "The Beehive". Many families occupied the Beehive and one of them, Howie Bottomly, recalls finding a grave stone under the floor in the stable/garage. It turned out that the stone was the old headstone that had been replaced. In the early 1990's Getty Petroleum purchased the property and neglected it. This caused the tenants to leave. The building was demolished Thursday, April 2, 2020.

Tyler's Dry Goods Bee Hive of Indianapolis, Indiana was established March 1861 on the corner of Washington and Meridian Streets. The store was 22 feet x 60 feet long. The next year 20 feet more were added to the length. In 1886 George M. Traver and C. Tyler Jr. were admitted as partners. The second floor was used for manufacturing and jobbing. In 1887 another 20 feet was added to the floor space making it 120' in length. The basement of 22' wide x 80'



H. P. Wasson & Company Building

long was an apartment. There were 15 salesmen and five cash boys. In 1861, the sales were \$860,000 and in 1868 the sales were approximately ½ million dollars. Hiram P. Wasson started out as a stock boy. Wasson acquired an ownership interest in the Bee Hive Department Store in 1874. In 1883, Wasson moved it down the street with a new name, H.P. Wasson and Company. Hiram Wasson died July 21, 1910 and his son, Kenard died in 1912. Thus the store was sold to Gustave A. Efroymsen and his brother-in-law Louis P. Wolf. Louis Wolf was killed in a plane crash in Alaska in August 1967. In October the stores were acquired by Goldblatts. Suffering heavy losses, all the stores were closed. The Kokomo store was the last to close February 27, 1981. After some renovations in 1980's of the original store, became the home to the State Department of Health.

The Bee Hive near Sioux City, Iowa opened in 1884 and was run by Dave Davidson. Dave's brother, Ben, then ran this store while Dave opened up another store in Sioux Falls, South Dakota. The South Dakota store was situated on the west side of Phillips Avenue, between 9th and 10th Street. It opened on May 1, 1886 and was a dry goods store as it sold carpets, clothing, boots, and shoes. The two stores were approximately 75 miles apart. In April 1893, the South Dakota Bee Hive was sold to Herman C. Freese and Charles M. Rhode. Additions were made to the store in 1904, 1910, and 1924. Rhode died shortly after a heart attack in 1930. Freese carried on a few years, but sold the store to Fantle's before he died in 1936. The final days of the Bee Hive, it was a four-story building with a restaurant, hair salon, and many departments. Montgomery Ward opened its first store at the old Bee Hive location in 1935.

Dave Davidson shocked those that knew him by committing suicide on January 15, 1931.

Waiuka Beehive Store, New Zealand started September 1905. It was run by Stephen Perrin, who opened it in the Flexman Building on the corner of Bowen and Queen Streets. Bad luck seemed to follow Perrin, for about a year after the store opened, he was in a bus accident



Sign reads: Beehive Stores, S. Perrin Co., Universal Providers
Stephen Perrin is holding the young child and the photo was taken in 1908

where the horse drawn bus went over an embankment between Waipipi and Waiuku. He was badly bruised and thought that he would be confined to his bed for some time. Perrin declared bankruptcy in 1910 but just before his trial, he fell off a train carriage platform. He later closed the store.

Beehive Wool Shop, Victoria BC was founded in 1906 by the Fowler family. They started by selling yarn and fabric and the woolen underwear was proudly displayed suspended from the ceiling. The store moved locations several times before settling on Fort Street where it remained for several decades. In the 1950s, the Orme family purchased the store and the specialty became British Woolen Yarns and Fabric. In the 1970s, knitting had a big renaissance and the "Condo Sweater" craze began. This prompted the opening of the Beehive Store at Hillside Mall, Mayfair Mall, and on Oak Bay Avenue. By 1995 the multiple store locations had been combined into the Oak Bay Avenue location. In March 1997, Valerie Huggett bought the Beehive. In 1999, the Beehive was moved back downtown to 1700 Douglas Street, just a few blocks away from its original location. In 2018, Valerie's daughter Julia joined the team, making it a family ownership tradition again.



The Bee Hive Wool Shop in the 1950s.



The C.H. Pilger Bee Hive Grocery, Norfolk, Nebraska trade token did not have a date, so my research really began. There were three grocery stores and two newspapers in early Norfolk, but no names of the businesses were given in the documents. The village of Norfolk was settled in 1866. Did you know that Norfolk is the contraction for the words North Fork and the original abbreviation offered was Norfork, but the postal authorities thought that it was a spelling error and changed it to Norfolk? The Nebraskans still pronounce it Norfork. The village was incorporated in 1881. I found that Augustus Philip Pilger, 1849-1906, married Bertha Gerecke, October 2, 1870. In 1871 Augustus set up a tin shop and later was a dealer in stoves and hardware. He was the father of Charles Henry Pilger born May 9, 1877 in Winnetoon, Nebraska and died April 12, 1945. Charles married Helene Wilhemma Pasewalk on September 25, 1907. She was born in 1885 and died in 1963. Charles served from 1907 to 1909 as the fire chief of Norfolk. He was listed on the 1920 census as living in Nebraska, but on the 1930 census he had moved to Los Angeles, California. Thus the trade token must have been made about 1907 to 1920.

Living in Norfolk must have been a chore as they had a record of 66 years of floods in Stanton County from 1823-1940 in the Elkhorn Basin. They had three major floods and 17 minor floods. The floods that



These men used a rowboat to navigate Norfolk's flooded streets. The hotel is the building on the right.



The Elkhorn overflowed through Norfolk's business and water for months.

would have affected Charles Pilger were the March 27–29 to early April 1912 where they had 76 inches of snow melting, the snow and rains of 1917 that caused two floods that year, and the April 20–26, 1920 flood. In 1924, the Sanitary District began to make improvements at Norfolk but Charles Pilger may have moved by then.

The floods also weakened the bridges so people would to have walk across, rather than drive over the river.

Just 22 miles due east of Norfolk is a town, Pilger, Nebraska. It was incorporated in 1887 and named after Peter Pilger. They had two beehive stores in Pilger, one store at 155 W 1st Street and the original Bee Hive store at 405 W 1st Street. On June 16th and 17th of 2014, twin tornadoes (both EF-4's) came through Pilger and damaged most of the town. The older Beehive convenient store is pictured, after the tornado.



Pilger Store



Lois and Gerald Bernstien at store

The Bee Hive Grocery in Omaha was run by David and Mary Bernstien. I thought for a moment that it may have been the C.H. Pilger store as it said that the store had been started by his great uncle. The Burnstien store was located at 822 N. 16th Street and started in 1913 however the date was wrong for the Pilger store. There was a list of 1000 defunct grocery stores in the Omaha area, two of which were Bee Hive stores. One was the Bee Hive

Grocery Store at 2421 N. 24th Street which was in operation from 1902 – 1998. The other was the Burnstien Bee Hive Grocery Store that was in operation from 1904 – 1999. David Wolf Burnstien, Mary Reva Bernstien (Fried), children: Gerald and Donna have passed away and their grand children: Mark and Ronald had other pursuits. So Bruce was the one to continue the store until his death in 1999. **BC**

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 History Beehive Augusta Tavern, internet
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 Looking Back: Russian immigrants' downtown store, The Bee Hive, opened to crowds, internet
 Memories of the Jewish Midwest Mom and Pop Grocery Stores; internet
 Once stately, the Beehive in center could ace wrecking ball, internet
 Pilger, Nebraska tornado damage map, internet
 The "Beehive," a former church and store, is demolished in Sutton, internet
 The Bee Hive Wool Shop, internet
 Waiuku Museum//The Coolest Little Museum this side of the Waikato river, internet
 Two tokens from my collection

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Beatrice Kamau



My name is Beatrice Kamau. I was born in Kenya (Africa) and have lived in Chicago, IL for over 20 years.

My company is Multiple Harvest LLC. (Sowing, seeds, Knowledge and confidence). I am a nurse, beekeeper and urban farmer. I am currently a participant of Farmers for Chicago, (FFC), a farmer training program offered by Urban Growers Collective located in Chicago, IL.

I've been beekeeping for the last four years. I usually start off with four to six packages of Italian or Canolian bees in a year, and end up with three to four hives at the end of the year. Mistakes that I need to improve on, are hive maintenance (regular checks, treatments and control of *Varroa* mites and hive beetles).

I've done a couple of successful splits, and I've had

some years of good honey harvest and over wintered bees. My target is to get to 10 to 15 hives and make more value added products.

Just like my beekeeping instructor, Marcin of Garfield conversatory in Chicago always says, 'Every beekeeping is Local'. I believe this and I love to learn from other beekeepers. I love bees and even though I have had a great support of experienced local and international bee keepers, I've made almost all mistakes!

Learning how to keep the smoker lit throughout the hive check is one of the most basic and important skills to learn for a beginner.

When I started beekeeping, I underrated this skill and my smoker would go out as soon as I opened the telescoping and inner cover. This caused my knowlege to fly off as soon as the agitated bees begin flying towards me in my full bee suit, and fear would take over, which a couple of bees sensed and took advantage of by finding unsealed areas of by hard hat veil. My hands-on experience has given me the ability to mentor aspiring and new beekeepers – hoping they will not repeat the same mistakes. I read books, online, watch youtube videos, attended bee keeping conferences and Apimodia Congress.

I founded the African women in beekeeping (AWIB), in 2019. The group started with seven members from six African countries. Currently, the group has over 110 members from over 13 African countries and growing. I have learned alot from the female beekeepers – who use traditional or/and modern hives. I recently learned from a traditional bee keeper who uses propolis tincture to kill scorpions, which are a big threat to beekeepers in the area.

Beekeeping in Africa, like in most parts, of the world, was traditionally a male job. Women in Africa in recent years have been getting into beekeeping as a means of providing supplemental income to their families and communities. Today, involving women in beekeeping, especially in rural areas is very beneficial to the community because most women are the ones who tend the family land for food or cash crops.





Women can be a great channel to encourage growing of native pollinators in their area. This not only will help protect native pollinators including bees, but will also contribute to environmental conservation, thus improve the ecosystem.

AWIB vision is to be the biggest Apiculture network of African women in the continent of Africa and beyond, and be able to supply quality and competitive apiary products both regionally and across the globe.



My advice to aspiring bee keepers is learn the basics from experienced beekeepers and trainers and join local beekeeping Associations or groups. You will learn a new skill and also help save the bees. **BC**

Beatrice Kamau Multipleharvestllc@outlook.com

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The Journey

I never planned on being a beekeeper or a scientist. I fell into this industry. And just like anyone who has ever harvested honey knows, it's a sticky profession. Honey, when harvesting, has a way of escaping and leaving sweet traces on door handles and shoes. Wax, honey and propolis gets into your clothes. Somehow, the bees just become part of you – you start watching the weather more. You plan for the seasons. You notice what's pushing up through the ground in your neighbor's yard and what's coming into bloom around town. The weedy lot, strewn with dandelions and clover that you considered an eyesore now makes you smile. You pause to watch a bumble bee work a purplish blossom and wonder how it ever got named red clover. The herbs and sunflowers you planted for your honey bees attract other visitors – hoverflies and sweat bees, monarchs and swallowtails. A quick walk to the mailbox morphs into a 30-minute visit with winged friends, as you watch them dine and flit, mate or fight.

Honey bees are a gateway bug. When I started keeping colonies, I suddenly had an up-close view of the intricate dance between flowers and bees. I worried how the two-week warm snap in February might confuse my colonies into thinking spring had arrived, only to watch

the temperature plummet below zero in March. I would sneak out to heft my colonies, knowing they had enough food stores, but still worrying they were booming with brood inside, had cranked up the nursery temperature and might run low as the carbohydrate rich honey fueled the generation of heat. I saw how two weeks of rain in April washed out most of the season's cherries. Honey bees taught me how ecosystems are intertwined, how interconnected our world is, how, when one thing slips out of place, the change ricochets and ripples in unexpected ways.

2020 is the first year in almost two decades where I haven't kept my own bees. I fell into beekeeping almost by accident when I planted some wildflowers in my garden. I wanted pollinators for those flowers, and so I attended an intro beekeeping class, winning a hive in a raffle. Not the bees, just the box. But once you have a box, you have to fill it with bees. And as every good beekeeper knows, it's a terrible idea to only start with one. So I leapt in with three colonies. Within two years that had grown to 20.

For almost 20 years the bees have been with me. But I sold my house last summer and moved across the country, splitting my time between Arizona and Berlin, Germany for

research. I also launched **2 Million Blossoms**, a new quarterly magazine dedicated to all pollinators. Getting a print publication off the ground from scratch, while working in two countries meant I wouldn't have the time to care for my colonies. That was before a pandemic shifted the territory beneath my feet.

I miss having my own hives. Managing colonies at the university is different from running your own. As a scientist I explore different questions than I do as a beekeeper. As a beekeeper, I let the bees be bees, rejoice in the heavy flight traffic, marvel at the many colors the foragers cart home on their back legs. I encourage my colony to grow. I manage the spring burst of bees to make nucs for new beekeepers. I lose an hour immersed in a colony, watching the ebb and flow, forgetting my long list of things I desperately need to do. I listen to the bees. I read the colony, so I know what they will be doing two weeks from now and prepare accordingly.

As a scientist, I study how varroa mites subtly change the behavior of nurse bees. This means letting varroa populations escalate beyond what's healthy and keeping the colony alive by adding in healthy brood frames from donor hives. I feed colonies pollen besmirched with low levels of pesticides to measure the sublethal impacts on colony health. I'm not nice to my colonies, forcing them to draw out weird plastic combs as part of an EU project, so our lab can scan the brood and determine if there are subtle irregularities during development.

These are important questions and worthwhile projects in need of investigating, but it is far removed from letting the bees be bees. Rather it is an in-depth view of how human fallacies have complicated the lives of our pollinators. We've moved pests and parasites around the globe. We grow our food in large monocultures that promote disease and provide pests a feeding bonanza. Having



Kirsten beside an apiary outyard at a new solar installation that was planted with pollinator friendly plants.

created a glut that attracts aphids, leafhoppers, and stink bugs, we reach for chemical solutions to keep these unwanted visitors in check. Globalization has not been kind to the environment, though it has provided an incredible living standard for most Americans and allowed an explosion in food variety. Our supermarkets offer a dizzying array of choices even when living on a tight budget.

We've changed the landscape and the pollinators that feed us are often starving themselves. The ranks of beekeepers have swelled. Many individuals eager to help save the bees have stepped up, purchasing equipment and bees. But in a fragmented landscape, especially in some urban environments, the flower resources have not increased even though the colony numbers have surged. Tensions are on the rise between native bee enthusiasts and beekeepers, with honey bees often described as pollen pigs that hoard resources. This feels a bit like a strawman argument – it's not really the honey bees that are the root problem, it's the lack of forage.

This is where beekeepers, with their large numbers, can take on an active role as stewards of the environment and gatekeepers to improved pollinator habitat in their communities. We've all experienced this: we're at a social gathering and someone we've just met learns we keep bees.

"You keep bees?!"

Suddenly they are grilling us with questions, their eyes wide, nodding along, absorbing all they can. Your cousins, uncles and distant friends forward you the stories about the bees that survived the Notre Dame fire or the red honey discovered in Red Hook, New York. Your parents send you random videos of the tiny bees buzzing their poppies and the monarchs visiting their milkweed. Friends introduce you as a beekeeper and memories resurface from the newly introduced acquaintance of time spent on a farm, delicious honey, colonies kept on the field edge.

As a beekeeper, you've turned into a touchstone, a guiding light that helps your inner circle appreciate the small creatures that flit through their yard. They brag about you to friends, and your reach ripples outward. People don't change their behavior because of top down commandments.

People change their behavior, because someone they care about showed them by example. Biases and bad behavior fade away when people we care about demonstrate that they were built on misconceptions.

We live in divisive times, where our online interactions often steep us into a narrow point of view. What I love about beekeeping is that it cuts across political divides and educational strata. The third-generation farmer with iron-strong hands from stringing fence posts and chopping wood chats about failing queens with the urbanite hipster, who couldn't change a tire because he doesn't own a car, but made a small fortune mining bitcoin as a teenager. They may argue about varroa management strategies over a shared beer. They approach life very differently, yet they respect each other's skills in running bees. Honey bees are one of the few topics that still encourage dialogue and listening to each other. Keeping bees is both a science and an art, where experience brings a new understanding.

I launched my magazine because honey bees opened up the world for me. *Apis mellifera* are just one of 20,000 species of bees. They share the world's blossoms with butterflies, bats, birds and a plethora of other insects and animals, helping to preserve our shrinking biodiversity. Beekeepers are not the enemy. Beekeepers are the lynchpin – important stewards of the environment that introduce so many strangers to the delicate dance of our interconnected world. Through their love of the charismatic honey bee, beekeepers influence their neighbors and friends to slowly



Kirsten checks on a two story nuc in her old home yard, collecting some extra frames for a new mating box that will receive a queen cell in a yard about five miles away.

change sterile lawns into pollinator friendly habitat, increasing forage for the insects that feed us.

I am extremely grateful for the way honey bees have increased my understanding of our interconnected food web. Just as I bring my smoker to smolder, building up a fire that burns quietly and steadily, the bees have lit a match in me. I am eager to keep learning about ecosystem interconnections. Nature is incredibly diverse. She's dreamt of some ingenious and crazy solutions to problems.

Did you know that some stingless bees excrete wax not from the underside of the abdomen, like honey bees, but from their back? There are fruit bats that migrate from Mexico into the southern U.S. while pregnant, arriving in giant maternity caves to rear their offspring. Pawpaw and persimmon seeds germinate better after they pass through the gut of coyote, who helps the native trees reach new fertile landscapes. Bumble bees that escape from greenhouses often interbreed with the local populations, which may cause the hybrid offspring to be out of step with the season. Swallowtails require plants in the parsley family – which includes fennel, dill, carrots, and Queen Anne's lace – to rear their young.

Honey bees must visit two million blossoms to make a single pound of honey. I still marvel at the taste of Spring and Summer in a jar. But by letting me be their steward, the bees have also connected me to all the other insects and animals that weave invisible threads through the air as they move pollen between plants. "These insects, so essential to our agriculture and indeed to our landscape as we know it, deserve something better from us than the senseless destruction of their habitat," wrote Rachel Carson in her book *Silent Spring*. We need more flowers for them all. **BC**

Dr. Kirsten Traynor is a honey bee scientist and founder of the magazine 2 Million Blossoms. She is also a cohost for the podcast **BeekeepingTodayPodcast.com**. If you enjoyed her essay, you will love the 100+ pages in every issue of this new quarterly dedicated to all pollinators. Read the first issue for free online. Better yet, subscribe today at www.2millionblossoms.com.

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The Nuc Business

From Start . . . To Finish

— Jennifer Berry

When I first decided to sell nucleus colonies (nucs), I thought, well this will be easy because bees make bees, right? Well, the latter is true, but I wouldn't say that selling nucs is easy! It's the same as with anything else, if you want to do it right and do it well, it takes time and experience. It's been over 14 years now that I've been selling nucs, and I have learned a lot, but I'm far from being an expert. Here's how I got started and a few things that I've learned along the way in case you are thinking about making the plunge or just interested in how we sell nucs.

When this idea of selling nucs popped into my head I reached out to my good friends, Steve and Sandy Forrest. Talking with them, they both recommended that I start off with solid, well-built, painted equipment. They had both been beekeepers for years so I took their advice and the first woodenware I purchased came from their operation, Brushy Mountain Bee Farm, (which sadly is no longer in business). I ordered enough equipment in the fall of 2006 to house 100 colonies, but first, it had to be assembled and painted. So, I spent the next five months, assembling, priming and painting boxes, lids and bottom boards (two coats). But I had help. I called friends and family, fed them pizza and beer and had an assembly and paint party. Without their help it would not have been possible. I did eventually move to eight-frame cypress equipment since it's easier on the back. By the way, most of the equipment I purchased from Brushy still looks great today, even with the propolis and bee poop stains scattered about.

While I was busy getting equipment ready, I knew I better order bees before they were sold out. My first and only purchase of bees/nucs came from Bob Binnie at Blue Ridge Honey Company. I knew Bob very well since he had collaborated with us on several research projects at the UGA Bee Lab. I also trusted the quality of his bees. I've been in most of his apiaries, seen his hives and his bees. They were and are always healthy and very well cared for. Bob is a conscientious beekeeper who cares about the welfare of his bees. That is why I choose to buy from him. I wanted to start out with the best bees in the area.

Once the equipment was ready, and the bees were soon to arrive, I needed locations.

Good locations are very important, not only for the beekeeper but also for the bees. You want the apiary to

be close enough so you're not wasting time driving about but also in a safe location. Locations I choose were either behind a locked gate, down a private driveway or so far off the road no one could see them. Hive theft happens all the time, and can ruin a nuc season, or a business. We never advertised where bees were and never told neighbors there were bees nearby. Best to keep your bees out of sight so they are out of mind.

It is also important, when choosing a location, that the site has good forage and isn't toxic for bees. Thankfully, in our area, there isn't a lot of intense agriculture, so not too many pesticides are used. However, we have had a few issues over the years. Probably the worst was when a farm was sold and the new landowners had no regard for bees, or the environment for that matter. They didn't inform us that they were going to spray the fields so when we showed up days later, mounds of dead and dying bees littered the ground in front of all the colonies. When I asked if they had sprayed, they blankly looked me in the eye and said, "We don't know nothin' about nothin'." We loaded the bees up that night and got them out of there. Fortunately, the colonies survived, but needed a tremendous amount of TLC. I did find out later they had sprayed the fields and now are getting paid to spread "sludge" (human waste byproduct) from Atlanta. That's not the sort of location a beekeeper would want! When making arrangements with landowners, make sure they want bees, are passionate about the environment and understand the importance of communication. Your bee's lives may depend on it!

Once the locations, equipment, and bees were in place, I was in business. It has taken years to settle into a routine but once I figured it out, things have started to run a lot smoother. Instead of going into a diatribe about all my mistakes, let me fast-forward 14 years and share a



Painting initial hives purchased from Brushy Mountain Bee Farm.



Jennifer and Bob Luckey searching for queens. (Linda Tillman photo)

Hive Reversal



Figure 1. Correct Hive Reversal.

few things that have worked. As you know, beekeeping is a yearlong process; we must always be one step ahead of the bees if we want to be successful beekeepers. Anticipation and planning are very important. It's the same with nuc production. As we watch the last nuc leave our property, preparations for the next season's batch of nucs has already begun. In other words, we started in March of 2019 to prepare to sell nucs in March of 2020. But let's back up a few months and start off with the chores we start first of the year.

Throughout the Winter months, bees have slowly moved upwards into the honey supers, and by the end of January or February, they're at the top of the hive bumping their little heads against the inner cover or lid. Typically, they have left an empty box void of life below. By doing what we call a "hive reversal", it immediately provides drawn comb for the queen and bees to move into (Figure 1). Also early in the year, queens have begun to lay eggs which means brood areas and populations are expanding. A hive reversal will allow an area for this expansion. With more area for the queen to lay eggs, it means more bees available to sell in the Spring.



Colonies to split.

Hive Reversal



Figure 2. Incorrect Hive Reversal.

Hive reversals are fast and easy and a must in our nuc operation. We remove the empty box from underneath the brood nest, and put it on top, but, and a huge BUT here, do this only if there is NO brood in the lower box. It needs to be empty of bees and brood, otherwise you will separate (split) the brood into two different locations. Bee populations at that time may not be strong enough to cover both areas, hence unprotected brood will die (see Figure 2). Another word of caution, do not separate the bees from their honey this time of year either. Cold spells still occur and the bees need to be close to their food source. Put the empty box on the top, just like you do when you super a colony.

Here in the Southeast, in January, there are always days here and there that are warm enough to start performing hive reversals. Sunny days in the 50s to 60s, with little to no wind, are perfect. While doing hive reversals, this is a good time to check for honey stores. If the colony is light, feeding is a must since the nectar flow may be months away. Once hive reversals are completed, our main chore in the beeyard is feeding and back at the house it's time to contact customers.

Normally, we start taking orders for next year's nucs in early fall. On our website, which took years to finally get up and running, folks can fill out a form to order nucs. Once I receive the order, I send an email to let them know they have a nuc reserved and answer any questions. Keeping up with and satisfying customers can be almost as difficult as keeping bees. Several years' back I began to require a \$50 deposit per nuc; reason, every year I would have four to six customers that would order nucs and either never show up when they were to get their bees or would stop responding to emails. It is time-consuming contacting customers, so asking for a deposit separates out the ones who are really serious about getting bees. Trust me, before requiring a deposit, we would have numerous nucs ready to go, but no one showing up to take them home. Also, keeping up with who ordered what and how many, can be a challenge. Just make sure you include their order information in an email so there are no surprises. Late winter is also a time to inform customers when they should expect their bees. The weather and nectar flows are always a crapshoot. Some years they have been out the door in March, other years, not until May.

Starting in February, tensions begin to mount for nuc, package, and queen producers. It's an extremely nerve wracking time because by this point, there is not a bee to be found. Everyone in the southeastern portion of the country has completely sold out. So, if something goes wrong and you can't deliver, your customers will be without options. They're relying on you to keep your promises from the prior year. Yet, weather can wreak havoc on a timeline. So, back in the Fall we must determine how many nucs we can sell. If only we had a crystal ball, right? Since none exist that I know of, our rule of thumb depends on how many colonies we have going into Winter. If there are 100 colonies, I will take orders for 80 nucs for the first round and 80 for the second round. Best to err on the side of caution; if I take an order and am unable to fill it, it's not a good feeling. I hate disappointing people, however, there is a disclaimer on our website that reads . . . For both early and later nucs, we will do our best to provide you with bees, however, Mother Nature is in control. If the weather turns cold and rainy or worse, we may have to delay or even cancel orders. Honey bees are "livestock with wings" and their availability depends on environmental conditions. If this is a concern, you may want to find your bees from a different source. We are a small operation and put the health and wellbeing of our bees first.

Since we do our best to get our first batch of bees out the door in March, I have seven weather apps on my phone and starting in February, am looking at them all. As soon as I see a break in the weather, (sunny and temperatures in the 60s), we hit the field. Our splits consist of a queen along with five to eight frames of bees, brood, honey and pollen. They are placed into a five- or eight-frame nucleus colony, depending and are boiling over in bees. This first batch of nucs is extracted from overwintered colonies headed by a queen we choose the year prior. We crown them as "overwintered, proven queens". They were reared during the summer months and evaluated over time. Ones that make the cut, get crowned, ones that don't, get pinched with a kiss. Once all the splits have been made in the apiary, we transport them to a yard where the customers will come and pick them up. We used to hold onto these nucs for several weeks, but now once they



Five-frame nucs ready for their new owners.

are made we scoot them out the door days later. Next we turn our attention to the second batch of nucs, rearing queens and drawing out comb.

The overwintered colonies we harvested our first round of nucs from, are now split again into two or three colonies, depending on size. Each queenless split has at least one frame of brood, three frames of bees, along with some pollen and honey. We will feed these colonies since the nectar flow is always unpredictable in March. Once all the splits are made, and if the timing is right, queen cells, which we have reared, are inserted. Once a cell is inserted, we leave the colonies alone for 14 days, after which we begin searching for eggs. Colonies with mated queens are noted and ones without are combined. We continue to feed and let the bees be bees for several weeks. These splits will be the second round of nucs to be sold. Every nucleus colony that is sold out of our operation must have three to four frames of brood covered in bees and one or two frames of honey/pollen covered in bees. All combs must be completely drawn with solid brood patterns encompassing most of the frame. Once they have made the cut, customers are contacted, arrive and take home their new pets.

Like I mentioned before, as we watch the last nuc leave our property, preparations for the next season have already begun. One major goal during the Spring months is to have hundreds of frames of new comb drawn out. In the Piedmont region of Georgia, we only have about a three-month window during which the bees can draw comb. One must be ready with plenty of assembled frames with foundation, or you will miss the boat. We don't allow old comb to stick around. It is culled out immediately. Nothing worse than a beekeeper buying a brand new nuc, and finding their beautiful bees on old, black, brittle comb, yuck! Over the years, I've had customers send photos of nucs purchased from other operations. I can't believe anyone would sell ratty, moldy, black comb, but it happens. If you are planning on selling nucs, don't sell off your crap, you will quickly get a bad reputation and lose customers. If you are selling nucs, you are constantly cycling in and out frames, so comb should never get too old; if it does, toss it out.

We used to label the top bars of our frames with the year, but like most well laid out plans, it didn't always work. I would find dated frames that were three, four,



Eight-frame nuc to be sold full of bees.

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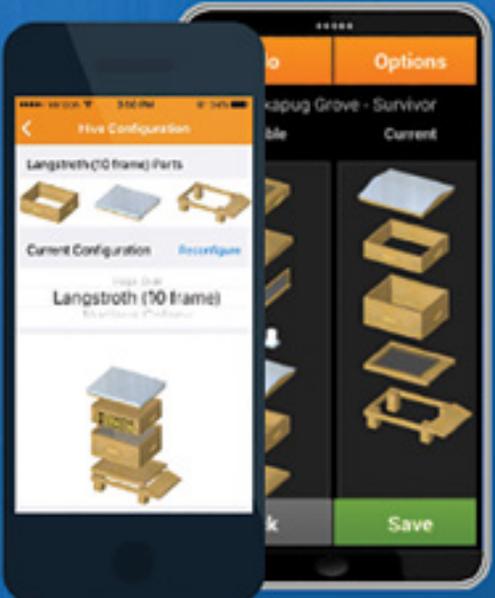
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and five years old, but had not yet been drawn out. We have tried other methods, such as dating the frames once they've been drawn, but, on a busy day in the apiary, we would forget, not have a permanent marker or forget what year it was. Plus, top bars quickly accumulate waxy build up that often makes writing on them, after the fact, ineffective. It is, however, a good practice to date your frames, especially brood frames, so you know how old they are.

Once Spring turns into Summer, we just let the bees be bees. We continue to evaluate queens, make splits, collect mite data, and rear queens to replace poor quality queens. Nectar flows have come to an end so undrawn frames are removed. Drawn frames are inspected along with brood patterns. Weak colonies with poorly performing queens are combined and requeened. As Fall rolls around, hopefully, all colonies have plenty of stores and are starting to hunker down for the Winter; if not, we continue to feed. This is also the time when we determine the number of nucs that will be available for sale next

year, but still, lots can go wrong between October and the following March/April. In Winter, we take orders, repair equipment, build frames and lick our wounds. Like I said in the beginning, selling nucs isn't easy.

It has been a great ride, and I have really enjoyed selling bees and meeting customers, but it's time to get out of the nuc business for now. We are still on the fence if we should sell the entire business or sell nucs one more year. With my husband starting a new business venture and me back in graduate school, time has become the limiting factor. I still plan to hold classes and keep rearing queens (my favorite part of beekeeping), but it's best to stop for now. I've always stressed quality over quantity, which makes selling nucs a bit more stressful, but worth it in the end. To me it's not about selling 100s of nucs, it's been about introducing 100s of folks to beekeeping and our bees, which I hoped they've loved. 2021 will be 15 years of selling bees and will be my last in the nuc business, at least for now. Bees are my passion and always will be! Take care of you and your bees! **BC**

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BUILD A SYRUP DISPENSER

Ed Simon

You started making your sugar syrup in four- or five-gallon quantities and now you need a way to load it into your frame feeders or jars without spilling it. Currently you use a quart pitcher which works but it seems that you always miss the feeder or need just a little more syrup to finish filling the feeder. Why not try a liquid pump? Its a low-tech and relatively inexpensive filling device that is compatible with your current five-gallon mixing pail.

With a liquid pump you can load your feeders directly from the five-gallon pail with minimal spilled syrup. Most of these pumps are designed for oil or transmission fluid. Therefore, they should be able to handle your 2:1 syrup.



Parts

1. Liquid pump (1) – Usually found in the automotive section.
2. Five-Gallon pail

Construction

Step 1: Select a pump.

Buy a liquid pump with a lid compatible to a five-gallon pail.

Or buy a pump and then find a pail with the correctly sized lid opening.

Step 2: Assemble the pump.

Follow the directions and put

the pump together.

Step 3: If needed adjust the pump.

The pump intake should not be too close to the bottom of the pail. You don't want the sugar that did not remain in the solution to go into the feeder.

Step 4: Test the pump with water.

Fill a five-gallon pail with some water. Then make sure it works.

You now have a syrup feeder that is easy to use and minimizes the mess associated with pouring syrup into a feeder.

Note: This article is meant to enforce the way you can use readily available devices to make your beekeeping chores easier. You don't have to design/build/construct elaborate devices when you can use available devices with minor changes or "as is" to perform the same function.

THINK INNOVATIVELY!

Another low-tech suggestion:

Use a mover's dolly or a wagon to transport the five-gallon pail from hive to hive. For us senior beekeepers, a pail full of syrup is both awkward and heavy.

Case in point.

You can now fill the frame feeders with minimum difficulty, but you need to empty them before loading them for a move to an assembly area for their trip to California or to your home yard for wintering. The feeders are almost full and emptying them is not easy to do without spilling the syrup.

Why not use a handheld liquid pump to remove most of the syrup before struggling with the frame feeder? It is decidedly low-tech, inexpensive, and it works.

Suggestion: Take some time and roam around your local hardware and home improvement stores. You would be amazed at the things that you can find to help with your beekeeping tasks. You may not purposely remember what you see. But maybe, just maybe, you will recall some dinky little cheap device that will solve a problem that you didn't even have at the time you originally saw it.



It is usually much easier to modify a commercially available unit than it is to build one yourself.

Warning: From personal experience, make sure the exhaust nozzle for the pump is facing away from you when using any pump. **BC**

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A Honey Bee Driven Mid-Life Crisis

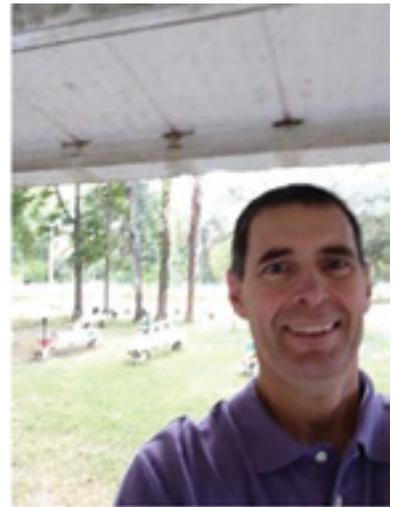
Jim Masucci

How did a boy who would rather fall off a ladder than get stung by a bee grow up to contemplate becoming a full-time beekeeper? It was a long journey, but once the seed was planted, it was a quick and complete transformation. The journey is common to a lot of beekeepers – you just get hooked. One or two colonies is not enough. The more you learn, the more you want to do. My path has come to a major fork. I am taking early retirement as a successful scientist, and making the leap to a full-time beekeeper. Scary? Yeah. But exciting too. I'm sure I'm not the only one with these thoughts and it's nice to know you are not alone. So, I'm going to share my story as someone who is in the middle of taking the leap. Who am I? How did I get in this predicament? What decisions do I need to make? Later, I hope to update you on my progress so you can decide for yourself if you want to throw away your stable life for a life of daily buzzes and stings . . .

I grew up in a blue-collar city in upstate NY. My parents were school teachers. I inherited their intelligence, but I was far from an intel-

lectual. My way of studying "bees" was to throw rocks at yellow jacket's nests and run like mad. I loved being outside and dreamed of living off the land like "My Side of the Mountain" or "The Call of the Wild". Ultimately, I went to college and, because it was closest to the environment, I got my degree in Biology. From there, a PhD in molecular biology and a post-doctoral fellowship studying root hair growth in the weed *Arabidopsis thaliana*. After 11 years of post-graduate education, I landed my first job with Monsanto. It was an incredible opportunity to help agriculture. Agriculture, the outdoors, the environment. They are all linked and right up my alley.

I worked happily for 15 years at Monsanto with no trace of bees in my life. I had thought about them though. Remember that dream of living off the land? That never really went away. I gardened, hunted, fished – and beekeeping fits that thought. Produce your own honey. But beekeeping is a lot like fly fishing. It's hard to get started without knowing someone who does it. My chance came in 2011. I volunteered



This is a picture of me visiting the University of Florida apiary where I spent a couple of weeks doing research. Only one of the great bee experiences my scientific career has given me.

to help with a field trial that was six hours away. I shared a ride with Tim Fredricks, a guy who had started beekeeping the year before and is currently president of Three Rivers Beekeeping club. We spent 5½ of those six hours talking about bees. By the end of the trip, our plans were set on me becoming a beekeeper. I read some books, built some hives, took a beekeeping course, and ordered two packages.

Having bees does not make you a beekeeper, though. I was successful and grew my two packages to four hives that year and overwintered three (a storm blew over one

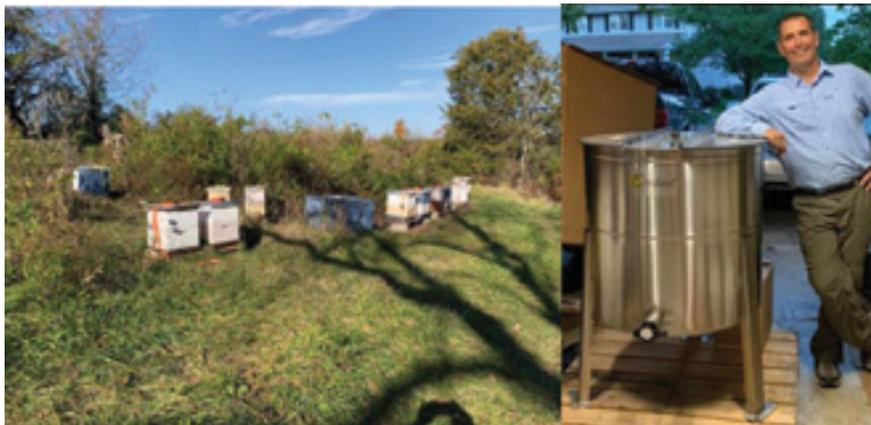


My humble beginnings started with two top bar hives and a pitcher full of honey. I remember thinking 'how much more could a person need?'

hive). It took a series of fortunate events over several years for me to become a bonafide beekeeper. It started in 2012 (my first year with bees) when Monsanto purchased the Israeli bee company Beeologics. Along with Beeologics, Monsanto hired Jerry Hayes, a legend in the beekeeping community. Who could ask for a more knowledgeable mentor? I then started helping the Bee Health Team with their field trials. I took trips to fields and worked side-by-side with commercial beekeepers and bee researchers. Walking into yards with hundreds of mating nucs, warehouses full of equipment, and incredible honey houses opened up a whole new world to me.

It got better. I joined the Bee Health Team and ran their field trials. These were the largest honey bee field trials ever performed and we partnered with some of the best commercial beekeepers in the U.S. and Canada. These guys became my friends. We worked side-by-side in their yards. They shared their know-how and welcomed my questions. We were allies fighting the same pest (*Varroa*) and they were happy to be a part of it. I took what I learned and applied it to my own bees, eventually developing my own system. This is when I became a true beekeeper. But I also feel “less qualified” as a beekeeper now, than when I first started. These guys, my friends, also opened my eyes to the complexity of bees and beekeeping, and the difficulties of running a bee business. Like with the rest of agriculture, your business is dependent on many things that are out of your control: weather, disease, pests, exposures, and even traffic. My system has been working pretty well, although I know it’s a matter of time before I’m hit with some curveballs. Will I be ready?

If you talk to my wife, this experience has been a double-edged sword. It takes bees to manipulate bees. You want to raise your own queens? You need mating nucs for that. To make the nucs, you need enough hives to establish them. You want to sell splits? You need enough hives to split from. You want a large honey production? You need production hives as well as “split-able” hives. Fortunately for me, she just rolls her eyes when someone asks me how many hives I have and



In 2010 I ran ~80 production hives, 30 nucs and produced 4,500 pounds of honey. The question that comes up now is, “how big do I want to get?” I’ve gone from suburban yards with one or two hives to rural yards of 20 and I graduated from an 8/4 extractor to a 20-framer. How many yards will I need? Will I need to build a honey house? Only time will tell.

the number is larger than the time she heard before. What can I say? It’s hard to be working with commercial beekeepers without secretly wondering, “can I do this?”

I am not a big operation, but every year I’m expanding. Two years ago, I overwintered 33 of 35 hives. I sold a few nucs and produced my first ton of honey in a single year. I had two “real” bee yards (greater than ten colonies) and a few scattered around town. Last year, I overwintered 84 of 89 hives. I sold 25 nucs and produced 4500 pounds of honey in 2020. I carried about 30 nucs for queen rearing, etc. After a mid-summer split and generating 150+ queen cells, I’m going into the winter with 148 colonies with the goal of selling 50+ nucs this spring and producing >6000 pounds of honey. I’m now in 6 “real” apiaries, and have two more lined up for next year. To some, that may sound like a lot, but it is truly a small side-line business. If I’m lucky, I’ll gross \$40,000 (\$5 a pound for honey and \$160 per nuc). From that, you need to subtract equipment, supplies, medications, feed, etc. It’s clear, if I want to be more than a small, side-line business, I need to expand and have a plan.

This year, I maxed out my ability to keep my bees and my day job.

Running 100+ colonies took all my spare time and there were times when I had to take vacation days to work my bees. Truth be told, my bees are going into the winter in smaller clusters than I would like because I missed some important feedings. I have to choose between toning down the bee operation or growing it. I was pleasantly surprised by my ability to develop markets for our bees and honey. I ran out of both even though I produced more than twice the amount as last year. Given the new found confidence in my ability to find customers and given the well-timed opportunity to take early retirement, I am taking the plunge. At the end of 2020, my day job is over and I am going to focus on bees. This leaves me with a lot of questions that I need to answer. How big do I want to be? What’s my business model? How much do I invest? Do I get involved in bee research (I am a scientist, after all)? I will provide an update when I have some answers and an idea of how it’s going. **BC**

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Gouache Paint

Alice Eckles

You may remember from my article in the November issue of *Bee Culture* that I had just discovered the use of honey as an ingredient in artist's paints. Tempera paint for example sometimes has honey as a pigment binder in the emulsion. The name tempera comes from the Latin word *temperare*, meaning 'to mix in proportion'. As I researched paints made, or bettered by the use of honey in the recipe, I found myself most drawn to gouache paint. Unlike tempera paint gouache paint is re-mixable with water after it dries, a useful quality for this artist. As usual my honey bee powered art quest began with both excitement and dread, because I primarily live to paint and any obstacle such as making my own paint, at first brings up feelings of doubt and dread. But once I get started I find a surprising joy in the process and the product.

What is gouache paint?

Gouache, the word borrowed from the French word *gouache* is pronounced "gwash" meaning: a water-based artist's paint very much like watercolor. Both watercolor and gouache paints often have honey as an ingredient. The principal difference between watercolor and gouache is transparency. Gouache is an opaque watercolor because of the added ingredient of chalk. Though gouache can be watered down and used interchangeably with watercolors, unlike watercolor paint it can also be painted on thickly for full coverage. Gouache paint is popular with designers, illustrators, and commercial artists as well as fine artists and has been in use for at least 1,200 years. From Egyptian painting, to Persian miniatures, and illuminated manuscripts gouache paint made with



Shown here are books and ingredients used in my paint making process."



Champlain Valley Honeybees in the Locust Tree Flowers is a gouache on panel. The gold leaf frame is attached and the picture is wall ready. Available from Alice Eckles website."

honey has found a place in art history and is a choice material for artists today.

Why is there honey in it?

Honey has several known purposes as a paint additive and undoubtedly adds more desirable qualities to paint than we know. Most importantly in the case of gouache paint, honey allows the paint mixture to accept higher loads of pigment. This give gouache paint it's intense saturated color. Honey also keeps the paint from getting rock hard on the palette, and the moist, slightly sticky hygroscopic influence of honey gives body to the paint making it easy to work with. Honey too has a way of blending and evenly dissolving the pigments for smooth washes of color when painting. Honey even acts as a preservative.

Does all gouache have honey in it?

No, but most have some sort of sugar, such as glycerine or dextrin, in the binder. Historically, artists making their own paints used honey and honey is still used in gouache paint today. Gouache from M. Graham is made with honey as they say in the product description:

"M. Graham gouache is made in the time-honored tradition of binding pigment with pure honey and gum arabic, just as it was for Dürer and Boucher. Providing superior coverage and a creamy application, M. Graham fine art gouache delivers lightfast color designed for your permanent artwork."

Recipe for gouache paint:

Step one – gather your materials and ingredients listed in this recipe, both necessary and options you may have on hand.

Ingredients and materials:

Artists powdered pigments, in a few different colors, in powder form.

Optional: alternative found pigments you may experiment with such as, curry, paprika, charcoal, ground earth turmeric.

Distilled water
Powdered chalk
Gum Arabic
Boiled water
Honey

Mixing pot, spoon, palette knife, glass mixing pad, clean jars with lids to store the paint and vehicle.

Paper, brush, and rinse water for testing your colors.

Optional: glycerin, clove oil, water dropper or mister, muller, tempered glass or marble mixing pad, wet wipes

First you will want to make watercolor vehicle. This is the same vehicle that would be used in making watercolor paint. Gouache paint is much easier to make at home because the paint particles of gouache are not as finely ground. To make the vehicle put two parts gum arabic in a metal pot or bowl and pour four parts boiling water over it. Stir the solution. Add one part or less of honey and stir in. Optionally add a smidgen of glycerin as well stirring that in too. Allow to cool and put in a lidded jar.

For each color of paint you make go through this process:

Important: Put on a good quality dust mask, such as a N95, before mixing pigments!

Take one part chalk and one part pigment and gently mix them just a bit with the palette knife being very careful not to breathe in any dust. Most pigments are toxic and breathing in even non toxic dust can harm the lungs and give you bronchitis.

Next pour onto the pigment and chalk mixture enough of the watercolor vehicle to make a paste suitable for painting.

Using a palette knife mix together in a circular downward motion. If the paint feels too grainy you can use a muller or mortar and pestle to grind it further. Different pigments absorb different amounts of the vehicle. A good place to start is 1/3 the amount vehicle as pigment and chalk you have out. If the paint seems too stiff you can add a little more water or honey. Once the look and feel of the paint seems right try painting with a bit on your paper. Use the palette knife to gather up the paint and put it in a lidded jar for future use. If you plan on keeping this paint for a long time before using it up, clove oil can be used as a preservative, but the honey also works as a preservative. Clean the area and repeat the process for your next color. For quick cleanup between colors I like to have wet wipes on hand.

Tips for painting with gouache:

When you're testing your colors you've started your first painting and can use this exploration as a natural artistic process. Use thick watercolor paper, mixed media paper, or print making paper that can stand up to the water without buckling. Take a brush, some rinse water, and see what your new colors can do. What happens when you add more or less water, if you paint over previously painted areas, if you paint wet on wet or next to another color? What shapes can you make with your brush strokes? Water has a memory that you tap

Use a sheet of watercolor paper to test your paints, learn what you like, and see what your honey enthused paint can do.

If alterations need to be made to the mixture add more honey or water. And while you're at it you might as well make art!



into with your brush and as you put your strokes down just to test out the paint you will automatically compose artistically some design or image from water, color, earth, and light. Gouache paint dries quickly allowing for layering, both transparent with more water or opaque with little or no water. Paints that have dried on your palette can be re-wet to clean off or continue using, or can be rewet to blend, mix, and spread the color on the painting. Gouache paint has such flexibility! It's also highly pigmented, bright, uniform, flat, matte. Explore the possibilities with just a few colors. Use gouache with watercolor to add whites, brights, and intensity to your watercolor paintings. Celebrate the primitive connection to art we all have in materials that are as close to home as your beehive.

As opposed to commercial paints I have bought, I found my own paints filled with personality, direct experience, real-ness, and intensity. It felt wonderfully primitive to paint with all natural ingredients that I had put together myself.

This revelation is very similar to the revelation of making my own sour dough bread. A process I started years ago out of necessity and thrift. It seemed like a lot of trouble at the time but once sour dough was part of my culture it became and remains deeply satisfying. Ironically it hasn't been particularly thrifty though since we simply devour more bread.

Honey is more than a food, sweetener, or medicine, it can also be used to make your own paints, which can be empowering and save you money in art as a hobby, profession, or value added bee products business. **BC**

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.

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Preventing Wax Moth Damage

It's All On You!

Preventing Wax Moth Damage

For centuries American beekeepers have struggled against the ravages of the wax moth. The larvae of the Greater (*Galleria mellonella* L.) and Lesser wax moth (*Achrois grisella* F.) feed on impurities found in combs such as discarded honey bee larval cocoons and feces, etc. In the process, the larvae tunnel through the comb leaving behind silken tunnels and their own feces that can seriously damage combs and eventually lead to total destruction of the comb. In the 1800s when beekeepers thought that wax moths were the cause of hive deaths, numerous patents were filed claiming special hive designs that would prevent wax moth damage. None of these patents actually worked and it took modern scientific methods to establish that wax moths are not so much killers as they are scavengers: a scavenger that can cause severe economic damage to beekeepers. Not only do drawn out combs represent a substantial investment of time and resources (estimates are that the bees must consume six to eight pounds of honey in order to produce a single pound of beeswax), but pound for pound, beeswax is more valuable than honey.

The best defense is a good offense

The most cost effective defense against the moth and damage caused by moth larvae (wax worms) are strong healthy hives with a large population



It is estimated that wax moths cause beekeepers millions of dollars worth of damage annually."

of bees. When colonies are weak, wax moth damage can be controlled successfully by manipulating the bee-to-comb ratio in hives that are weakened by swarming, disease, pests, supercedure, poor nutrition, or other causes. Simply put, by adjusting the size of the cavity that the colony occupies so that there is at least one bee covering every square inch of comb in the hive, moth damage can be avoided.

The wax moth prefers to lay its eggs in cracks and crevasses deep within the hive where it is dark and there is little ventilation. Exposing combs that are unoccupied by bees to fresh air and sunlight will discourage the moth and can deter them from utilizing the combs for reproduction. This approach is most successful with new comb and combs that have only been used for honey storage, as old brood combs with higher levels of impurities are much more attractive to wax moths.

The chemical paradichlorobenzene (PDB) has historically been turned to as an alternative to the cultural wax moth controls outlined above. Unfortunately, as is the case with most chemical pesticides, PDB is a restricted use product and can be absorbed into bees wax comb leading to exposure and potential hazards to both bees and humans.

Natural/Organic control of wax moths

Following honey extraction, beekeepers in northern climates have traditionally stored empty honey supers on top of the inner covers of their hives. This allows the bees to move up through the inner cover, clean up any left-over honey on the honey combs and protect the combs from wax moth invasion. Once freezing winter weather settles in, the cold tends to kill off the adult moths, their larvae and their eggs. Following a hard freeze, the empty honey supers can be removed and stored in an unheated building until

they are needed the following season.

While this approach works fairly well, there are a number of potential drawbacks. First of all this option is not available to beekeepers in warmer climates. For beekeepers in the North, if they remove and store the empty supers before a hard frost, or experience unseasonably mild weather after the honey supers are taken off the hives, the wax moths can damage the combs while in storage. Even worse is if a hive upon which empty supers have been stored becomes seriously weakened, or dies out, before the empty supers are removed. This leads to wax worms damaging both the combs in the dead/weakened colony and the empty honey supers that were being stored on top of the hive.

Certain/B401 & B402

Regular *Bee Culture* readers may have noticed a new advertisement that started appearing in these pages during the last half of 2020. The ad is for Certain/B402 a biological treatment developed by Vita Bee Health in collaboration with Valent Biosciences Corporation and designed to protect combs from wax moth damage. B402 is a concentrated solution of *Bacillus thuringiensis* (BT), subspecies *aizawai*, strain ABTS 1857. BT is a microscopic critter that is relatively harmless to all life forms

Ross Conrad





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Now that Certan/B402 is available again in the U.S., American beekeepers do not need to rely on smuggled products from Europe in order to prevent wax moth damage in stored combs."

except certain caterpillar/larvae. The BT product solution is sprayed onto both sides of combs and allowed to dry adequately prior to storage to prevent mold issues. When consumed by wax moth larvae, the environment within the larvae's digestive system stimulates *B. thuringiensis* to release a toxin that causes the larvae to stop feeding and eventually causes the organism to die. Certan offers efficacy of up to 100% against wax moth larvae. Since the BT toxin is only released when the microscopic organism is in the digestive system of the larvae it is extremely safe for bees, people, and other organisms and leaves no chemical residue in beeswax or honey.

B401 is the original formulation of Certan and is currently sold in Europe. B401 was available to American beekeepers at one time but was removed from the U.S. market a number of years ago. A company representative explained that "the

registration lapsed during a period of upheaval when Sandoz was merging with Ciba-Geigy to form Novartis. Certan in North America was just a casualty. The product had been manufactured by Sandoz but all our BT business was then divested."

The recently released Certan for the American market is labeled B402. The reason for this is that although B402 contains the same species of *Bacillus thuringiensis* (subspecies *aizawai*) it is a different strain of BT than is used in B401. The B402 strain is reported to have a more up-to-date and stronger regulatory database so this is what the company has chosen to register and release in the U.S. marketplace.

It should be noted that while deadly to wax moth larvae, Certan/B402 does not harm adult wax moths. B402 should only be used as a preventive measure as it is not as effective once a wax moth infestation has already taken place. Also, since B402/Certan contains living bacterial spores, the product needs to be carefully stored in a cool place to ensure the continued viability of the BT. Once the concentrate is mixed with water for application, all the diluted solution must be used right away and it cannot be stored for later use.

Treating foundation

In researching this article I came across an April 2009 paper published in the journal *Entomological Science* and co-authored by Amanda M. Ellis and current *Bee Culture* editor Jerry Hayes. Ellis and Hayes found that

B401 treated beeswax foundation when drawn out into comb by bees, retained some of the same protective properties that fully drawn out combs sprayed directly with Certan/B401 demonstrate. Unfortunately, unlike combs that are sprayed with Certan/B401 prior to storage, the comb made from Certan/B401 treated foundation did not provide complete control of wax moth damage, although it did experience significantly less damage than comb drawn from untreated foundation. While the results of the study suggest that it is not profitable to pre-treat wax foundation for wax moth control, it does suggest that rather than throwing out any left over Certan/B402 solution after treating frames of comb, using left over solution to treat frames of undrawn foundation after all comb treatments are complete would be a good way of using up any excess Certan/B402 solution and getting the most for your money.

A 120ml bottle of B401 (about 4oz) will treat about 500 shallow frames of comb. B402 available in the U.S., comes in a 5oz bottle (about 148ml) and will set you back about \$35: cheap insurance to protect your stored comb against wax moth damage. **BC**

Ross Conrad is author of *Natural Beekeeping: Organic Approaches to Modern Apiculture*, Revised and Expanded 2nd Edition, and *the Land of Milk and Honey: A history of beekeeping in Vermont*.

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All About The Queen Part III

Tina Sebestyen

Last month, we talked about successfully introducing a new queen using the long release method in which the beekeeper manually releases the queen from the cage. There was a strong warning about how perfectly capable the new queen is of flying, since she has lost weight while not laying eggs. The best strategy is to avoid the unhappy occurrence of having your queen fly away. Remove a frame or two, or three, so that you can get your hand and the queen cage way down in the hive. Hold the cage right against the frame so that the queen is encouraged to walk out, rather than to fly out and away. If she still tries to fly from down inside the hive, you have a second to react, and cup your hand over her. If the queen gets away and goes flying off, stay calm. This has happened to me, and after I knew better, too. My queen flew away, and I saw her go. I hoped she would come back, so left the hive covers off, and just stepped back to watch. Sure enough, the queen came flying back, and went right on by. As she did, she picked up a small comet of bees following her. A few minutes later, she came by again, and again picked up more followers, but kept on flying. On her third pass, she flew right in. Whew! I got lucky! Sometimes you might not see her return. After waiting a good long time with the covers off, go ahead and put the hive back together, with a frame containing eggs from another colony. We haven't given up, though. Give it three days, and check back to see if the bees have started queen cells, while disturbing the colony as little as possible. A newly introduced queen can still be rejected if too much stress is placed on the bees. It takes a new queen up to several days or even a week to start laying if she's been caged for a long time, so



A partial retinue around a queen, attendants pick up queen pheromone and pass it throughout the colony. It is a combination of queen pheromone and brood pheromone that keeps laying workers from developing.

keep calm some more. After a week check to see if there are new eggs, revealing her presence.

The stories beekeepers tell one another help us learn and know what is possible. Here is another story that helped me. My friend told me that he had accidentally let his queen fly out of the cage, but, he said, he just reached out and caught her in his hand. That story told me that I could do it, too. The next time a queen flew away, I ripped my veil off (for better depth perception, and the reason I often don't zip it on), reached right out and caught the flying queen, careful not to squeeze her. This is another good reason to work bare-handed. I happened to be in someone else's apiary, and he just stood there with mouth open for a second before he said, "did you just catch that queen in your hand?" Sometimes our super-hero moments are actually witnessed. If you miss catching her, and she hasn't returned and started laying eggs in a week, order another one, and chalk it up to lessons learned. Don't let the bees continue raising one, they will have been queenless for too long. Remember that the colony will never accept a new adult queen when they have a queen cell going. Remove all queen cells before trying again to introduce a new queen.

In a previous article, we talked about how queen pheromone and brood pheromone work together to create a happy and prosperous colony. Once the queen is gone from the colony, there is obviously no more queen pheromone. After 21 days, all of the worker brood emerges, and after 24 days, even drone brood has all emerged. This is why it is important for beekeepers to be engaged, rather than just leaving them alone in their box. Queens get sick, they die, they get injured, they even get eaten by wasps. If you, the *beekeeper*, don't notice the lack of eggs, the colony becomes broodless, and soon it will become a laying worker colony. It is queen pheromone combined with brood pheromone that keeps the workers ovaries from developing.

Though workers can start laying eggs, they don't have a functioning spermatheca, and so cannot mate, store sperm and thus cannot produce anything besides drones. These drones will be smaller than normal drones since they are raised in cells meant for workers. They can fly, and they can mate, but have less sperm, and less of a chance of out-competing normal large drones. It is

next to impossible to introduce a new queen to a laying worker colony, since 10% of the girls in the hive think they are the queen, and don't want to give up their new status. The most efficient and effective way of dealing with laying worker colony is to shake all of the bees out in front of other queen-right colonies, and they will walk in and become happy and productive members of their new homes. Remove the old hive, bottom board, and everything so there is no old home to go home to. If you want to restore your number of hives, wait two weeks and make a new split with its own new queen.

A frequent failing of beekeepers, including yours truly, is the failure to know when to quit. Combining a laying worker colony with queen right colonies is not giving up. However, if you must try to rectify the laying worker colony, the first step is to add a sheet of brood. Open brood is best. It has the right pheromones and will last the longest before it all emerges. Don't let the bees raise their own new queen. It won't work, and it takes so long that the colony will probably not be able to make enough honey or bees to survive the Winter. A day or two after installing the brood, carefully seek out and destroy all queen cells, and place a queen without attendants in a cage near the sheet of brood. While looking for queen cells, take every frame out and shake the bees out in front of the colony (or across the yard). It helps change their attitudes while helping you be sure you don't miss small queen cells. Manually release the queen after you are 100% sure they are ready to play nice with her. A well-developed queen with strong pheromone is better than a young girl who has only laid a few eggs before being caged. This is a great use for a queen that is ready to be retired. She still has strong pheromone, but it isn't the end of the world if they kill her, which is a strong possibility. Please understand clearly, the real answer to laying worker colonies is to combine and then split after peace has been achieved. When combining, be sure not to over-whelm one small queen-right colony with a large number of laying workers.

One of the best reasons to replace a queen is for poor genetics. That means that the colony, which gets its personality and traits from the queen, is either not good at keeping mite numbers low, or they are not frugal enough with honey to survive the winter, or they are susceptible to a disease like chalkbrood that they don't have any resistance to, and most often she is replaced because the bees are mean.

There are multiple reasons for colonies to be aggressive other than genetics, however. If a usually docile colony becomes aggressive, it is possible that they have been superseded by a queen mated with aggressive drones. But more likely, the new-found aggression might be due to a dearth. Lack of incoming food makes bees cranky, as does wind, heat, rain, and predation by wasps or skunks. Rather than instantly buying a new queen, it might be wise to investigate and try to solve whatever problem might be causing the aggression.

One way to tell how much nectar is coming into the colony is to hold a frame horizontally over the hive and give it a good shake. The new nectar will fall out onto the frames below and tell you how much there is. Feeding sugar water for a bit is much less expensive than buying a new queen to replace a perfectly good one.

Inspect the area for signs of predation. Lots of dead



: Bees shaken out in front of another colony will walk right in and play nice. Even shaking them out in front of their own colony changes their attitudes when combing, adding a new queen, or trying to solve a laying worker problem.

bees and wasps in front of the hive tells a story. Reduce the entrance and/or place a robbing screen to keep wasps at bay. Skunks sometimes dig a hollow in front of the hive to protect their bellies while they feast on your bees. Sometimes they leave a telltale sign of their activities in the form of chewed/sucked bees spit-up that looks like cat poop, right in front of the hive. A skunk trap is the sure-fire answer, but difficult at out-yards that can't be checked every morning for skunks in need of more attention. A fun way to discourage skunks is to leave two squares of chocolate Ex-lax in front of the hive. They eat the Ex-lax first, then eat some bees, then learn how eating bees makes them feel really bad. At least we get to feel like we got some sweet revenge. The more long-lasting way to discourage skunks is to place a nail board in front of the hive, so that they can't get close enough to scratch at the entrance.

A colony that becomes aggressive after re-queening or that can't be assuaged by management needs a new queen. Allowing them to raise one would only perpetuate the bad genetics, so buy the best one you can find. Then be prepared to do a long release of that new queen. Aggressive colonies are more aggressive to new queens, too.

Another failing of many beekeepers is our reluctance to part with old queens. We fall in love with our good queens, and most of us are too soft to pinch their heads off, which is usually unnecessary. We can have our cake and eat it, too, if we retire our good old queens to nucs where less is required of them, and where their eggs are available for us for raising new queens. If we allow the old colony to raise its own new queen, we get a new, younger version of the queen we loved (hopefully, depending on mating) along with more sure colony survival for the parent colony.

If the old queen fails to begin laying after Winter, or if the nuc is lost during Winter, at least the large parent colony wasn't lost because of that old queen. Another good thing to do with an old queen is to gift her. There is always someone in the bee club who needs a new/old queen to get them by for a bit. If it really is the end of the road for our old girl, like she just isn't laying enough to keep even a nuc supplied with bees, then keeping a little vodka in your bee kit helps immensely. The vodka isn't for drinking to soothe your broken heart. You drop your girl in, and give her an instant death while making queen tincture. This magic substance has many uses like baiting swarm boxes and calming queenless colonies. **BC**

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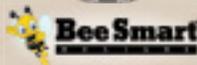
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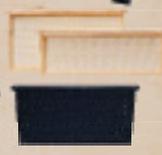


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One tiny native Mexican stingless bee, the Melipona, holds an exalted and revered status amongst the Maya people. Just as it did with their ancestors before them, the Aztec. Since Pre-Hispanic times, centuries before the first outsider set foot in Central America, the Melipona bee and its potent healing jungle honey have been treasured.

I was in awe learning about the sacred relationship between the Maya and Melipona from a shaman. In the past, vast apiaries of anywhere between 1000 - 2,000 natural log hives were kept at different locations during the height of the Mayan empire. Their honey fueled armies, cured all manner of illness, was used by shaman in healing and even traded as a form of currency throughout the Maya's range spanning four Central American countries south to Copán in northern Honduras.

In fact they were, and still are to this day, so highly prized in Mayan culture they have their own goddess. Known in local Yucatan Mayan language as Xunan Kab (pronounced *shoonan caab*) the royal lady bee.

The traditional old ways of beekeeping in natural log hives are now blended with newer practices (manmade hives) but the deep respect of the Maya people remains unchanged. Even now, talking with a local shaman on Cozumel Island – Mexico's largest island off the coast of the Yucatan Peninsula – their potent honey and hive products like propolis are used to heal everything from a woman's caesarean scar through to preventing bronchitis (when mixed with eucalyptus). It is said to hold three times the medicinal healing power of the honey from the European *Apis* species.

Because they are so deeply respected by the Maya, when you enter the Mayan Bee Sanctuary a

purification ceremony is performed before visiting the jungle hives.

This ceremony is to ask all associated god's blessing and permission to enter the sanctuary where the hives are housed. It is also for the melipona's protection dispelling any negativity or ill-will someone may consciously or unconsciously harbor against the bees.

The Ceremony

Thick plumes of incensed smoke meet your nostrils as the smoldering amber like resin from a local copal (*Protium copal*) tree fills the air. Its scent is said to be most pleasing to the gods.

The Maya have a nature-based religion harmoniously blending with their environment. There are gods for plants, animals, weather, the all-important elements, and of course honey production and the melipona as they hold such a special place within the culture.

A honey nectar drink is sipped by the shaman each time he pays tribute to one of the three gods in the ceremony.

First to Ah Muzen Kab – the Mayan god of bees and honey.

Second to Xunan Cab – the royal lady bee – the Melipona.

Lastly to Yum K'aax - Mayan god of the jungle and protector of animals.

Once homage is paid and permissions asked then the thick incense infused smoke is wafted over everyone present with a large black feather to clear away any negative energy. You can watch a short video showing the purification ceremony and different species of stingless bees held at the sanctuary [here \(https://youtu.be/igPzCtSzpDc\)](https://youtu.be/igPzCtSzpDc).

It is only after this ceremony

MAYAN AND MELIPONA BEE LOVE AFFAIR PART 1

Bel Woodhouse



Melipona in hive.

that you may enter the white stone walkway leading into the jungle sanctuary to visit with the Melipona and see the hives.

Along the walk edible and medicinal plants are pointed out and explained before arriving at a small open cenote. This is a year-round fresh water source for the bees right next to the hives.

This region of Mexico, the Yucatan, has over 6,000 cenotes (a natural pit, or sinkhole) dotted throughout the peninsula. Formed millions of years ago, it is suspected the heat of a large meteor impact rippling through the limestone formed the vast cenote network. Some scientists speculate it may be the same huge meteor impact that caused the extinction level event wiping out the dinosaurs.

Full of interconnected underground rivers and streams cenotes are unique in the natural world. There are four main types of cenote – open, semi-open, cavern and dry. All are sacred to the Maya as they believed them to be an entrance to the underworld and the only source of fresh water in the jungle.

Because river, rain and water gods were believed to dwell in them it gives the water healing power.



This shows a mix of natural log hives and manmade boxes. They're about the size of a shoe box.



This is where the purification ceremony is performed. You can see all three gods carved into the wall behind the altar.

Sacrifices were thrown in to the appease the gods and pay tribute and to this day calcified animal bones can be seen and human skeletal remains have been found.

For the Melipona it is only a fresh water source although the shaman I spoke to believes the powerful healing energy of the cenote water melds with the Melipona honey enhancing its power. Like an elixir of life, this is why the honey is so unique.

See for the Maya, everything in the natural world is interconnected. Their symbiotic relationship with the environment is woven into the natural world. Even their great pyramid temples in Tikal, the heart of the Mayan Empire, blend seamlessly with the jungle itself to this day.

It was in grand Mayan cities like these where the largest Melipona apiaries of as many as 2,000 hives were kept. Merged into the jungle, with hive placement complimenting the cardinal points for maximum honey production. As the shaman says “happy bee, happy me – because I get more honey so we make sure to keep them happy and pamper the lady.”

A sweet sentiment for our sweet honey producers. **BC**

Here is the manmade hive.



This is the melipona in a natural log hive.

This is how they give extra supplies to the bees. In a bottle cap.



Beekeeping Can Be A Pain . . . In The Shoulder

Scott Hotaling

Shoulder pain is common. Especially for movers like beekeepers. Moving those hives is hard work, especially for those that don't have the benefit of machines. But we can do something about it. In only a few short minutes we can help strengthen our shoulders, improve their flexibility, and decrease the pain that makes collecting all that honey a headache and not the fun project it used to be. It's time to get back to the days where the only pain you felt was that of a bee sting.

One of the best parts about these exercises is that they can be done at home, either inside or out, without the need for expensive gym equipment. You don't even need a pair of dumbbells if you don't have any. A bag or two of flour, sugar, or even a jar of honey will do the trick. And I know we all have jars of honey! So let's get to it:

Anterior Raises – This shoulder exercise helps target the anterior or front part of your shoulder. This is the part of the shoulder that you use most frequently, especially when lifting objects overhead. Since we do most of our work in front of us, it's important to develop adequate strength in this part of the shoulder.

- To begin, stand up straight with knees slightly bent.
- Place your arms at your side with your elbows slightly bent.
- Raise your right arm, keeping your arm straight in front of you to about shoulder height.



Anterior Raises

- Pause then lower your arm back down.
- Perform the same movement with the opposite arm.
- Avoid swinging your body with your back during the exercise.

You can perform the exercise using both arms at the same time if you prefer. Choose the variation that you're more comfortable with. It's very important to avoid any swinging movements to help lift the weight while you're performing the exercise. Keep your back and body in a straight line. If you find yourself struggling to lift the weight without swinging, lower the resistance. If you feel any pain, discontinue the exercise.

Lateral Raises – This exercise helps target the middle of the shoulder. This part of the shoulder is usually weaker and the amount of weight being used should be lowered to compensate. If just learning this exercise for the first time, start with just a few pounds and adjust from there.

- To begin this exercise, stand up straight with knees bent slightly more than when performing anterior raises.
- Bend forward slightly, about 15 degrees. Keep your back straight when bending forward. Hinge at your hips, not your back.
- Your arms should rest slightly in front of you with a slight bend in the elbow. Avoid bending them into an L-shape.
- Raise both of your arms laterally



Lateral Raises

(to each side of you) until you reach about shoulder height.

- Pause, then slowly lower your arms back down. Don't let them just drop down. This is the eccentric part of the muscle contraction and it's just as important as the concentric (lifting) part of the movement.
- Avoid throwing or swinging movements to help lift the weight.

If you feel pain in your back, shoulders, or anywhere else stop the exercise. If you feel pain in your lower back, try bending forward slightly less or not at all. Bending forward during the exercise helps isolate the middle part of the shoulder but it's perfectly fine to do this exercise standing

straight up. This modification will just allow the anterior part of the shoulder to help more when performing the movement.

Figure 8 – This exercise combines the previous movements of both the anterior and lateral shoulder raises. This is an excellent exercise to simulate your normal body’s movement of picking up and putting down those heavy boxes.

- Begin as you would for the anterior shoulder raise exercise, nice and tall with a slight bend in your knees.
- Hold the weight slightly in front of your chest with both hands.
- Push the weight out in front of you with your elbows slightly bent, keeping the weight at about chest height.
- Trace a figure – 8 pattern horizontally in front of you.
- Once you complete tracing the pattern continue moving without pausing in the middle.
- If less resistance is necessary, lower the weight being used or bring the current weight closer to your body and/or trace the pattern with less lateral (side-to-side) movement.

This exercise should be done with minimal weight if you’re learning this movement for the first time. Focus on your form and not the difficulty. Just adding a few pounds can make this exercise quite challenging. This is also true of the previous exercises. Again, avoid any swinging or other movements to help support or lift the weight. Focus on using your shoulders to perform each movement. Stop the exercise if you feel any pain.

Bent Over Rows – Bent over rows are a great exercise for the back and posterior (rear) portion of the shoulder. It mimics the natural movement of your body when picking up a box. When choosing an exercise, it’s best to choose those that simulate your daily activities as much as possible. This is one of the best exercises for doing just that.

- Stand up straight with your knees bent.
- Bend forward by hinging at your hips as you did for the lateral raise exercise.
- Bend forward about 30-45 degrees, or as far as you can without arching your lower back.
- Your arms should hang gently in front of your legs, below your chest.
- Extend your shoulders and raise your elbows just behind your back. Squeeze your shoulder blades together as you raise your arms. Imagine picking up a bag and lifting it up.
- Keep your back straight while you perform the exercise.
- Pause at the top, then slowly lower the weight back down.
- Keep your elbows close to your body during the movement.
- Avoid arching or swinging with your back while performing the exercise. Keep your neck and head in line with your back while performing each repetition.
- You can also perform this exercise with your elbows out at about 45 degrees to target different muscles in your back.

As always, if you experience any back or muscle pain discontinue the exercise. If desired, you can perform



Bent Over Rows

a variation of this exercise by using a bench or other flat, stable surface to lessen the strain on your lower back.

- Place one knee and arm on the bench while keeping your back straight. Your body should be just about horizontal.
- Hold the weight in the opposite arm, letting it hang below you.
- Place your other leg on the ground to support yourself, bending your knee slightly.
- Raise the weight as previously described by extending your shoulder and arm until your elbow reaches just behind you. Again, imagine picking something up off the floor.
- Pause and lower the weight slowly to its previous position.
- Keep your back straight throughout the movement.
- Avoid placing your support hand



Figure 8



Chest Pushes

and knee too close together. Give yourself plenty of room to keep your back in a nice straight line.

- Perform repetitions with your elbow close to your body and then with your elbow out as previously described.

This is a great variation for those that have lower back pain and may be uncomfortable doing the exercise without extra support.

Chest Pushes – This is another great exercise that incorporates many of the same movements as the previous exercises and simulates lifting a box and placing it next to you at the same height.

- Stand up straight with a slight knee bend.
- Hold the weight in front of you against your chest with both hands.
- Push the weight straight away from you and pull it back to your chest.
- Maintain consistent height for the entire movement.
- Push the weight diagonally from you, at about a 30 degree angle. Bring it back to your chest to complete the movement.
- Look straight ahead. Do not rotate your body when pushing the weight to your side.
- Push the weight to the opposite side and pull back to your chest.
- Keep your back straight throughout the exercise.

Everyone's flexibility, strength, experience and range of motion is different. If you feel any pain or limited range of motion when pushing

the weight to your side adjust the angle accordingly. As with all of these exercises, avoid arching or swinging your back during the movement.

Before any workout, it's important to warm up for at least 5-10 minutes

before progressing into your normal exercise routine. This can be as simple as performing each exercise using less weight or no weight at all for several minutes.

The amount of repetitions you should do for each exercise is based upon several factors such as training experience, endurance, strength, weight being used and your own personal goals. At first, try to do several repetitions with very little weight if you're just learning the exercises. The goal here is getting the form right, not challenging yourself with the exercise quite yet. Only when you're confident you can complete the exercises with proper form using light weight should you increase the number of repetitions or the weight being used. You can also adjust your rest time between each exercise to increase the challenge.

The most important aspect of any exercise program is your dedication towards it. Stay with it and be consistent. Your body will thank you for it! **BC**

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Japanese flowering
apricot

Bloom Where You Are Planted

Winter Blooming Bee Plants In California

— Connie Krochmal

Quite a few bee plants bloom during the Winter in California. Some of those are highlighted below.

Japanese flowering apricot (*Prunus mume*) can be a shrub or a rounded, upright tree. It reaches about fifteen feet in height. The fruits are generally unpalatable.

From January onwards, depending on the location, the dark pink blossoms emerge. Around an inch wide, these fade to a lighter pink. Like the other ornamental fruit trees, Japanese flowering apricot is a wonderful source of pollen and nectar.

Lemonade berry (*Rhus integrifolia*) can be found in California along beaches, bluffs, ravines, and canyons below 3000 feet elevation. It typically inhabits sandy sites. The fragrant, evergreen small tree or shrub is three to twenty feet in height.

Flowering is usually from February to March, but this can also rebloom in July. The very tiny pink, rose, or white blossoms form large, branched clusters. Considered a good bee plant, lemonade berry brings a moderate honey surplus.

Sugar bush (*Rhus ovata*) is native to California and Arizona. The small evergreen shrub or tree bears pink, greenish-yellow, or white blossoms. These emerge from February to May on long, dense terminal clusters. This species can provide a huge honey crop, especially in California.

Black wattle (*Acacia decurrens*) is widely planted in California and has naturalized in some regions. This evergreen reaches 40 to 50 feet in height.

Flowering occurs from late Winter into early Spring, depending on the location. The fragrant blossoms are vivid yellow to dark yellow. The spherical flower heads open on six inch long panicles.

Black wattle is an excellent bee plant and a major honey source in Hawaii and California. The golden wattle (*Acacia pycnantha*), a related species, blooms in February.

Flowering quince (*Chaenomeles spp.*) is a widely grown, thorny shrub. A number of species are in cultivation. The carefree, easy to grow, adaptable plant is one of the earliest blooming shrubs. Flowers emerge from late Winter to early Spring before the foliage appears, depending on location. Flowering can continue for several months.

The blossoms can be orange, red, pink or white, according to the variety. Bees collect lots of pollen from these flowers. The nectar flow is best during warm weather.

Flowering currant (*Ribes sanguineum*) is a native shrub found in California and is also widely grown. It is also called red flowering currant and pink Winter currant.

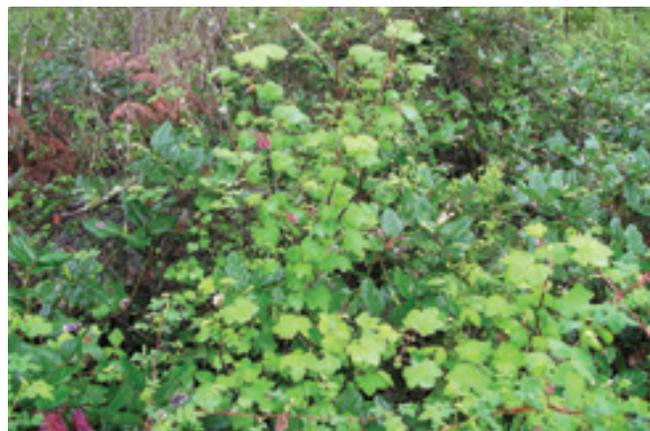
This shrub can bloom from late Winter into April. The species features white or deep pink blossoms. Cultivars with red blooms are available. The flowers form crowded clusters that can contain dozens of blooms. All of the currants and the related gooseberries are great sources of pollen and nectar.

Quite a few **heaths** bloom during the Winter in California. These include Scotch heath, Darley Dale heath, Spanish heath, and Biscay heath.

Winter heath (*Erica carnea*) is among the hardiest heaths, and blooms reliably from November until April. The bell-shaped blossoms are usually white, pink, or red on two inch long clusters.

Bees are very fond of heath blossoms from which they obtain nectar and pollen. Winter heath honey varies in color from yellow or reddish-brown to rich brown. Granulating very quickly, it has a distinctive, sharp flavor.

Some species of **melaleuca** can bloom in California during the Winter months. These include dotted melaleuca (*Melaleuca hypericifolia*). This species can bloom almost



Flowering currant

all year from late Spring throughout the Winter. The vivid reddish-orange blooms form crowded clusters.

Pink melaleuca (*Melaleuca nesophila*) can also bear blossoms pretty much year-round. It features purplish-pink flowers that become white as they age. They form large terminal clusters.

All of the melaleucas are great sources of pollen along with an excellent honey crop. Melaleuca honey, which can be amber to dark, tends to granulate pretty quickly.

In demand among bakers, it has a characteristic aroma and strong flavor. As this honey ages or is heated, the taste and aroma mellow.

Wild alfalfa (*Lotus glaber*) blooms from January through August in southern California and mostly from June to September elsewhere in the state. Considered a major honey plant, this can bring a white or light amber to amber honey, possibly with a greenish tinge.

Two species of daphne begin flowering in February in California. Winter daphne and February daphne are sources of pollen and nectar.

Cucumbers and cantaloupes are Winter blooming crops in California. The latter provides pollen along with a good surplus of honey. Cucumbers can yield an amber to pale yellow honey.

Other Winter blooming bee plants in the state include citrus, various species of eucalyptus, yellow jessamine, willows, some viburnums, and some sages.

Witch hazel (*Hamamelis* spp.)

While the species above have been featured in previous articles, the ones below are new. Although no native witch hazels are found in the state, my copy of the “Sunset Western Garden” recommends Chinese witch hazel, common witch hazel, and intermediate witch hazel for California.

Beekeepers can find a species of witch hazel in bloom during every season except Summer. A number of these bear flowers during Winter.

These unique scented flowers feature four or more, crinkled, long, narrow, ribbon-like petals. Typically yellow, these unfurl when the weather is warm enough and fold back up as temperatures cool. Witch hazel blossoms form small axillary cymes or clusters containing two to three blooms.

The calyx is ¼ inch wide with four sheath-like reddish sepals that contrast beautifully with the yellow petals. Yielding some nectar, these flowers are very rich in pollen, which is easily accessible to bees.



Witch hazel

Witch hazel blossoms are valuable bee plants partly because they appear over an extended period.

General Description

Members of the witch hazel family, these plants generally have a natural, vase-like shape. Some species are more dense than the others.

Depending on the species, these are small trees or medium to large shrubs. The size varies slightly by species. Arranged in a zigzag pattern, the angular, slender stems are about an inch thick.

The alternate, richly textured leaves are medium green. Resembling that of the filbert and hazelnut, the foliage is very heavily veined. Often roundish, the leaves can also be oval to obovate.

Initially, the young leaves have a reddish tint. During the Fall, these typically turn yellow, but the color can vary by species.

One curious habit of witch hazel is the exploding seed capsules. When these mature and split in the Fall, the seeds are hurled quite a distance – 25 feet or more.

Native Witch Hazel Species

In addition to the native species featured below, there is one relatively newly discovered uncommon one that is found only in Alabama and Mississippi. Leonard’s witch hazel (*Hamamelis ovalis*) occurs on moist slopes and wooded areas. Appearing from late December into February, the red-orange to red blossoms are larger than those of the common witch hazel. The plant reaches 15 to 25 in height.

Ozark witch hazel (*Hamamelis vernalis*) is also called spring or vernal witch hazel. Native to Texas, Oklahoma, Arkansas, and Missouri, it inhabits woods, sandbars, gravelly spots, damp sites, and streambanks. Well suited to the Midwest, it is recommended for zones four through eight. This plant can be grown in large planter boxes. It adapts to clay and poorly drained soils.

The tall, rounded, dense shrub is typically six to twelve feet tall and slightly wider. This is much more attractive than the common witch hazel. The plant spreads by stolons, enabling the species to form thickets.

The thick leaves are two to five inches long. Ozark witch hazel flowers emerge when snow is still on the ground, from late January to March, depending on location, typically during the first thaw of the year. Unlike most witch hazels, this one sports blooms that range from yellow or orange to orange-red. They’re 1/3 smaller than those of the common witch hazel.

Common witch hazel (*Hamamelis virginiana*) is a very adaptable, easy to grow plant, native to the entire East and Central U.S. westward to Texas and Oklahoma. Partial shade is preferred in the South and Midwest. Elsewhere, full sun to part shade is fine.

Recommended for zones four through nine, it can be found in floodplains, wooded slopes, thickets, and damp woods. This is unsuitable for dry soils.

The somewhat straggly, spreading, open small tree or large shrub is typically 10 to 20 feet tall and almost as wide. The young stems are hairy.

Providing yellow color in Fall, the roundish leaves, three to six inches long, resemble those of Chinese witch hazel, but are hairy and gray beneath.

Emerging in October and November for several weeks,

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Clarence H. Collison

the golden yellow, scented blooms are ¾ inch wide and long. They're larger than Ozark witch hazel blossoms.

Introduced Witch Hazel Species

There are two introduced species in cultivation along with a hybrid.

Chinese witch hazel (*Hamamelis mollis*) is a large shrub or small tree, reaching eight to ten feet in height. Suited to zones five through nine, it does well in areas of the South with mild Summers. This is more compact than the common witch hazel and the hybrid intermediate witch hazel.

A particularly attractive plant, Chinese witch hazel features loose, spreading, zigzag branches arranged in layers. The young stems are hairy. The greenish-gray, hairy leaves, 3½ to six inches long, are almost rounded. These turn bright orange-yellow in Autumn.

One of the longest blooming witch hazels, this bears scented blooms, 1½ inch wide and ½ inch long. They emerge from December through March, depending on location.

Japanese witch hazel (*Hamamelis japonica*), suited to zones five through eight, is a sparsely branched small tree or wide spreading shrub with smooth foliage. Twelve to 20 feet in height with a slightly smaller spread, this resembles Chinese witch hazel. It is also similar to the intermediate witch hazel except this one is more erect and tree-like.

The oval, wavy edged leaves, two to twelve inches long, bring spectacular Fall color in a range of colors from yellow, purple, and red to orange or yellow.

Flowering occurs from late Winter into very early Spring, depending on location. Flowers are 2/3 inch long.

Intermediate witch hazel (*Hamamelis x. intermedia*) is a hybrid of the two Asian ones, and displays traits of both species. Typically, this is hardy in zones five through nine. However, the hardiness and flower color can vary

slightly according to the cultivar. Exhibiting hybrid vigor, intermediate witch hazel is a loosely branched, spreading to upright vase-like plant, twelve to fifteen feet tall and wide.

This blooms mostly from late January into mid-March, depending on the location. The Fall foliage is just beautiful and can be dark red, orange, or yellow. The flowers range from deep red or orange to yellow.

Growing Witch Hazels

Generally, the introduced species are much more widely cultivated than the natives. The general growing conditions are pretty much similar for all. These prefer a well drained, acid to somewhat acid, moist or damp soil that is high in organic matter.

Most species are adapted to full sun and partial shade. Hardiness can vary according to the species. Generally, witch hazels do very well in the East and South.

Quite a few varieties are readily available. In the bee landscape, witch hazels are recommended for naturalizing, informal hedges and screens, shrub borders, specimen plants, and understory plants. With a slow to moderate growth rate, these plants often grow more slowly than most landscape shrubs.

Witch hazels are mostly care free plants that require little routine care. When growing grafted plants, remove any shoots that arise below the graft. In addition, if the plant becomes too large for the available garden space, pruning serves to keep it within bounds. Pruning can also rejuvenate witch hazel.

These plants seldom experience pest or disease problems. Balled and and burlapped plants or those in containers are recommended for best results. Spring and Fall are the best planting times.

Witch hazels can be quite difficult to propagate by cuttings and by seed, which is why I recommend purchasing plants from a nursery. **BC**

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BIGGER PICTURE

Jessica Louque

Never Underestimate The Power Of Beekeeping

I think most people can say they are completely ready to ignore that 2020 was even real. Everyone will be going into the new year with a completely different mindset as compared to a year ago. People will be more likely to stockpile items that seem to be popular in the stores for fear of running out. Hopefully, more people wash their hands in public (and private) restrooms. Traveling makes people wary of being around you, and being home is en vogue. Small businesses and lower wage people have struggled like never before, while large companies broke records for home delivery and boosted their sales on the backs of the working class. A lot of things might be different (unless you're a multi-millionaire, in which case, do you even notice a few more million dollars?) but no matter what happens, keeping bees stays pretty much the same.

I think more people have taken up beekeeping because of being at home so much more than previous times. The biggest problem with this is that there's a lot less hands-on resources than normal to combat the new-bee excitement phase where you know just enough to be dangerous. Granted, there are plenty of online resources to peruse, but none of it is the same as having a seasoned veteran looking at a situation. I have seen beekeepers absolutely convinced that they have some sort of disease in their hive because they just started learning about diseases. I had a tech working for us one time that sat through a pest and disease lesson by our chief apiary inspector, Don Hopkins. Immediately after the session, the techs went through bees so we could do some assessments. He was totally panicked and convinced that the hive he was in had chalkbrood. As new techs, they worked in pairs to try to have someone as a sounding board in situations like these, but he did not

agree with his partner, who had to come get me to stop him from freaking out. It turns out that it was just normal brood. It's very hard to convince an overzealous beginner that what they're seeing is not the end of the world. It doesn't help matters that most bee clubs are online only. We all know there is a decent percentage of beekeepers that would rather use a potato peeler on their skin than use technology. These are usually the same group that would be included in the "seasoned veterans" category, to the detriment of the newer beekeepers. Online meetings are also just not as personable either and I don't think you can get as much out of it. Giving presentations on Zoom is a little weird for me, but I do find it more likely to end on time because participants are less combative with their questions – if you get any at all. At least I can't see when you fall asleep though if your webcam is off.

Now, what do I propose doing about this situation? Well – I'm not really sure. A lot of people are just not going to visit people in person. It's hard to even know what beekeepers need help now since they can't tell you at a meeting. If you feel up to the challenge, you could put a flier up at

your local bee store (if you have one) so people could see it when they go in to get equipment. This can also be a problem since more people order their equipment now.

I would suggest for everyone to do their best to support their local bee dealers so they have good business through this weird time in the economy. If you figure out something helpful in this, spread the word. I am thinking that some beekeeping communities might not have the same problems, but I'm sure there are some struggling new beekeepers.

Besides beekeeping, a lot of people are developing new hobbies that involve home time, like baking, canning, food preservation in general, sewing and knitting, and gardening. A lot of these things are pastimes already covered by beekeepers, but still present an opportunity. In an effort to develop community ties and have some social interaction in a time when it is discouraged, bartering or trading goods is a great way to talk to people without having large amounts of contact. If you have enough honey, barter for jams, jellies, fresh bread, eggs, or vegetables. Some people are going to struggle with cash now, but if you have goods for trade, you don't have to touch gross money and you get food. Of course, you should definitely trust the hygienic practices of the person who made it, but I think that should have applied to everyone before this past year.

If you can meet or bond with useful neighbors, it could help you in the future if you ever need anything. A lot of people are theorizing about the future of our country right now. Maybe nothing happens, and maybe something happens, but it's definitely an uneasy time. I am all about planning for the worst situations, and sizing up your neighbors for who could be the most useful in various situations is not a bad idea.

I wouldn't tell them you're only



If you can find a mentor like this guy – Kim Flottum – you'll be on your way to being a good beekeeper.

friends with them to guilt them into giving you vegetables, but maybe remember it. Working with other people might give you some ideas on how you can improve your own self sustainability and be prepared.

A lot of the ideas I'm throwing out here will be much more difficult for people in densely populated areas to employ, but I'm sure they can be used in some form. I did see an episode of the show about preppers on NatGeo where one guy knew how to survive and use guns, and the other guy had lots of land and money and the common survival sense of a dead mouse. The partnership between the two was basically that if something happened in the city, they would both go to the rich guy's farm in the middle of nowhere and the crafty guy would help them survive. At the time, I thought that was kinda ridiculous (like the entire show), but now, I can just see people trying to do this same thing when virus lockdowns were happening in cities across the nation. This kind of sounds like a good idea now, and I'm sure a lot of people in Paris wish they had a strange, mildly incompetent rich friend with lots of land in the countryside.

This is definitely the time to do your best to take care of your bees. It may become even more difficult to get packages and equipment, so don't let them die. I know there's a lot of beekeepers that are going the natural route and think this is for the best. Right now, it's just not the time for experimenting. If you let hive pests like *Varroa* get out of control, you may very well lose your colonies and have no replacements.

Bees are not only a valuable commodity both for their pollinating abilities and their byproducts, but also for you having beekeeper experience. If your bees die, it will probably not impress your neighbors. There have been several cases of beekeepers with dead bees that have used every excuse under the sun to justify their dead bees, from pesticides to pests to "bad bees" but the fact is, they still have dead bees. This is not the time to look for reasons that you've failed in an endeavor, but the time to learn to take care of what's yours and come to terms with the very real possibility of not being able to replace what you lose. It is your job to do your best to manage your colonies successfully, to treat

them as necessary, to keep them from spreading pests and diseases to other colonies, and to overwinter them with low varroa counts and plenty of food. Wrap them if you need to, winterize your colonies as necessary for your area, but take care of your bees and don't take them for granted.

Back to my original issue of new beekeepers not having mentors – just keep in mind their bees are the ones that will be spreading to your bees, so help them out if you can. I want you to feel at least a little bit responsible if you know a beekeeper who has failing bees. You can't make everyone listen, but do your best to help. You might need a split from their bees later, or their drones might be mating to your queens.

Overall, you should never underestimate the value of beekeeping. This might be the time you learn to make really good candles and strain wax, use propolis and honey for medicinal purposes, barter with your neighbors, but more importantly, keep your bees alive. If you're struggling, find someone to help you. Guilt them into it. Bribe them into it. Harass a poor worker at a bee supplier. Find a way. Your bees are counting on you, and you should treat them as if they are irreplaceable. There's a chance they might end up like that, and you don't want to find out the hard way. **BC**

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Processing Honey Is *NOT* Keeping Bees



My comments here are not intended as an exposé on honey extracting

In the bright light of reality, honey extracting is not truly beekeeping. Indeed, it's not uncommon for a business to *only* process and pack honey without a single beehive in sight. There are good, clear reasons for that. Like producing queens, packages, and pollination services, honey processing and honey packing is a specialty aspect of apiculture. For instance, worrying about *Varroa* control is not similar – in any way – to plumbing a honey pump.

Having written those comments, I do not wish to be that guy who “tells it like it is,” but this honey-extracting thing is a sticky aspect of bee husbandry. Through the passing decades, I have had the opportunity to extract a lot of honey, and I acquired that experience using a variety of extracting equipment – both large and small capacity. I have accumulated the following disassociated thoughts and comments.

Honey processing photography is a challenge

The person who photographs the honey extracting process, as is so often the case in all other things beekeeping, needs to strictly be a

photographer and not the person actually running the extracting process. Why? Because you get sticky honey all over your camera equipment. For the extractor to also be the photographer, the extractor operator must stop all honey processing activity, completely clean their hands, capture the pics, and completely move the camera from the work area. That's a hassle.

I suggest that if one is to take photos of the event, do at the outset. As the process unfolds, (#1), you tire and have decreasing interest in photography, and (#2) the work area becomes a photogenic mess. In all honesty, is a bona fide extracting area something that one wants the non-beekeeping world to see?

This past November, I processed 10 deeps of late season honey. (*Honestly, it was a task I really did not want to do.*) My long-suffering neighbors were curious and asked to be invited for a tour. Since they are not in any way beekeepers and have no experience in the world of honey extracting, I decided to quietly ignore their request. While I will be certain that they get their annual quart of honey, I decided that they did not want to actually see what is involved in getting that beautiful honey into a quart jar.

Why am I putting you through all of this? Because photographing a full-blown honey extracting process can be difficult. Also, it may be tricky to acquire photos that make others want to be a part of this process. Flat fact – honey is sticky.

Neatness counts – give it your best shot

Please, never forget, you are processing high quality food. As honey processors, we have a serious obligation to our honey-consuming public. Neatness counts – a lot. (*As I type, I have this thought – I really don't care to see the chicken that becomes my Chicken Tenders. To whomever processed my chicken, thank you. So,*

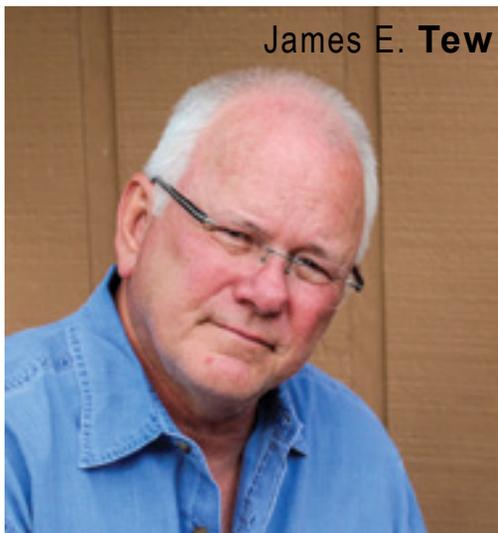
it's not just honey processing that is frequently done behind the scenes.)

Honey is inherently sticky – even messy. Yes, put down plastic on the floor. Yes, try to keep all cappings in the cappings container. Yes, try not to string liquid honey from the uncapped frame to the extractor. Try in all ways to stay neat and clean. Know that you're going to fail. I suggest that it is an extractor operator's goal to forestall the inescapable failure as long as possible.

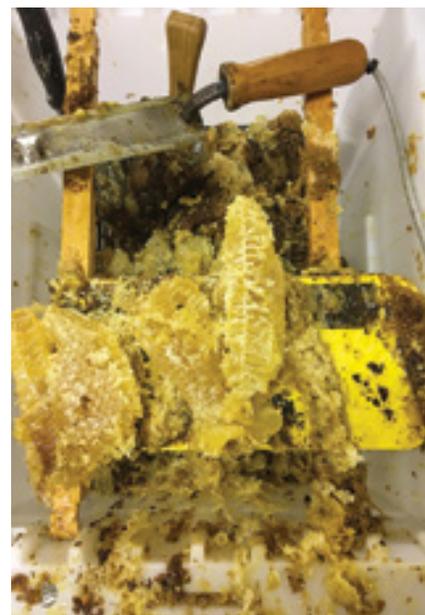
If a large quantity of honey is being processed, intermittent clean-up may be required just to maintain high standards. If you're using a hot knife, the handle becomes sticky. Try as you might, cappings and honey drop to the floor and try as you might – you step in it. At some point, occasionally tidying up the work area is the best way to go.

Extractors wobble – embrace that fact – don't fight it

There is simply no way to balance the extractor load. Frame contents vary and vary widely. Maybe at the outset, you try to put comparable



James E. Tew



Is this a beautiful aspect of honey processing?



Work platforms used as extractor stand. Only one of the two platforms is visible. C-Clamps held the extractor (mostly) in place. The stands allowed for normal extractor wobble.

frames across from each other, but as you tire, your goal becomes to just get the extractor loaded. To my knowledge, only commercial extracting operations are able to build a base stout enough to withstand the wobble torque of a fully loaded extractor.

There is a huge advantage to a hand cranked extractor not found in electrically powered extractors. That advantage is that the operator has no inclination to walk away from a whirling machine. Yes, start the freshly loaded extractor at the slowest speed and slowly increase the speed allowing the frames to equalize as much as possible. The first load or two is interesting. The operator watches the honey spin from the combs and admires the functionality of the honey extractor. Then, back to the hot knife and other uncapped frames. As time passes, the operator becomes involved uncapping frames while the extractor runs. Never let your full attention wander from that rotating extractor. In just a few short seconds, the spinning extractor basket can develop a rhythmic wobble that can tip the extractor – no matter the base. If the machine begins to do the washing machine wobble, back the speed down. Ideally, an operator monitors the extractor, but then another person is required to uncap. In my life, there is no second person. I must do both.

Just as there is no standard hive stand, neither is there a standard extractor stand. As you might expect,

honey extracting people have tried many ideas. None have risen to the top of the suggestion pile.

Several years ago, I had good luck using a small utility trailer and ratchet straps to hold my electrically powered, 10-frame radial extractor to the trailer. The trailer springs and shackles absorbed much of the wobble. My negative issue was the trailer needed to be attached to my small tractor to stop the trailer from creeping under the wobble effect. The combination of the tractor and trailer length made this useful idea require much more space than I had. Don't suggest using this setup outside. Unless you are extracting at night, curious bees will come to the area in great numbers. Invariably, this causes a scene.

During my recently past extracting procedure, I had "okay" results using two Werner Work Platforms (any similar brand name would suffice). Wobble was still an issue, but C-clamps kept the extractor on the work stands and the twin stands withstood the wobble. The work stand height was perfect for a common five-gallon drain bucket.

A completely untested idea – use at your own risk

In my youth, my Dad had a paint supply business. The old Red Devil one-gallon paint shaker was NOTORIOUS for bouncing all about and occasionally hitting the floor. Imagine the excitement. Bolting it to the floor only resulted in restraining lag-screws being ripped out. Someone unknown to me had the idea of putting the paint shaker on a large, discarded truck tire – minus the rim. The tire was screwed to the floor and the paint shaker stand base was bolted to the side of the truck tire. That idea worked well. The rimless heavy truck tire absorbed the paint shaker vibrations.

Each time I run an extractor; I wonder about the practicality of using a truck tire beneath my extractor. I have never tried it. Why? It is somehow offensive to me. If neatness is paramount, to have a worn-out truck tire as an integral part of my food processing system just seems wrong. Plus, it would make the extractor sit higher. So far, this is just another idea on the scrapheap of extractor base ideas. Even so, I think the tire would dampen the extractors

tendency to wobble just as it did the paint shaker. (*I still have this paint shaking machine.*)

The extractor load

Just so you know, no matter how long you run the machine, the extractor load never truly levels out. Even a load that has run for twenty minutes (as fast as possible) still has a wobble tendency.

Secondly, each extractor load has its own characteristics. Some loads are beautifully smooth while others are infuriatingly unbalanced. It seems to be blind luck. When the load is smooth, enjoy it. The next load will most likely wobble.

Thirdly, in any extractor load, the frames – even after running for twenty minutes or more – still seem wet and heavy. Yep, it's somewhat of an extracting secret. Quite a bit of the honey does not spin out. It's not wasted. I put extracted equipment back on the bees for them to reclaim any remaining honey, but after all the work of getting the bees out of the supers and then all the work of uncapping and extracting, I want ALL of the honey to spin out. It never does. Extracted frames are always wet and heavy.

Fourthly, as I impatiently stand in place, overseeing the extractor's wobble factor, I have found that a flashlight is very handy for checking the rate of honey extraction. Watching the stringy honey strike the extractor tank side gives me an idea of how much honey remains in the combs. Plus, honestly, it's something to do while I just stand there holding onto the extractor. Never, never hang your fingers over the top edge of an extractor tank that has a spinning basket.

The hot knife

In posted videos, I frequently see beautiful white comb cappings being effortlessly cut away by a single motion of a perfectly heated hot knife. When I occasionally get such combs, I take a moment to just enjoy that moment. The next comb is probably going to be an old black comb that fights the knife every step of the way. The knife jumps and lurches. I must always remember not to let my thumb hang over the edge of the end bar. A cut with a dull knife can be a painful cut. In what can only be called frustration, I frequently use the heat of the knife

to simply melt the heavy cappings away. Rather than cutting, I simply hold the hot knife on the cappings. They melt open.

In a variation on this hot knife theme, there are posted videos of honey processors using heat guns to melt the cappings rather than using traditional knives. On the videos, the process seems to work, but there are remaining issues – namely lots of wax particles remaining on the comb surface. The process appears to be much easier than using a knife, but I have no personal experience with this procedure.

Hot knife temperature regulation is not a particularly simple procedure. Like the soup in the childhood story, *Goldilocks*, the temperature of the knife needs to be “just right.” I have several knives that consistently run too hot – no matter my adjustment. While a scathing knife is probably helpful in the uncapping process, the operator’s risk when using the knife is increased. Not only can the operator take an occasional cut, but now the operator can also be occasionally burned.

A second small detail is where does the operator lay a blazing knife when not in use? Lay in on cappings and they will begin to sizzle. Knife stands are available, but that’s just one more piece of equipment. All things considered, a knife that’s too hot is not a good thing – but neither is a knife that is too cool.

Another small detail is my right arm. After a few hours of uncapping honey with a hot knife, my dominant arm aches – then and later. It’s just work. There is no way around this characteristic.

Insects and honey

Yes, I boldly entitled this piece with an indication that beekeeping is not honey production. Yet without healthy bees, there is no honey. Bees make honey from nectar. If one has trouble with insects, that person probably does not want to know the details of honey production. But the occasional bee in extracted honey is not the only insect issue.

In other articles, I have speculated that Gallarasis is more common than beekeepers think. Wax moth larvae tunneling near the mid-rib of the honey comb is not wildly uncommon. Upon spotting a wax moth larva making a run for it, the hot knife



Finally, liquid unfiltered honey.

becomes the insect control device of choice. A moth larva stands no chance again a heated knife.

Small hive beetles are no better. They scurry about, and I worry about them getting back into extracted hive equipment. The hot knife is called upon again. The beetle withstands the hot knife no better than the wax moth larva.

So here we are. Bees (insects) intimately made the honey. Other common insects, wax moths and beetles, are also in the mix. Is this honey contaminated? No. Is it a misuse of the hot knife to alternatively use it for insect control? No. Do I want to invite my neighbors over to watch this process? No, I do not.

Even if some people would not like the thought, honey is an insect related product. While in the U.S., we don’t intentionally eat insects, we eat lots of honey. It’s a hardy food product. It’s wholesome, and to a degree, a healthy product – but bees made it.

As is so often the case

As is so often the case, I need to spend the last few bits of this piece explaining that I actually like and appreciate honey. I can say, with head held high, that it is a demanding product to acquire. For those of us who do not have dedicated extracting space, it is nothing short of work to set up, extract, and break down the extracting line. But when that clear honey is in a jar, isn’t it a beautiful product. Springtime in a jar. What flavor, other than sweet, could such

a beautiful product have? In the end, it is all worth it, but you will have to work to get to that end point. There’s no easy way.

Honey Bee Obscura with Kim & Jim

I have recently begun working with Kim Flottum and Jeff Off at *Growing Planet Media* and *Beekeeping Today* podcast. Kim and I will be producing concise, practical, podcasts that discuss eclectic beekeeping titles and will also include occasional interviews. Sessions are currently being produced. The new podcast is entitled *Honey Bee Obscura*. When appropriate, I will be using this new format to supplement my *Bee Culture* Articles. Watch for future updates.

A personal “Thank You” for reading to this point. I appreciate your time spent here. I mean that. **BC**

Dr. James E. Tew, Emeritus, Faculty, Entomology, The Ohio State University and One Tew Bee, LLC; tewbee2@gmail.com; <http://www.onetew.com>; *Honey Bee Obscura with Kim & Jim* podcast.



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OBITUARIES



Elmer Yaddof Jr., born at home in 1931 in Preston IA, passed away November 30th, 2020, in his home at the age of 89. Elmer's parents were Elmer Yaddof Sr. and Norma (Ruchotzke) Yaddof. He was baptized as a member of St. John's Evangelical Lutheran Church in Preston, IA, a graduate of Preston High School, and married Carol Meyer on February 21st, 1953, in Green Island, IA. A private grave side service was held at the Preston Cemetery.

Elmer was fascinated with honeybees since childhood and decided to start a beekeeping business which – with the help of his sons Tom and Bill and son-in-law Ray Johnson – became the largest honey producer in Iowa. In 1987 and 88, the business produced a million pounds of honey, had 8,000 hives and covered a 150-mile radius around Preston, IA. Ray and his sons continue the operation today.

In 1975 and 76 Elmer was recognized in the "Who's Who In Finance and Industry." In later years Elmer served as a beekeeping expert during official U.S. Government events in China and South America. In 2007, the American Honey Producers Association named Elmer Beekeeper of the Year. Elmer was the oldest active beekeeper in the state of Iowa.

Elmer loved checking on beehives every day and meticulously recorded weather patterns and changes to the environment over the years. His records were critical to planning his operations and continue to guide three generations of beekeepers today. Later in his career, he focused on working with the landowners who hosted the business' beehives.

Elmer was a member of the Preston Fire Department, Iowa Honey Producers, American Honey Producers, and several St John's Lutheran Church committees. He held leadership positions in many of these organizations.

While starting his beekeeping business, Elmer had a variety of additional jobs (rural mail carrier, delivery milkman, assembly line worker at Clinton Engines and Savanna Army Depot), From 1952 to 1956, he served in the U.S Army Reserve and Iowa National Guard as a Sergeant with Battery A 556th Field Artillery Battalion, in Clinton, IA.

Elmer was a lifelong trapper and hunter. In 1952, he was proud to be among the first hunters to receive an Iowa deer hunting license and obtained one every year thereafter. He was active in high school sports as a player in his youth and later on as an official baseball umpire.

Elmer had a fun loving and curious personality. He loved kidding around with family and friends. He was passionate about beekeeping and proud of his profession. Elmer loved to see the smile on people's faces when he delivered or gave them honey.

Elmer is survived by his wife, Carol, and their four children: Steven (Linda) of Platteville, WI, Christina (Ray) Johnson, Thomas (Rose), and William (Janet), all of Preston, IA. Also by his sister, Lois (Larry) Hoffman, his 10 grandchildren and 19 great-grandchildren.

Elmer was preceded in death by his parents and five siblings: Melvin, Alvin, Everett, Norman, Robert, and Florence. Also, one grandson, Devon Yaddof, and two great granddaughters, Paisley Bennett and Grace Yaddof.

Bob Harvey passed away December 5. Bob battled cancer since July last Summer.

He was a successful commercial beekeeper for several decades, and later was a help to many getting started. Bob would take bees to almonds every year, as many as 32,000 hives a year. Most of these bees were from people he had sold bees to and had taught some of the basics to. Many of these bees were sold and boxes that his hands or forks had touched are scattered around the country, and have been pictured in many photos on this page.

Bob served in Vietnam, and this cancer was likely a result of exposure to chemicals there.

Bob had many interests, from snakes to fishing and carpentry, and his keen intelligence yet humble attitude were apparent in each. There was a time when he was involved in a Guinness record for largest bee beard, and even did a bee beard demonstration on the David Letterman show.

He was a kind and helpful man, always trying to help the underdog, often sacrificing his own profit for others to succeed. Despite his giving nature, he often had difficulty expressing his feelings to others, especially those closest to him.

Many Prayers for his children, Dee Dee Harvey, Rob Denise Harvey, and CJ Harvey. He will be tremendously missed in the bee industry as well, both by friends and those who had the pleasure of doing business with him.



CALENDAR

◆NEVADA◆

Nevada State Beekeepers will hold their conference February 26-27 in Yerington.

There will be speakers, hands on workshops, honey tasting, photo contest, banquet and more.

For information contact NevadaStateBeekeepers.org.

◆OHIO◆

Lorain County Beekeepers Association will hold their annual Beginner Beekeeping Class on Fridays in March beginning March 5, at Life Church, 1033 Elm Street, Grafton.

The fee is \$50 which includes 1 year membership to the club.

Hands-On Field Day will be held June 5 at Queen Right Colonies, 43655 State Route 162, Spencer, OH.
Bonus Class - Fall Wrap September 10, 7:00 p.m. at Life Church.

For information visit www.loraincountybeekeepers.org.



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Bastin Honey Bee Farm.....	76
BZ Bee Pollination.....	76
Combs Bee Farm.....	81
Gardner's Apiaries.....	62
Hardeman Apiaries.....	54
Honey Land Farms.....	72
Koehnen, C.F. & Sons.....	40
Old Drone.....	70
Old Sol Apiaries.....	55
Olivarez Honey Bees Inc.....	8
Roberts Bee Company.....	46
Rossman Apiaries.....	47
Spell Bee Company.....	62
Strachan Apiaries.....	82
T&A Bee Farm.....	70
Travis Neves Apiary.....	94
Weaver, R Apiaries.....	55
Wilbanks Apiaries.....	32
Winters Apiaries.....	82
Wooten's Queens.....	40
Z's Bees.....	15

Associations/Education

2 Million Blossoms.....	82
A Closer Look.....	85
ABC & XYZ.....	92
American Bee Journal.....	63
American Honey Producers.....	65
Bee & Butterfly Habitat.....	82
Farming Magazine.....	58
Georgia Beekeepers.....	58
Honey Bee Health Coalition.....	10
Nevada Beekeepers.....	58

Project Apis m.....	29
Root Candles.....	22
Wicwas Press.....	73

Equipment

Bee Smart Designs.....	65
Country Rubes.....	70
Cowen Mfg.....	62
Dakota Gunness.....	72
Forest Hill Woodworking.....	70
Humble Abodes Woodenware.....	76
Pierce Uncapper.....	32
Pierco Frames.....	3
Superior Bee.....	44

Related Items

Angel Bottles.....	58
Beekeeping Insurance Ser.....	3
Beepothecary.....	72
BIP.....	33
CreamPal.....	62
Complete Supplement.....	65
Custom Cedar Beehives.....	51
Draper's Bee Pollen.....	86
Global Patties.....	7

Help Wanted.....	58
HiveAlive.....	2
Hive Tracks.....	62
Mother Lode Products.....	15
NOD Formic Pro and Bee Cozy.....	4
OxaVap.....	65
Rayonier Land License.....	55
Sailor Plastics.....	55
Strong Microbials.....	12,13
Texas Insurance.....	Inside Front

Seeds & Plants

Ernst Seeds.....	70
Rockbridge Trees.....	86

Suppliers

Acorn Beekeeping Equipment.....	42
Beeline Apiaries.....	53
BetterBee.....	11
Blue Sky Bee Supplies.....	Inside Back Cover
Dadant.....	6,18
JZsBZs.....	55
Mann Lake Supply.....	Back Cover
Maxant Industries.....	55
Miller Bee Supply.....	54
Millerbees Mfg.....	94
New England Beekeeping Supplies.....	25
Propolis-etc.....	47
Queen Right Colonies.....	51
Ross Rounds.....	46
Rossman Apiaries.....	47
Sherriff Beesuits.....	26
Simpson's Bee Supply.....	67
Southeast Bee Supply.....	1
Western Bee Supplies.....	42



If you are having an annual meeting or teaching a beginning beekeeping class, we are happy to send you magazines to give to your attendees and students.

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Please email Amanda at Amanda@BeeCulture.com with the number of magazines needed, a complete mailing address and a contact person.

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It's early November as I write, and every evening we open the gate for our bear, who comes down from the Hogback in the moonlight to munch on fallen apples in the orchard. Likely once-bitten and twice-shy, he steers clear of the electric fence around my bees.

You might wonder why a beekeeper would open the gate for a critter renowned for his fondness for bee brood and honey. I can't keep him out. He squashes the fence when he climbs over it, and I'm weary of setting it right again. I really don't mind him visiting. He helps us put an otherwise wasted crop to good use, and he never fails to leave behind his nutrient-rich calling card.

Beekeeping apparently rivals golf as a hobby, but to me it's all wrong. Beginners generally have no idea what they're getting into, and our favorite insect suffers for it. I thought I might offer a word of caution to the uninitiated, so I posted this on the Colorado State Beekeepers Association website:

So you want to be a beekeeper! You'll do your part to save the bees, and you'll have honey on your toast every morning, right?

My name is Ed Colby. I'm the president of the Colorado State Beekeepers Association (CSBA). Now take a deep breath, please, because I have some good news, and I have some bad news.

First, the bad news: There is nothing on Earth easier than failing at beekeeping. By "failing" I mean letting your bees die.

Beekeeping requires some fundamental knowledge about honey bees and how to care for them. Short of working for a commercial beekeeper, the best first step for a beginner is to take a course taught by a competent teacher. In Colorado, lots of regional bee clubs, plus universities like Penn State and University of MT, teach such courses, either in-person or online. But a little education still isn't going to be enough. Beekeeping requires time-consuming dedication. Getting bees is not like getting a kitten. If your bees are to live and thrive, you're going to have to do some work. In the Summer this means checking on your bees every 10-14 days. You might like to take vacations, but your bees do not. If you place a hive in your backyard and don't take care of it, you're not "saving the bees." You're killing them, because parasitic *Varroa* mites will eat them alive, creating wounds that vector the transmission of deadly viruses.

Varroa mites are an invasive species relatively new to the United States. All bee hives in the U.S. harbor them. These reddish, pinhead-sized critters normally attach themselves to the undersides of adult bees, so they're pretty hard to spot. There are ways to determine if mite levels have reached levels that threaten the health of the hive, but they are time-consuming and require not only education but a can-do determination on the part of the beekeeper. None of this is easy.

Left unchecked, *Varroa* mite infestations normally peak in the fall, when mite numbers continue to grow, just as a honey bee colony reduces its bee population in preparation for Winter. In other words, the ratio of mites to bees increases. The colony now likely succumbs to one or more viruses. As its mite-ridden bee population dwindles, opportunistic bees from neighboring hives raid the collapsing colony, feasting on honey and picking up hitchhiking mites that they bring back to their own hive.

You as a fledgling beekeeper will be forced to make a conscious or unconscious choice. Do nothing to reduce the mite population in your hives, and your bees will likely not make it through their first Winter. Even if your colony is headed by an extraordinary queen who imparts above-average mite resistance to her workers, its being "*Varroa* bombed" by collapsing mite-ridden hives in your neighborhood can and likely will, seal its doom.

Your other option is to use formic and oxalic acids, thymol, hops derivatives, synthetic chemicals, or even mechanical means to kill mites. It can be a messy business. Some treatments are more effective than others. Some work only at certain times of the year. You need to be careful not to contaminate the honey. All of this costs time and money.

You can search for queens that impart natural mite resistance to their offspring, but I recommend you get a little experience before you tackle this. The thing to remember is that sooner, not later, you will surely face serious challenges from mites, and a failure on your part to act on behalf of your bees can spell curtains for those innocent creatures in your charge. Some people consider this animal abuse.

You don't like this, do you? I don't like it either. But this is the way it is. If your passion to keep bees is anything short of red-hot, and you still want to help pollinators, maybe there's a better path for you. You could plant a bee-friendly garden, or advocate for responsible pesticide regulations, or join an environmental organization devoted to pollinators, like the Xerces Society. You can help bees without owning them.

For those of you still determined to keep bees there is, however, some good news. If you're willing to commit yourself, you can thread the needle and learn to keep your bees alive. It will be more work than you ever imagined. But if – and only if – you have the fire in your belly, you can do it, and CSBA can help.

If you're easily discouraged, you'll never make it. But if you're willing to learn, if you're willing to fall flat on your face and get up and have another go, if bees haunt your daydreams, if you put your heart and soul into this noble craft, you might find you have the right stuff.

The world doesn't need more beekeepers. It needs more good ones.

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