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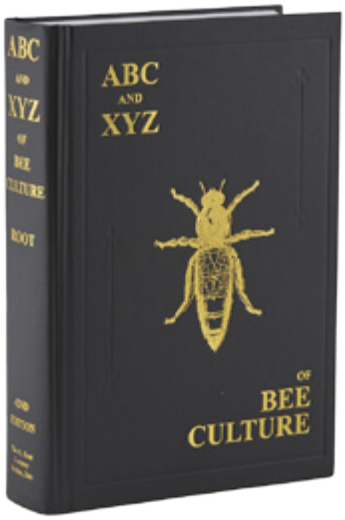

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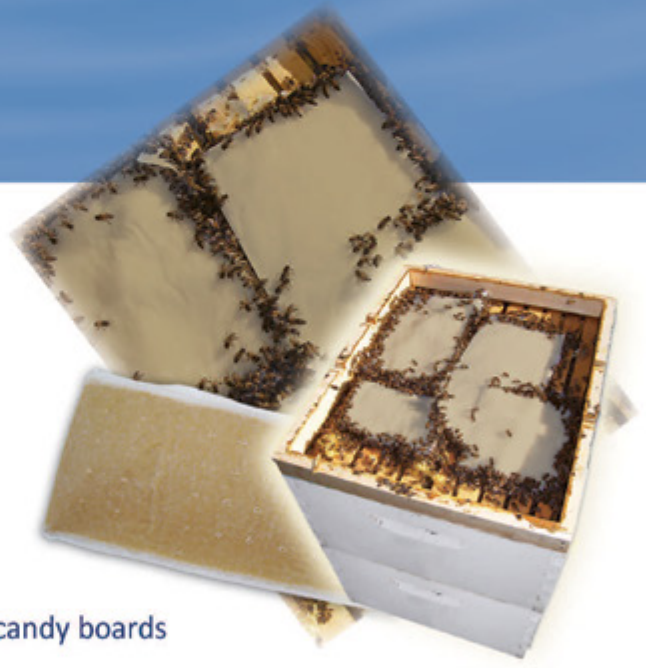

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Bee Culture

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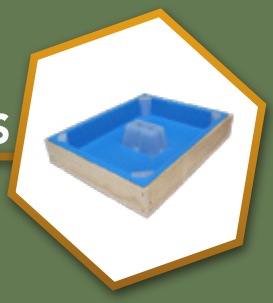

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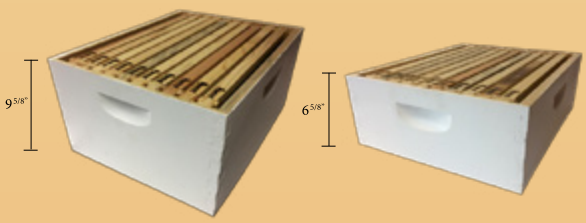

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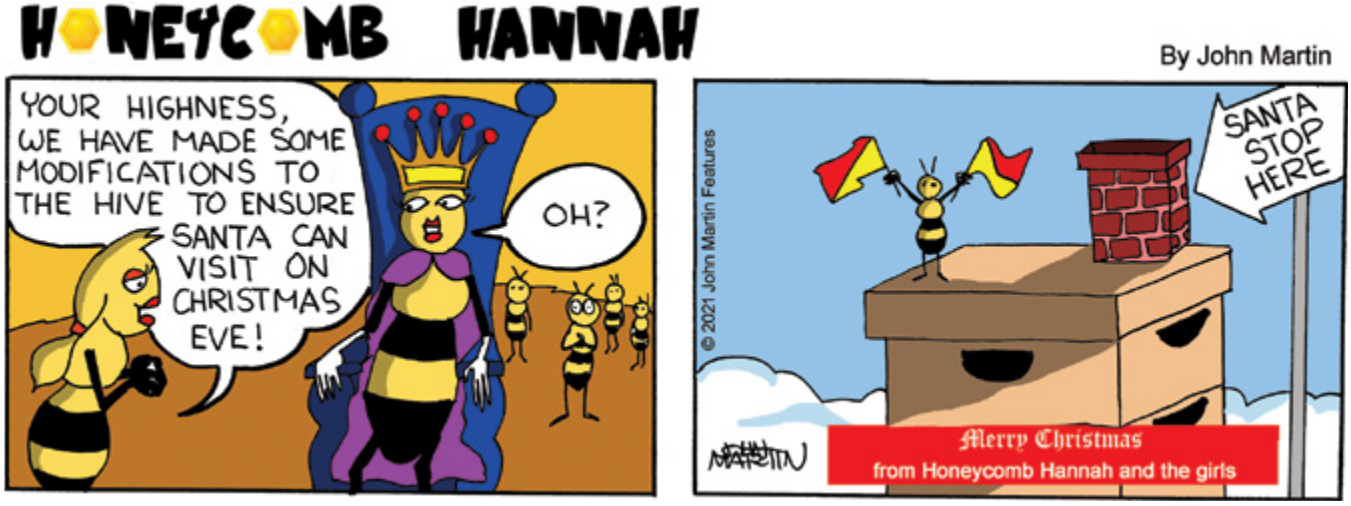

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Going Away

I launched 2 Million Blossoms with crazy enthusiasm and a firm belief that if I created something beautiful I could beat the trends that print is dead. While I have had tremendous luck and wonderful subscribers, growing quickly in my first year, my resubscription rate has been too low to make this venture sustainable. I am incredibly proud of the eight issues I published, over 800 pages of thought-provoking content. The artists, writers, scientists, and photographers I met on this journey enriched my life and I am grateful for the encounters. We will not disappear. We are simply pivoting our model. We will focus on producing podcasts and an in-depth monthly newsletter. Instead of annual subscriptions, we plan to produce special stand-alone issues on specific topics in the future. Thank you to all of the subscribers, who believed in this project. Many of you read each issue cover to cover. Stay tuned, as we revamp for the modern world. And in the meantime, check out 2 Million Blossoms - The Podcast: **https://2millionblossoms.com/thepodcast/**

Dr. Kirsten S. Traynor

Beekeeping Today Podcast

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Just want to say, thank you, I very much enjoy your episodes and particularly the scientists who come on. Regarding the episode on hive alive- excellent product, I have always been big fan of It goes on in foliar sprays in biological and nutritional tank mixes for fruit trees, in soil preparation, sheep have a self serve graze of seaweed meal, and I rub the (also cold processed) seaweed meal into bee frames – they certainly seem to like it. We eat in a number of ways. I know there are factors outside of my control are at play here, but my bees are consistently healthier than anyone else's I know. I think seaweed (and microbes) as a part of a holistic management approach are two very important elements in their vitality. (These are the only two supplements I give them- no syrup, no patties). A quick look at the phytyocompounds and minerals in seaweed should convince anyone it's wonderful stuff. (oh yes, I'm a naturopath with four years clinical nutrition and and now a horticulturist with adv dip in agronomy). Yes, health comes from the gut up. Dr Dara is spot on in that all beekeepers should address nutrition and gut health as a priority and a base on which to build other aspects of bee health like immunity or *Varroa* treatment. Gut health and good nutrition are two sides of the same coin – inseparable from each other. Science requires an empirical approach but nature delivers things holistically- look to nature to heal nature. Thanks guys you rock,

Amanda

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Loving Bee Culture

To the right is a renewal that we received from on of our subscribers who really enjoys what we do. This is what we strive for every month – that you all enjoy what we do.

Thank you for the kind words.

From The Editor –

My life With Honey Bees, Beekeeping and with Beekeepers has been **incredible**. As I look back and reminisce about all the beekeepers, researchers, inspectors, government, media, NGO's, Big Ag. leaders and regular people, I have met as I have traveled the world because of honey bees it is **incredible**! But I already said that – and it is absolutely true. Who gets to do these things because of an amazing insect? Not too many.

In this remarkable journey I have had the once in a lifetime opportunity to be able these last two years to be Editor of *Bee Culture* magazine. I have written papers, and articles and wrote the Classroom column for decades, and a book but I had never been an editor of anything except my own writing.

I have known Kim Flottum for years and Kathy Summers for years. With Kim, two years ago, in his last days before retirement they wanted to find someone who had years of the smiles and laughs and bumps and bruises one gets after 40 years in the industry. Apparently, that was me. And I said yes because Kim and Kathy had already come up with an excellent plan for *Bee Culture* to maintain it as "The Magazine of American Beekeeping" for all beekeepers. Kim would stay on and train me for a short period of time then retire, and Kathy would stay on for two more years to add to her 30+ years to do the real training then retire.

Bee Culture had at that time two years ago Kathy, Jean Newcombe and Amanda DeSimone. Kathy did design and layout for *Bee Culture's* 100 pages every month. Jean was the advertising expert and Amanda, the daily Catch the Buzz, social media, customer service etc. But this strong, knowledgeable group were a family and shared needs and responsibilities back and forth. Everybody was there to help make *Bee Culture* the best and help each other make this happen.

This is what I was invited into two years ago. What wonderful people to take on a rookie (an old rookie at that) and with tremendous patience lead and guide me as the new Editor of *Bee Culture*. And really nobody is the "Editor" at the end of the day because we all talk, share and decide what *Bee Culture* readers will get the most value from. And this is happening more now as Kathy retires at the end of December. Emma Wadel, has been here for a few weeks and is learning and fine tuning her existing abilities in design and layout but learning the nuances of *Bee Culture*, the yearly calendar, customer service, Catch the Buzz, social media and much more. Kathy has taken her under her wing and Emma will be great.

For me Kathy's patience, knowledge, skills, abilities, and genuine friendliness are exhibited in each issue of *Bee Culture* for the last 30+ years. I have learned so much from her. We will all miss her, but I can truthfully say without even asking her that if we have a question or need more direction she will always be there with a smile for us and you.

Jerry Hayes

From Friends and Loved Ones –

Dear Kathy,

Sorry to see you go. We will miss you. The fact that you stayed on to help Jerry assume the challenge of becoming editor with the departure of Kim shows a continuing contribution to *Bee Culture* that we all appreciate. Let's hope that even in retirement you will frequent the halls of the A.I. Root Company to rally the staff, as they produce one of the oldest, most prestigious bee journals in the nation. Meanwhile enjoy your retirement, which I trust will mean more time for other pursuits, including your beloved chickens.

Malcolm T. Sanford

Kathy,

Thank you for all your contributions at *Bee Culture*. I am especially appreciative of your help with my articles. I wish you the best in whatever you do, you do excellent work!

David MacFawn

I have had the pleasure to work with Kathy Summers for several decades. Saying hello as we travel to conferences, bee meetings and honey shows worldwide. Working at A.I. Root as Graphic Design Assistant Editor, Vice president of **Medina Beekeepers** and Vice Chairman of EAS. As an EAS Master Beekeeper and a Lifetime member of EAS, I always appreciated the work that Ms. Summers did. The best part that I enjoyed about Kathy was her smile and her honest desire to help. Last her admiration and affection for her flock of Buff Orpington's was and is outstanding. Keeping her chickens and fighting the snakes has been part of her journey!

EAS Master Beekeeper
Earl Hoffman

Dear Kathy,

You have been a constant friendly face during the decades that I have been a beekeeper. I remember you at various bee meetings working on something, but providing a cheerful smile and answer regardless of how busy you were. In the last few years, I have had the privilege to know you and Kim better and have realized just how hard you work and your dedication to make *BC* the best magazine, no matter how challenging it is sometimes, especially with limited staff and recent stresses.

More personally, I am touched by your love of nature, plants and bees and consider you a good friend. *Bee Culture* continues to be an interesting and fun magazine to read each month and you are a vital part of its creation. We will all miss you!

Barbara Bloetscher
State Apiarist/Entomologist
Ohio Department of Agriculture

Kathy Summers and Kim Flottum have been such long time fixtures at *Bee Culture*, it is hard to imagine the magazine without them. Behind every great man there is a woman, and in this case Kathy had more staying power than Kim did! I am finding it hard to find the words that express how grateful I am to Kathy for everything she has done to help make *Bee Culture* what it is today: the most popular beekeeping magazine published in the USA. I am

also grateful to Kathy for helping to keep Kim in line for so many years. There is a saying that goes: "Do you want to talk to the man in charge, or the woman who knows what is going on?" I always had a sense that it was Kathy that always knew what was going on. Happy trails Kathy. We will miss you.

Bees be with you,

Ross Conrad

Kathy,

It is no surprise to hear of your retirement as it was announced back when Kim retired, that you would stay on for a few more years. However it is surprising that it has come so soon.

You have done a marvelous job at A.I. Root and you will be missed. "They" tell me that the whole key is to stay busy and I don't mean work on the computer. Get some more chickens and ducks and chase them around the garden.

Jim Thompson

I want to thank Kathy for all her hard work over the 30 years at *BC*. She's been very kind to me whenever I needed something for the State Fair and she's always been very helpful when needed. She must be a Queen to put up with Kim. He taught me how to eat fried bee larvae. I will miss her articles.

Nina Bagley

Kathy this is the end of an era. I so appreciate all you've done for *Bee Culture*, the Root Company and for me as well through the years. You deserve a rich and fulfilling retirement. My wish is that you learn to wind down, relax and most of all enjoy the coming years. Thank you. Thank you Kathy. All the best.

Bluntly said, I cannot imagine *Bee Culture* without Kathy Summers making things happen behind the scenes. When was she not there? She has been making things happen for so long, that I can't even remember when she began. But all things change, and it is appropriate that Kathy now should take some time to work on other things in her life. However, that does not mean that she will not be missed – greatly. Kathy has always been the "implementer." She was the one who made things happen. She is the organizer. Professionally, I will miss her presence and competence immensely, but I truly wish her well. Hers was a job beautifully done.

James E. Tew, PhD
Columnist, Bee Culture

"Here, take these gloves," Kathy Summers said, putting a pair of hand-knit mittens sent by her British friend into my hands. I was going for a bike ride on rail-to-trail segment and the weather had turned cooler than I had prepared for. In our friendship, Kathy's kindness has always been steady, as this example exemplifies, but there were many more as I was working on my books, I was always needing photos, needing photocopies, and needing items that required time I'm sure she didn't have. Yet, she never rolled her eyeballs, never sighed under her breath, and never expressed impatience with my requests. For all my idiosyncratic projects, I have always felt that she has been an invisible ally, and I hope she enjoys her well-deserved retirement.

Tammy Horn Potter,
KY State Apiarist KY Department of Agriculture

The Apiary Inspectors of America want to wish you all the best in your next edition and hope it is quite the buzz! We sincerely appreciate all your years of dedication and contributions to the beekeeping industry and we are also very grateful for your invaluable work with making our Apiary Program featured articles a stellar appearance in *Bee Culture*.

Hope you are well my friend,

Kim Skyrm

Kathy Summers has been an excellent format and copy editor at *Bee Culture* for many years, while also writing whimsical and interesting articles about bees and the hobby farm life. What this misses, though, is her eternally sunny disposition. Whether at meetings or in emails this has made it an absolute joy to work with her on various projects. She really sets the tone for a great magazine team at *BC*. She has tolerated missteps and a whole lot of tardiness from me without complaint, and helps contributors get their message across. It will be great to see Kathy and Kim at meetings for many years and I am sure they will enjoy even more travels and gardening now that both are 'actively retired'.

Jay Evans

Behind every great man stands a great woman, as the saying goes. Kathy Summers has been the backbone of *Bee Culture* for as long as I can remember, which is a very long time. I always copied her in my correspondences with editors Kim Flottum and Jerry Hayes, because I know who really runs the show. I will so miss her gentle reminiscences of backyard chickens and travels with her beloved Kim. I also understand that there comes a time. Godspeed and thank you, Kathy.

Ed Colby
Bottom Board columnist

Kathy:

Want to thank you for your many years of service to the A.I. Root Company, working on my monthly column and for designing and formatting my two books. I always knew that I could count on you in getting the job done. Wishing you the best in your retirement years; you have certainly earned it. With best regards.

Clarence Collison

Best wishes Kathy to you on this chapter in your life journey! You have always been such a strong part at Root in upholding and showcasing our heritage and expertise. Your attention to detail and your diligence in everything you do is impressive – even providing us with feedback on the proper orientation of the honeycomb on our Root logo, or working so hard to assure that your seminars and events happened so well! And you always did this in your quiet, gentle manner. Happy Retirement!

Frank Graziano

Kathy,

I have only known you for a short while but I have loved every minute. I appreciate your patience and kindness through all of my learning and many mistakes; as well as your willingness to let me start to put my own mark on the magazine. I can only hope to make the impact you have on everyone in this special community. Have fun in retirement, you definitely deserve it after all the work you've done!

Emma Wadel BC

It's Summers Time –

Holidays, Changes And Memories!

As I write this it's mid-November and it's one of those incredible weather weeks in Northeast Ohio. It's 66°F and the sun is shining. It was a beautiful weekend – we actually got some things done outside in anticipation of Winter. And by the end of the week they are predicting snow. So we've learned to take advantage of these fleeting days.

It was also Daylight Savings weekend. I know it made sense 'back in the day' but now I'm not so sure and not a fan. It was nice that the sun was up when I got up this morning, but it will be almost dark when I go home. I guess there's always something to complain about.

Things are changing – again – here in *Bee Culture* land. Can you believe it's been two years this month since Kim retired as Editor after 33 years. He's been keeping very busy with writing and podcasts. Hopefully, some of you have been listening to all of that good information. So now our *Bee Culture* family is going through more changes. Change isn't always easy, but most of the time it's necessary.

Here's a quick summary of what's been going on and what's going on for the future. Two years ago Jerry took over as Editor of *Bee Culture* when Kim was ready to move on. It's been quite the journey and hopefully most of it has been enjoyable and exciting for Jerry. I've certainly enjoyed getting to know him better as a friend and as a boss.

When Jerry walked in the door there was myself, Jean Newcombe and Amanda DeSimone here in the office. We also have Brenda Bray in MN who helps us out with layout and design and who took over *BEEKeeping, Your First Three Years* quarterly. Although we no longer publish the quarterly Brenda is still a part of our team and helps us out whenever we need her.

In the September issue I talked about Amanda and her moving on after the birth of Liliana. She is doing well and enjoying being a mom. As it turns out her parents are having some health issues and Amanda is concentrating on that. I miss her but we keep in touch on a regular basis.

Amanda, Jean and me at the Tri-County meeting in Wooster, OH in March 2019.

Now I'd like to talk a bit about Jean. Jean has been in my life for almost 30 years. She is one of my treasures. She worked in the Root Company customer service department for several years and was exceptional at it. Customers would specifically request to talk with her. During that time she had her daughter Katie who is I think 26 now. And then some years later along came her son Jake. Jake had a rough start with some health issues and some special needs that needed to be met. To better accommodate Jake's needs, Jean left the Root Company and took a position with one of the hospitals in the area that offered her more flexibility. But we always remained close friends.

As *Bee Culture* went through more changes Jean offered to come back part time, while still working at the hospital, and help us out. And she found her spot with selling advertising and has done and is still doing an amazing job at that. She's established lasting relationships with so many of the industry people. And as Jake got older Jean was able to travel with Kim and I to several of the National meetings. So many of you got to meet her in person. All this time Jean has also kept her full time position at the hospital getting promoted along the way.

Now comes the next change happening to our little *Bee Culture* family. Some of you know already that I will be retiring as of December 31 of this year. I'll be around for the January issue and then I'm moving on down the road.

It's been a journey I could never have planned or dreamed of. I've talked about the details over the years on these pages. When Kim got ready to finally talk about retirement we agreed that we shouldn't both leave at the same time. We thought that would cause too much disruption and our wish was to have a smooth transition and leave things as neat and tidy as we could. At the time two years seemed so far away and yet here it is.

Oh, the places we've been and the people we've met. Kim and I have been so incredibly blessed by this journey that we have been on for these 30+ years. We have been to bee meetings all across the U.S. and visited several other countries all while talking and teaching and writing about honey bees. The friends we have made along the way are absolutely amazing and will be with us forever, living on in photos and memories even if we don't physically cross paths again. Along the way we've lost good friends and that's always hard. But the blessing is that we got to have them in our lives for a time.

And the same goes for here at Root. I have friends that I've had for the whole time I've been here. Friends that watched my children grow up and turn into adults. Friends that prayed with me and cried with me and laughed with me over whatever was going on in each of our lives over the years. Those friends are family and we'll be together forever.

The transition with Jerry taking over as editor has gone well. He's done a great job establishing himself in this new role. Have there been bumps? Yes there have, just like with any family when changes occur. But *Bee Culture* is surviving and will carry on.

I'm excited about the next chapter and a little afraid. Mostly I'm looking forward to doing a better job with all of the things I've been neglecting – bees, chickens, gar-

den, family. Folks have asked what will you do when you retire. Believe me I have a great long list of things that I'd like to do and just haven't had the time. So, God willing I'll get to do some of them now.

I might volunteer at the library, I might learn sign language or how to play the guitar (I took lessons about 100 years ago). One Winter goal is to read many of the stacks and stacks of books that surround me at home. That is one of my great passions – reading.

I wrote the first of these columns in the January 2012 issue. I certainly never fancied myself a writer and really still don't – but Kim said you need to do this. So I just started writing about what was going on in our lives. And over these years I've enjoyed writing about the chickens, our travels, kids, friends, the bees and whatever else popped into my head. And you have graciously received my contributions with positive comments. Thank you for that.

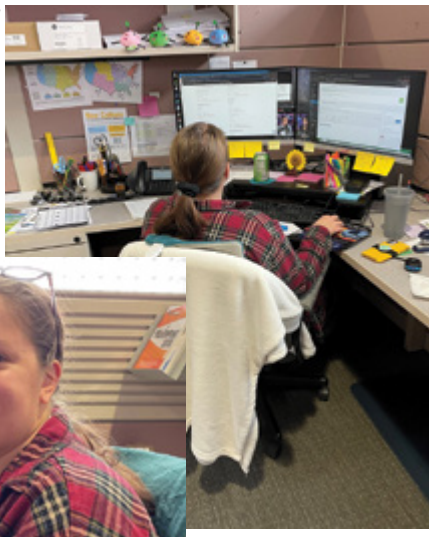
So what happens at *Bee Culture* now? Well we want to introduce you to Emma Wadel. Emma graduated from Kent State University in June with a degree in Graphic Design, and joined our *Bee Culture* family at the beginning of September. For the last two months Emma has been learning all the jobs here in Publications because we are still short handed. Her main job will be the layout and design of these 100 pages each month. But she's been doing an amazing job with customer service – answering your phone calls and emails and entering and managing the subscriptions. She's also been updating our web page and working on our Social Media presence. And she did the lion's share of this December issue. Emma is young and smart and excited about her new position.

I have a few weeks to try and teach Emma all that I know and along the way give her some history of the A.I. Root Company. Emma doesn't know anything about bees yet, but neither did I or Jean or Amanda. I think her love of bees will come with time. Who knows, maybe by next Summer we'll get her in a beesuit and out to the beeyard.

So like Kim when he retired, I won't be going far – physically or emotionally. We will always have bees for as long as we're able and hopefully will continue to see many of you along the way.

As we head into December I hope your vision of what this holiday season should look like is coming true for you. I find lately that I start so many conversations with "Before Covid we did it this way." I'm optimistic that this year the holidays will be like they were before and even better. The last two years have been hard for lots of reasons. And many of us have lost family and friends. I hope that your memories of those lost will help you through the season.

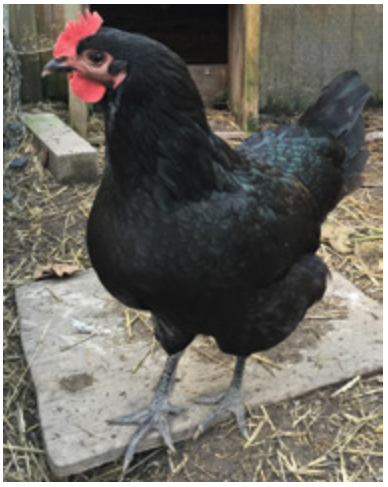
Emma getting comfortable in Bee Culture *land.*



At our house we'll have some with us this year who haven't been there in awhile and we are excited about that. We have a wonderfully big dining room table and I hope it will be full this year. I hope your's will be too.

From both Kim and I, we wish you a very Merry Christmas and a Happy New Year. Please keep in touch. My new email address is **kathyksummers@gmail.com**.

Kathy Summers



NEXT MONTH

Region 1
- Check Colony Weight/Feed if Needed
- Provide Upper Entrance to remove Moisture
- Possible one Time OA Treatment if no Brood
- Hope for Break in Weather for Cleansing Flights
- Rest my Knees and Shoulders
- Order Nucs
- Install Mouse Guards
- Check Hive Wraps
- Repair old equipment
- Clean Up Early Deadouts
- Clear snow from entrances
- Take time to read *Bee Culture*, leisurely

Region 2
- Check Colony when Temp above 57°F
- Buy, assemble, paint, repair
- Check Hive Weight, Feed if Needed
- Read *Bee Culture*/Plan for next year
- Order Honey Containers
- Feed Nucs through Winter
- Assemble new frames with foundation

Region 3
- Build Equipment
- Check Food Stores/Feed if Needed
- Clean Up Apiary Area
- Check Colonies as Weather Permits
- Do Alcohol Mite Wash
- Do Mite Check/Treat if more than three mites per 100 bee sample
- Clean up Honey Supers
- Make up Brood Boxes for Spring Swarms

Region 4
- Shovel Snow Away from Entrance
- Ensure hives are dead heavy with food stores
- Review your 2021 Log Book
- Start your 2022 Log Book
- Add top entrance if you haven't already
- Go to Bee Meetings....In Person
- Fix, assemble new equipment
- Hope for a Warm Winter
- Maintain Wind Breaks
- Join a Bee Club

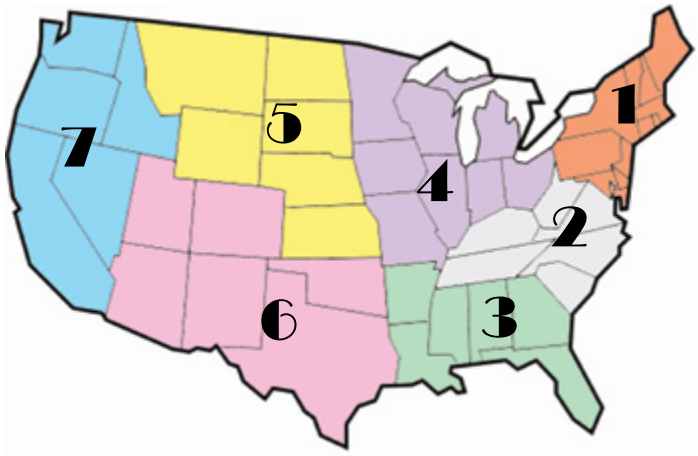
Region 5
- Check Food Stores
- Feed if colony(ies) are light
- Clean out dead bees at entrance
- Remove Snow Blocking Entrance
- Make Sure Hive Wraps are in Place
- Read *Bee Culture*

Region 6
- Read *Bee Culture* every month
- Check for Dead Outs
- Order Queens for Spring Splits
- Clean Up Yards
- Replace Damaged Equipment
- Monitor Certain Hives with Temperature Transmitters
- Consider Mite Control
- Check Hive Weight/Feed if Necessary

Region 7
- Check Hive Weight
- Feed Syrup and Pollen Sub. To get ready for Almonds
- Clean Out Deadouts
- Sample and Treat for Mites
- Repair, replace old equipment
- Monitor Colony Strength
- Go to National Meetings

Honey Reporters Wanted

We are expanding our Honey Reporter population and need new reporters in EVERY region. We ask that you fill in most of the wholesale or retail or both sections, most months, and our short survey on the back. We give you a FREE subscription for your service. So if you are interested send an email to **Emma@BeeCulture.com** and put REPORTER in the subject line. Include name, email, phone number and mailing address and we'll get you the next Honey Report form. Sign up today and be a part of the BEST Monthly Honey Price and Beekeeping Management Report in the industry.



DECEMBER – REGIONAL HONEY PRICE REPORT

REPORTING REGIONS – 2020 SUMMARY

	1	2	3	4	5	6	7	Range	Avg.	$/lb	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS												
55 Gal. Drum, Light	2.23	2.23	2.30	2.10	2.36	2.10	2.50	1.55-3.00	2.18	2.18	2.17	2.09
55 Gal. Drum, Ambr	2.12	2.23	2.22	1.94	2.12	1.93	2.43	1.35-3.00	2.06	2.06	2.09	2.05
60# Light (retail)	222.95	193.11	222.95	196.00	170.00	174.33	223.75	144.00-325.00	211.40	3.52	210.77	200.28
60# Amber (retail)	215.82	194.05	185.00	181.40	175.00	166.00	214.38	129.00-325.00	204.64	3.41	206.21	199.32
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	100.80	73.60	100.80	82.20	61.20	100.00	84.82	19.40-144.00	87.94	7.33	86.89	94.62
1# 24/case	181.92	127.25	142.95	115.87	149.67	126.75	154.80	45.00-300.00	145.03	6.04	131.27	133.86
2# 12/case	173.76	96.00	129.58	110.23	111.84	132.00	123.00	78.00-288.00	129.29	5.39	116.61	126.27
12.oz. Plas. 24/cs	125.65	120.86	86.40	93.24	62.22	106.80	108.80	40.68-244.00	108.96	6.05	103.70	99.74
5# 6/case	204.00	113.05	129.89	111.57	113.16	146.19	146.19	71.50-240.00	136.63	4.55	137.21	134.81
Quarts 12/case	157.76	140.29	140.47	152.38	161.49	170.33	183.00	94.50-300.00	160.80	4.47	162.63	159.80
Pints 12/case	118.26	110.02	85.50	91.47	111.00	94.00	96.00	69.84-194.00	104.61	5.81	102.43	93.68
RETAIL SHELF PRICES												
1/2#	4.50	4.93	5.25	4.68	4.24	4.45	5.77	2.89-9.50	5.35	10.71	4.89	5.58
12 oz. Plastic	7.02	6.59	5.88	5.81	4.76	6.29	6.45	2.99-12.00	6.54	8.72	6.23	6.31
1# Glass/Plastic	8.00	8.20	8.32	7.15	7.74	7.87	8.71	4.49-17.00	8.56	8.56	8.05	7.99
2# Glass/Plastic	14.75	12.60	15.37	12.55	12.72	15.00	14.75	7.99-25.00	14.36	7.18	13.92	13.80
Pint	12.97	11.49	8.75	11.86	9.90	10.10	14.28	4.00-25.00	11.44	7.63	11.28	10.21
Quart	21.26	17.38	16.77	16.20	17.02	19.20	20.17	4.90-42.00	19.06	6.35	18.23	17.94
5# Glass/Plastic	34.50	27.01	44.00	27.78	21.72	17.89	31.06	15.00-50.00	29.63	5.93	28.50	29.76
1# Cream	10.00	8.38	20.00	9.75	7.75	11.93	12.33	6.00-20.00	10.86	10.86	10.10	10.18
1# Cut Comb	14.44	10.17	11.50	13.99	10.00	12.00	15.00	6.00-24.00	13.89	13.89	13.10	13.35
Ross Round	11.58	7.05	11.58	11.50	10.00	11.00	13.75	7.00-17.00	11.15	14.87	10.57	11.03
Wholesale Wax (Lt)	8.50	8.46	4.50	6.38	6.63	6.40	9.60	3.00-16.00	7.50	-	6.32	6.73
Wholesale Wax (Dk)	7.14	6.38	2.30	4.60	7.00	2.50	10.00	2.00-15.00	5.79	-	5.31	5.80
Pollination Fee/Col.	102.59	67.50	65.00	91.67	180.00	102.59	57.50	35.00-200.00	87.68	-	89.96	89.88

REPORTING REGIONS – 2021 SUMMARY

	1	2	3	4	5	6	7	Range	Avg.	$/lb	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS												
55 Gal. Drum, Light	2.23	2.28	2.40	2.30	2.42	2.19	2.00	1.75-2.75	2.29	2.29	2.33	2.18
55 Gal. Drum, Ambr	2.27	2.20	2.41	2.29	2.50	2.50	1.85	1.75-3.15	2.33	2.33	2.26	2.06
60# Light (retail)	221.15	191.23	205.00	196.38	165.00	192.13	202.50	120.00-300.00	205.10	3.42	206.75	211.40
60# Amber (retail)	221.25	186.78	187.50	195.57	203.59	181.18	212.47	120.00-285.00	204.68	3.41	204.33	204.64
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	103.32	101.57	96.00	79.50	126.60	96.00	113.97	61.20-194.90	99.90	8.32	96.81	87.94
1# 24/case	158.44	200.64	139.75	110.55	197.67	95.92	144.00	48.00-300.00	146.69	6.11	141.37	145.03
2# 12/case	143.85	187.23	108.17	106.11	75.92	108.00	132.00	40.00-264.00	127.87	5.33	128.13	129.29
12.oz. Plas. 24/cs	110.73	156.60	102.00	94.65	94.32	107.88	114.00	72.00-240.00	110.11	6.12	112.10	108.96
5# 6/case	157.34	192.12	135.00	118.56	113.16	73.00	173.94	73.00-330.00	146.37	4.88	146.08	136.63
Quarts 12/case	185.69	207.98	131.50	143.00	155.08	146.34	183.00	119.08-300.00	167.72	4.66	166.62	160.80
Pints 12/case	93.98	121.78	84.00	87.64	101.33	88.00	96.00	60.00-180.00	98.45	5.47	98.71	104.61
RETAIL SHELF PRICES												
1/2#	6.10	5.95	5.50	5.16	3.96	3.84	5.76	2.68-9.19	5.58	11.16	5.60	5.35
12 oz. Plastic	7.04	6.97	6.53	6.48	5.94	5.44	7.07	2.99-12.00	6.65	8.86	6.48	6.54
1# Glass/Plastic	9.38	9.15	8.44	7.63	8.73	7.12	9.00	5.00-17.00	8.63	8.63	9.08	8.56
2# Glass/Plastic	15.67	16.46	14.88	13.94	9.93	10.89	15.50	6.78-30.00	14.77	7.39	15.14	14.36
Pint	12.16	12.79	9.95	10.22	10.52	12.33	9.60	4.00-22.00	11.15	7.44	12.38	11.44
Quart	22.15	21.22	17.40	17.54	18.88	15.33	19.07	8.00-42.00	19.16	6.39	20.56	19.06
5# Glass/Plastic	32.95	37.22	36.39	28.67	28.10	21.45	34.24	12.48-60.00	32.24	6.45	32.02	29.63
1# Cream	11.75	9.25	8.50	10.50	7.75	10.00	14.00	7.50-18.00	10.79	10.79	10.58	10.86
1# Cut Comb	15.05	12.80	12.30	13.67	9.00	15.41	15.41	8.00-25.00	14.31	14.31	13.23	13.89
Ross Round	12.63	7.30	15.00	13.50	12.02	12.02	13.75	7.00-17.00	12.04	16.06	11.22	11.15
Wholesale Wax (Lt)	7.95	6.03	10.12	7.16	6.17	4.17	6.67	3.00-23.20	7.45	-	6.72	7.50
Wholesale Wax (Dk)	6.75	5.53	8.17	6.05	6.00	3.50	7.65	3.00-15.00	6.31	-	5.23	5.79
Pollination Fee/Col.	85.91	74.00	95.00	130.00	90.00	110.36	50.00	30.00-225.00	93.23	-	90.21	87.68

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Technology Tips For Beekeepers

Malcolm T. Sanford

SWARM MONITORING: Theo Hartmann; BroodMinder People's Drone; USA; theo@broodminder.com

The presentation shows how relatively simple instrumentation (temperature and weight) can help to detect colony swarming and to distinguish between swarms initiated by mated queens and after swarms initiated by virgins. Functionality has been implemented in the T2SM temperature measuring device for brood nest temperature spike recognition, capturing high-resolution data before, during, and after the swarm event and automated beekeeper notification when an event occurs. This instrumentation, combined with hive weight measurement, made it possible to show the timing between swarm departure and the brood nest temperature spike. In most cases, the spike occurs at or after the swarming bees' departure. The common assumption that the temperature spike is caused by the swarming bees warming up their flight muscles may not be correct. The data show that the general chaos more likely causes the spike in the hive during a swarm event and the bees which are staying behind are simply overwhelmed and unable to regulate the brood nest temperature until the swarm is over. It has further been discovered that swarms return to the hive surprisingly often. It is believed that this is a result of virgins going on mating flights, and a rather large number of bees are escorting the virgins and return to the hive when she returns. The firmware upgrade required for swarm detection is available free of charge to current BroodMinder T2 owners. 5 Minutes, https://tinyurl.com/3h3ds2dc.

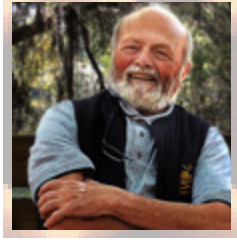
Acknowledgement Firmware upgrade was implemented following the logic published here .

ACCURACY OF INFRA-RED (IR) IMAGING TO ASSESS COLONY POPULATION SIZE: Colin B. Henderson, Robert Seccomb, Scott Debnam, Jerry Bromenshenk; Bee Alert Technology, Inc.; USA; beehealthguru@gmail.com

Since 2010, we have been exploring the use of non-invasive, IR evaluations of colony population size, using high-end research and robust, NIST certified(accuracy), IR cameras. In 2015, using professional grade FLIR IR cameras, we inspected 1500 colonies in California, with 500 colonies in southern, central, and northern regions of the state. We imaged all of the colonies at night. We compared the IR images to visual inspections conducted by commercial beekeepers and our own Bee Alert team. Our objective was to determine if a one-to-one equivalency between IR imaging and visual inspection was possible. Our initial data analysis showed that IR imaging, compared to visual inspection, significantly overestimated the population size of colonies with a frame count below ten and underestimated the strength of colonies with ten or more frame of bees. A one-to-one equivalency was not possible. However, when we considered temperature profiles by colony relative strength and region, we found that grading by relative colony strength was quick and reliable. Our ability to segregate moderately weak (< 6 frames of bees) from very weak colonies was the only difficulty. We also found that by accessing the certified radiometric pixels of high- resolution cameras, it is probable that we can reach the necessary IR to visual inspection equivalency for rapid, effective colony grading. Our overall objective is to algorithms readily available to work on any IR camera, all across major brands of IR cameras, allowing beekeepers to choose the best camera for their purposes. 8 minutes, https://tinyurl.com/3zkrwvb2

Acknowledgements Funded by Project Apis m.

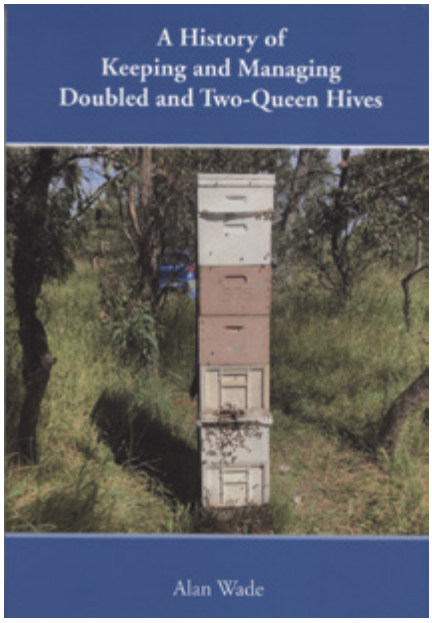
MONITORING COLONY STATUS WITH A TEMPERATURE SENSOR GRID Frank Linton, Colony Monitoring Website; fnlinton@gmail.com



https://beekeep.info/vita_details/

Honey bees optimize their nest environment for carrying out major activities such as overwintering, brood rearing, and nectar processing. We designed, constructed, and installed a temperature sensor grid consisting of 36 temperature sensors (in 4 rows of 9 sensors) to observe these activities in detail. Our sensor grid yielded unexpected results regarding in-hive temperatures during overwintering, unexpected results regarding springtime brood volume, and it tracked the transition from overwintering to brood rearing. 12 Minutes, https://tinyurl.com/2j23bktj

Suggestion for Holiday Season Reading –



A History of Keeping and Managing Doubled and Two-Queen Hives, by Alan Wade. Published by Northern Bee Books, UK, 6.5" x 9.5", 169 pgs., color throughout, $28.00 from Amazon.

If you have run two queen colonies, or are now, you pretty much know all the management techniques you need to make it work. But this book covers more than one way to do this, so you might learn something anyway. It is, as the title states, a history of the techniques it covers. And it's an interesting history.

Basically, the author looks at what is called a doubled colony, where the two brood nests sit side-by-side on the ground. A single shared excluder covers half of each brood nest below, and the single column shared honey supers are stacked above. Each brood nest has its own entrance facing opposite sides. Since the excluder only covers some of the frames of each brood nestt, the portion of the cover that does not have honey supers sitting on it is removable for access to the brood frames below. There often is no entrance to the honey supers except from the brood boxes below.

Some of the original models were designed so that the bottom broodnests were actually in a single box, with a wall between and an excluder covering both above. Honey supers above were the same dimension as the broodnext box below the excluder. A more extensive technique was to use three boxes for three individual brood nests, a shared excluder covered all three, and two off set honey supers above, available to bees from all three colonies below. Since only part of each brood nest on the outside was covered by a stack of two honey supers above, a removable cover was used so each could be examined. Entrances were on opposite sides of the two outside boxes, and in the front for the middle brood nest. Of course all honey supers had to be removed to examine the middle brood nest. These were powerful honey producing machines.

The two queen colony is a bit more complicated, and requires a strong back, and often a ladder to reach the top of the colony. For this, the first queen's two deep brood area sits on the ground, with an entrance on the bottom super and an excluder above the second box. Above that sits another queen's broodnest of two deeps, an entrance on the opposite side, and an excluder above these two boxes. Above that shared honey supers are stacked. There are variations on this using more or fewer brood boxes for each, when to start both colonies and more, but this is a common technique often used.

The techniques and equipment used are fairly standard, but it was the history of the evolution of these I found most interesting. Many early developers were in the UK, which I knew nothing about, but several were from the US, Floyd Moeller from the Madison Bee Lab, and not so long ago John Hogg. Of course Tom Theobald from Colorado was a staunch supporter of these hives, and we have many photos with Tom on a ladder, supering a strong honey producing colony.

Perhaps the most valuable section of this book is the 32 page bibliography. It is, essentially, the history of the research, books, articles and more of using these hives. All in one place. This in itself is a valuable collection of information, certainly worthwhile to students of the art, and science, of beekeeping.

Kim Flottum
Growing Planet Media

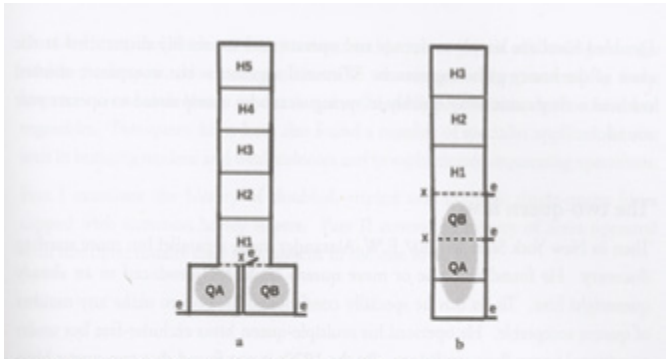


Figure 2 Schematic of double and two-queen hives shown in Figure 1:
e = entrance; x = excluder; H = honey super; QA, QB = queens:
(a) doubled hive employing independent single eight-frame brood boxes, supered above a centrally placed excluder with a riser rim and with an entrance allowing bees to access honey supers without having to traverse brood frames; and
(b) consolidated brood nest two-queen hive with tiered brood boxes, similarly supered above a second queen excluder and giving field bees direct access to honey supers. The lower brood box is extended to a second super as in practice the lower queen supports more brood than the second upper queen.

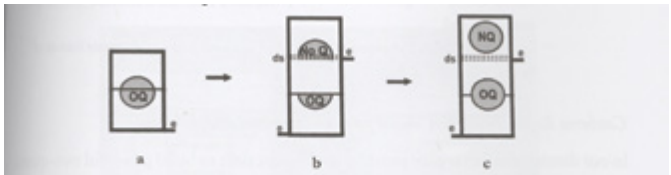


Figure 2.26 Farrar plan for establishment of a second queen in a hive: e = entrance; ds = double screen; OQ = old queen; No Q = no queen; NQ = new queen:
(a) the colony is built to a strong double by reversing the brood boxes and feeding them as needed;
(b) the colony is split with some brood and stores lifted above a nucleus (split) board or double screen where the queen is found and located in the bottom brood chamber; and
(c) a new queen is introduced and established as a prelude to establishing a two-queen hive.

APPLICATIONS OF FORMIC ACID do and don't.

How a commercially usable, low dose continuous release dispenser and method was created.

By: Bill Ruzicka

Abstract:
The writer immigrated to Canada from the Czech Republic in 1968.

When *Varroa* mites arrived in North America, he contacted the head of Beekeeping Pathology at the Czech Bee Research Institute to get advice around current treatments. After researching what was available, he designed and patented a low dose, continuous release, Formic acid treatment called MiteGone which makes the *Varroa* sick. It is not necessary to eliminate 100% of *Varroa* mites from your hives. If you can make them sick and infertile, their population will slowly die. This method will keep your *Varroa* levels and the damage that the *Varroa* mites can do at a threshold that will not negatively impact your hives.

In the 1960's in Europe, formic acid was the only treatment that worked on both the *Varroa* and trachea mites. Europeans had three general treatment methods and a vast body of research regarding when and how to effectively treat hives.

The first method, the prolonged blast or short flash method, could be applied either on the top or the bottom of the hive. When applied on the bottom of the hive, 30cc of acid was sprayed on the bottom board. When applied to the top of the hive, acid was added to absorbent pads like butcher meat pads (Mite Wipes) or onto Kramer Plates (MITEAWAY I & II). The principle of this method is to overdose the hives with acid and rely on the bee's ability to ventilate, reducing concentration of fumes to the level which does not kill adult bees, but kill mites. Unfortunately, these methods have many negative side effects including killing emerging brood and old queens. In addition, these methods are weather dependent and labor intensive.

The second method involves brushing a penetrating a solution of 85% formic acid onto capped brood. This method kills mites inside capped cells but it also kills the brood. The European practice was to brush it onto drone comb only. Quick Strips and Acid Pro are based on this method. If MiteGone pads are placed close to the brood, they will work in a similar fashion. As long as you use this method in the early summer your hives should recover from the treatment. As Randy Oliver wrote in his review, "losing brood is a fair exchange for reasonable mite control and hives will recover."

Unfortunately, this method is climate dependent. If used in California, hives will likely recover; however, if used at the wrong time of year in a climate with a cold winter and snow, hives will die. For example, if this method is used in August or September in the North, you will kill the brood that will become your winter bees. When the summer bees die in October, there will be no bees to maintain the colony through the winter.

The third method is a low dose, continuous release treatment. This type of treatment does not harm the hives, kills only the mites, and is not weather dependent. This method uses the remarkable ability of the bees to maintain brood temperature and humidity inside the hive. If you place MiteGone pads in an environment with a constant temperature and humidity, the pads will evaporate at a steady rate and will properly treat the hives against *Varroa* and Trachea mites.

When developing the MiteGone treatment in 1992 for my own commercial operation, I decided that I did not like the side effects of blast and penetrating methods. I liked how gentle the low dose continuous release methods were on the bees, but I could not use any of the existing dispensers in my 500-hive operation

My patentable discovery was that I replaced the wick suction principle of Nasenhider, with the principle of capillary tube and gravity; I knew I have to put it away from the brood so I measured the temperature in strong colony ready to go to pollination between last frame and wall of super. Regardless of the temperature and humidity outside running from below freezing to 20C/68F and humidity from 100 to 20% inside was steady 24-26C/75-78F and 55% humidity. The challenge was how to create any apparatus into 3/8 of an inch bee space.
USING LOW DOSE CONTINUOUSE RELEASE OF FORMIC ACID BY MITEGONE METHOD AND DISPENSER. US 6,837,700, B2 Patent.

Fact: Formic acid on its own is not enough to treat your hives for *Varroa*. Depending on the concentration of formic acid, and the dispensing method used, you will get either beneficial or negative side effects from your treatment.

Concentration of Formic Acid - Europeans used 85% concentration of formic acid to treat their hives; however, Carry Clark at the Bee Research Center in Dawson Creek Canada studied what

concentration of formic acid was most effective at killing mites and least harmful to honey bees.

Here is the abstract of what he found:
Use 65% solution as it is a mixture of molecules of water and acid. At 72%, the molecules of water and acid evaporate at the same rate. With higher concentrations, acid molecules have to evaporate first until the surface concentration reaches 72%. This high rate of acid evaporation

causes harmful blasts of acid to the bees. At 65%, the molecules of water must evaporate first until the evaporating surface reaches 72%. This is gentler on the bees and does not cause harmful side effects. 85%, 90%, 95% acid are a common concentration to purchase. It needs to be diluted when treating honey bees to 65%. **STRONGER IS NOT BETTER IN THIS CASE.**

MiteGone® pads are manufactured with millions of connected cells functioning as capillary tubes in the direction of the length of the pad. Both 4" ends are open with the tubes and evaporating surfaces exposed, so no one can put them in wrong. When soaked with acid, a four-gram 5" pad will automatically absorb 120 grams of acid. Hung vertically, the capillaries will keep the liquid in the pad without dripping and gravity will pull down the acid to replace acid evaporated at the bottom of the pad. If placed on wall inside of the box, in a hive's controlled average conditions of 24C/75F and 55% humidity, a four-inch-wide pad will emit a total of: **6g OF ACID IN CONTINUOUS LOW FLOW PER DAY.**
This method allows for variable dosage to treat colonies of different sizes by using multiple 5" pads or by restricting the evaporation surface of one pad for nukes.

COMMERCIAL BEEKEEPERS, BEEBREEDERS and BEE CLUBS can group buy.
Your out-of-pocket yearly cost for treating your hives twice can be as low as $5 depending on how you buy your acid. I thin and prepare tote of acid for filing in 9 hours including clean up, and supervise 3 filers to fill 82 kits in 3.5 - 4 hours.
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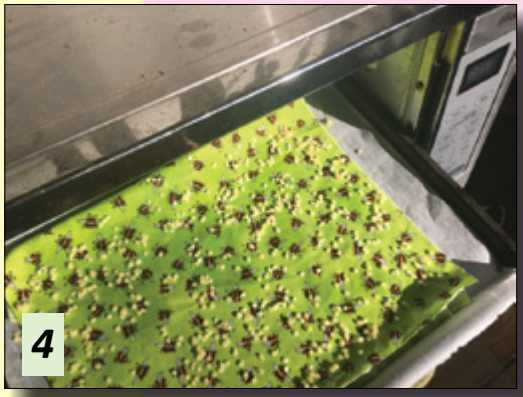
I will send you the discount code and contact information for the resort.
In the meantime, check out my website www.mitegone.com and make notes of all the questions you want to ask.
If you cannot come to Mexico, I can do a webinar for you on the phone or via ZOOM.

All The Buzzz in...



Beeswax Wraps

Looking for an easy, inexpensive, useful gift you can make for your family and friends? This is it!

You will need:

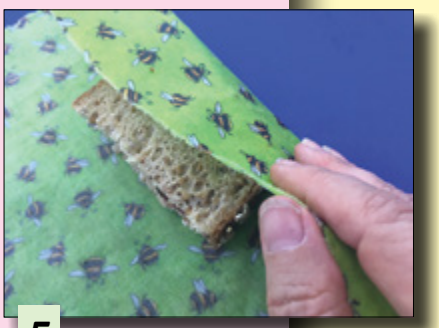
- beeswax – pastilles or grated
- oil – jojoba or food grade mineral oil
- fabric – 100% cotton, prewashed
- parchment paper or foil
- cookie sheet

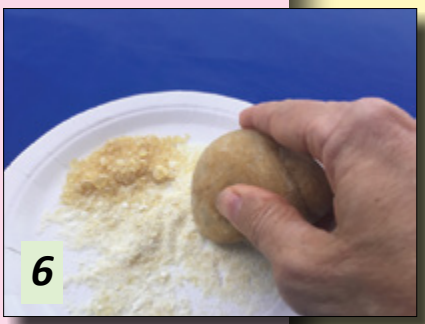
Directions:

1. Cover a cookie sheet with parchment paper or foil.
2. Lay the fabric on the cookie sheet. Sprinkle the beeswax evenly.
3. Drip a little oil here and there over the fabric.
4. Put in the oven for about 5 minutes at about 225 degrees.
5. Take out of the oven. Lay on a piece of parchment paper.

Tips

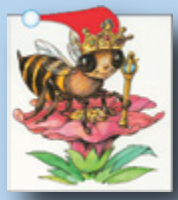
- Suggested Sizes
  8×8”: half an apple or avocado
  11x11”: a block of cheese or half a sandwich (5)
  14x14”: a full sandwich or a half of a small watermelon
  16x16”: a loaf of bread
- An old sheet will work for the fabric.
- Add pine resin to help the wraps to stick to themselves. Use a stone to grind up the resin into a powder before using. (6) A sieve works great to help sprinkle the rosin on the fabric. (7)
- Spot wax any unwaxed areas.
- Too much wax? Place another piece of fabric under the waxed fabric and put in the oven.
- Do not leave in the oven more than a few minutes. Beeswax is flammable.
- Provide a rubber band with the bags to hold the wraps in place.
- This is a great way to use less plastic!





... Bee kid's corner

Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
December 2021



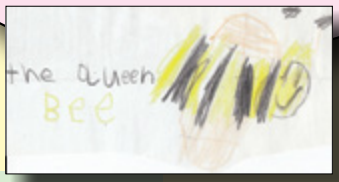
Hello Friends,

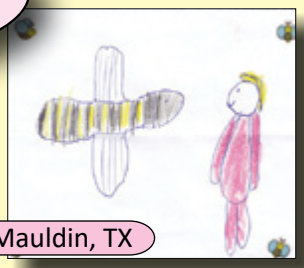
Have a very happy holiday season. May all your dreams come true!

Bee B.Queen

Bee B. Queen Challenge

Be sweet to everyone you meet!





Lillie Mauldin, TX

Reagan and Isla spent the end of last school year studying the honeybee and finished up with a hands-on day helping Mary Rider in the bee yard. They each made a big display poster with all the bee facts they learned.

Isla Berthelson 8 WA

Reagan Berthelson 10 WA

Claire Bean, age 9, and her wonderful bee artwork she created in a painting class at a local lavender farm in Maryland.

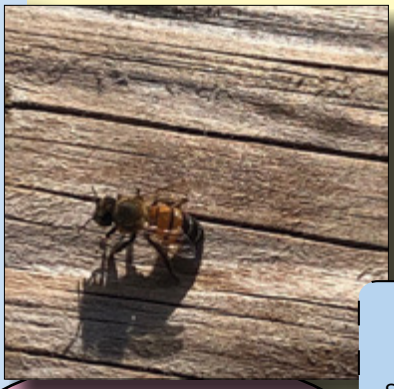
How Do Bees Make Wax?

When a worker bee is around 12-18 days old, their job is to make the wax.

They develop glands under their abdomens that produce the wax.

The white wax comes out of their body between the segments on their abdomen. These pieces of wax are called scales.

About 800,000 wax scales are needed to make 1 pound of beeswax.



This is a bee Lillie Mauldin from Texas, saved from a swimming pool. Thank you Lillie!

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Send two self-addressed stamped envelopes and the following information to: Bee Buddies, PO Box 117, Smithville, TX 78957.

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E-mail (optional)

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

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

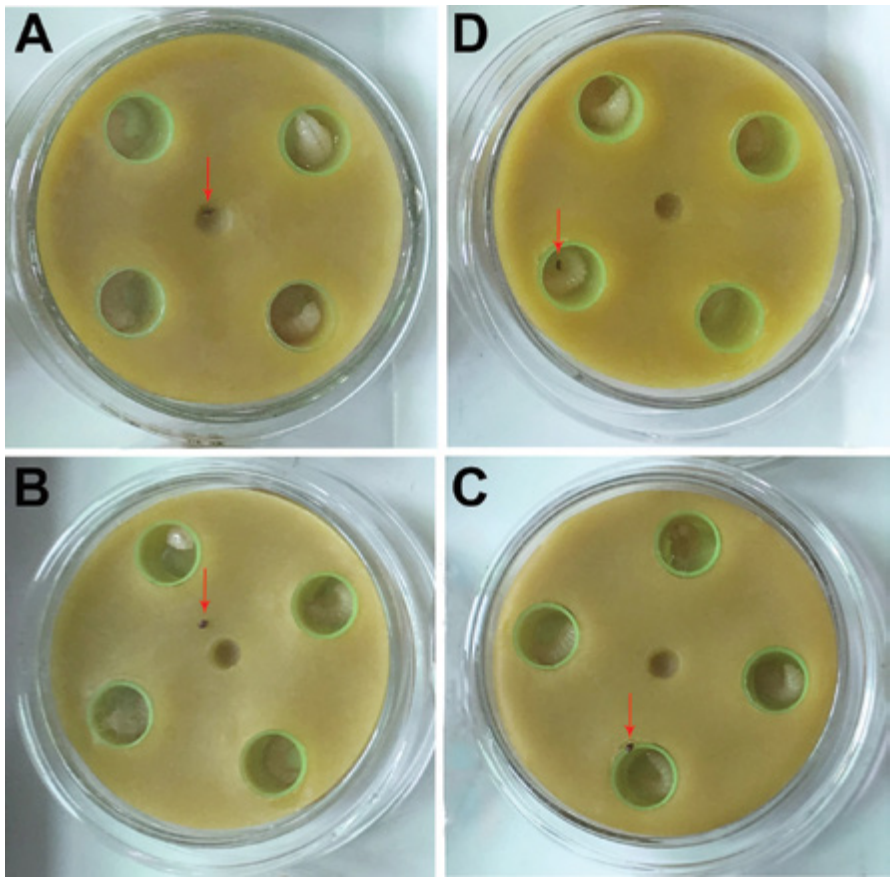
FOUND IN TRANSLATION

Smells Promising

Jay **Evans**, USDA Beltsville Bee Lab

It is pretty obvious that *Varroa* mites love honey bees. This love is realized by the mites' sense of touch and smell since their eyesight, should it exist, is minimal. Research to determine, and hopefully exploit, how mites smell their hosts is now entering its fourth decade (!). Yves LeConte in France and others started teasing apart the cues used by mites to find bees in the dark (see "Attraction of the parasitic mite *Varroa* to the drone larvae of honey bees by simple aliphatic esters", 1989, *Science*, Vol 245, Issue 4918•pp. 638-639•**DOI: 10.1126/science.245.4918.638)**. Hopes have run high that the varroa smelling skills, and bee smells, could be harnessed in order to trick and kill varroa mites. While such controls are not available currently for beekeepers, recent work shows that the table is set for the current generation of scientists to finally apply what has been learned.

Wenfeng Li and colleagues in China and the US, including my USDA colleague Judy Chen, have just published a study showing the attractiveness to mites of European honey bees (*Apis mellifera*, the primary managed bee worldwide) and Asian honey bees (*Apis cerana*, the original host for varroa). Their paper ("The cell invasion preference of Varroa destructor between the original and new honey bee hosts") is now in press in the *International Journal for Parasitology*, **https://doi.org/10.1016/j.ijpara.2021.08.001**. The scientists started with a behavioral approach. They used small arenas to test the preferences of mites for entering cells containing drone or worker pupae of each species. They studied the now-worldwide *Varroa destructor*, not the multiple Asian species that have not yet jumped to *A. mellifera.* Perhaps not surprisingly, these mites preferred *A. mellifera* worker brood to worker brood of *A. cerana*. *V. destructor* does not readily parasitize worker brood of *A. cerana* and, in fact *Varroa* species still connected with Asian bees tend to succeed not by reproducing in worker brood but in drone brood. What WAS surprising was that *V. destructor* also greatly prefers *A. mellifera* to *A. cerana* drone brood. This makes it clear that when *V. destructor* made its impactful jump from *A. cerana* to *A. mellifera* it did so with a major shift in its bee sensors, or at least has acquired a chemical fondness for its new host over the decades. Mites were three times as likely to choose *A. mellifera* drone brood over *A. cerana* in their choice arenas. Since it is almost impossible to collect *V. destructor* from *A. cerana* colonies, these trials involved mites collected from *A. mellifera* and it is possible they had learned, in their lifetimes, a taste for *A. mellifera*. To partially account for that, the authors gave mites two trials separated by time and showed that even on a



second try they could not resurrect a passion for their ancestral host.

This study went on to provide a modern look at the smells released by bee hosts in both species and their attractiveness to mites. Both honey bee hosts had a similar array of cuticular hydrocarbons (CHC's, commonly produced by and used by animals to share and perceive smells). As has been shown even within honey bee species, the ratios of different CHC's varied between the two, pointing to specific chemical classes that might explain attractiveness to mites. The main differences in worker bees were found in the 'alkenes' (highly represented in *A. cerana*) and 'methyl-alkanes' (more common in *A. mellifera*). This is a hint that these classes might be especially smelly for female mites and perhaps most exploitable as baits or traps. For drones, there were quite striking differences in several chemical components, matching the workers but adding large differences in n-alkanes and 'non-alkanes'. Basically, all classes of CHC's differed significantly between the species for drone larvae.

To come full circle, the authors painted glass cylinders with CHC's extracted from workers and drones of both species. The attractiveness of the fake bees exactly matched that of true larvae, with *A. mellifera* smells being favored and the strongest preference difference being for *A. mellifera* versus *A. cerana* drones. Along with showing that smell is king, since these glass cylinders look nothing like bees, this test points the way to really identifying the molecules that mites will (hopefully) die for.

In a second recent paper, Beatrice Nganso and colleagues in Israel, including Victoria Soroker, a well-known insect chemist who has spent much of her life studying the smells that unite insects and their associates, explore the *ways* mites pick up on the smells unique to their bee hosts. In *Towards disrupting Varroa –honey bee chemosensing: A focus on a Niemann-Pick type C2 transcript* (2021, *Insect Molecular Biology*, 30, 519–531, **doi: 10.1111/imb.12722**) they identify specific mite proteins that are turned on in response to the smells made by bees. In case your parents neglected to tell you, mites do not have noses and instead use cells at the tips of their feet (we think!) to perceive the smells around them. In those foot cells, one class of odor-related proteins was targeted since these proteins are known in other animals to relate to smells. Among those, one in particular was especially interesting. Using a gene knockdown technique (RNA interference) they attempted to silence that protein ("Niemann-Pick type C2", although a better name is needed) and then determined whether this affected the ability of mites to smell. Fantastically, knocking down this gene indeed had an effect on the abilities of mites to locate hosts, as well as on mite survivorship overall. It is known that mites turn on a whole package of reproduction once they smell the right bee, and in fact that package was less likely to turn on when mites had reduced levels of this protein. The assay itself is not realistic for beekeepers (mites were submerged in a fairly expensive soup of the knockdown activator) but the insights could well lead to new ways to block mite smelling and the disastrous results of their post-smelling actions.

Scientists on several continents (sorry, Australia, your time will come) are actively pursuing ways to build on these studies and use the 'foot-noses' of mites against them. I, for one, have hope that these efforts could lead to a breakthrough control of this critical honey parasite. BC

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A Closer LOOK

HONEY BEES SLEEPING

Clarence **Collison**

At night, honey bees pass through a physiological state that is similar to mammalian sleep.

"Honey bees are among the first invertebrates for which sleep behavior has been described (Kaiser and Steiner-Kaiser 1983). Honey bee foragers exhibit sleep, both in their natural hive environment, and when isolated individually in the lab. Foragers sleep in a posture characterized by a relaxation of the thorax, head, and antennae. This characteristic posture is associated with a decrease in muscle tonus and body temperature, and an increase in response threshold, measured both neurophysiologically and behaviorally (Kaiser and Steiner-Kaiser 1983; Kaiser 1988). It was further suggested that deep sleep in foragers (determined as periods lacking antennal movements) is correlated with rhythmic electrophysiological activity in the brain, including the mushroom bodies (Schuppe 1995). Foragers deprived of sleep for 12 hours showed a rebound the next day; they increased the duration of antennal immobility, one of the characteristics of sleep in bees (Sauer et al. 2004). This suggests that sleep in foragers is homeostatically regulated. Foragers are relatively old workers, have strong circadian rhythms, and sleep during the night. However, circadian rhythms are not typical to all worker bees; young bees typically perform various in-hive activities around-the-clock, with no circadian rhythms (Crailsheim et al. 1996; Moore et al. 1998). Young bees that are isolated individually, or kept in small groups in constant conditions, have no circadian rhythms in locomotor activity during their first 3-14 days (Moore 2001; Meshi and Bloch 2007). Their around-the-clock pattern of activity raises the question of whether young bees sleep as foragers do. It is possible that young honey bees do not sleep at all, which would make them an exception in the animal kingdom. An alternative hypothesis is that young bees do sleep like foragers, but distribute their sleep throughout the day. A third hypothesis is that young bees sleep, but their sleep is essentially different from that of foragers. In order to distinguish between these hypotheses, Eban-Rothschild and Bloch (2008) characterized the sleep behavior of individually isolated young bees, and compared it to that of sister foragers. Their detailed behavioral observations and analyses of response thresholds lend weight to the third hypothesis. They showed that young honey bees exhibit sleep behavior which is composed of the same stages observed in foragers, but their sleep dynamics differ (Eban-Rothschild and Bloch 2008)."

"At night, honey bees pass through a physiological state that is similar to mammalian sleep. Like sleep in mammals, sleep-like behavior in honey bees is an active process. This is expressed most clearly by spontaneous antennal movements which appear at irregular intervals throughout the night and interrupt episodes of antennal immobility. Sauer et al. 2003 presented a newly developed video technique for the continuous recording of the position and movements of the bee's antennae. The same technique was used to record head inclination and ventilatory movements. Despite the constancy of the ambient temperature, the magnitudes of antennae-related parameters, as well as head inclination and ventilatory cycle duration, displayed dynamic unimodal time-courses which exhibited a high degree of temporal covariance. The similarity between these time-courses and the nightly time-course of the reaction threshold for a sensory stimulus, investigated previously, indicates that, in honey bees, deepest "sleep" and least ventilatory activity occur at the same time (in the seventh hour of the rest phase) (Sauer et al. 2003)."

"Sleep appears to play an important role in the lives of honey bees, but to understand how and why, it is essential to accurately identify sleep, and to know when and where it occurs. Viewing normally obscured honey bees in their nests would be necessary to calculate the total quantity and quality of sleep and sleep's relevance to the health and dynamics of a honey bee and its colony. Western honey bees spend much of their time inside cells, and are visible only by the tips of their abdomens when viewed through the walls of an observation hive, or on frames pulled from a typical beehive. Prior studies have suggested that honey bees spend some of their time inside cells resting or sleeping, with ventilatory movements of the abdomen serving as a telltale sign distinguishing sleep from other behaviors. Bouts of abdominal pulses

broken by extended pauses (discontinuous ventilation) in an otherwise relatively immobile bee appears to indicate sleep. Can viewing the tips of abdomens consistently and predictably indicate what is happening with the rest of a bee's body when inserted deep inside a honeycomb cell? To distinguish a sleeping bee from a bee maintaining cells, eating, or heating developing brood, Klein and Busby (2020) used a miniature observation hive with slices of honeycomb turned in cross-section, and filmed the exposed cells with an infrared-sensitive video camera and a thermal camera. Thermal imaging helped us identify heating bees, but simply observing ventilatory movements, as well as larger motions of the posterior tip of a bee's abdomen was sufficient to non-invasively and predictably distinguish heating and sleeping inside comb cells. Neither behavior is associated with large motions of the abdomen, but heating demands continuous (vs. discontinuous) ventilatory pulsing. Among the four behaviors observed inside cells, sleeping constituted 16.9% of observations. Accuracy of identifying sleep when restricted to viewing only the tip of an abdomen was 86.6%, and heating was 73.0%. Monitoring abdominal movements of honey bees offers anyone with a view of honeycomb the ability to more fully monitor when and where behaviors of interest are exhibited in a bustling nest (Klein and Busby 2020)."

"As worker bees age they change tasks, typically performing a sequence of different task sets (as 'cell cleaners', 'nurse bees', 'food storers' and 'foragers'). Belonging to different task groups could differentially impact the duration, constitution, and periodicity of a bee's sleep. Individually marked bees were observed within observation hives to determine task-dependent patterns of sleep behavior. Three studies were conducted to investigate the duration and periodicity of sleep when bees were outside comb cells, as well as duration of potential sleep when bees were immobile inside cells. All four worker task groups that were examined exhibited a sleep state. As bees aged and changed tasks, however, they spent more time and longer uninterrupted periods in a sleep state outside cells but spent less time and shorter uninterrupted periods immobile inside cells. Although cell cleaners and nurse bees exhibited no sleep:wake rhythmicity, food storers and foragers experienced a 24 hour sleep:wake cycle, with more sleep and longer unbroken bouts of sleep during the night than during the day. If immobility within cells is an indicator of sleep, this study reveals that the youngest adult bees sleep the most, with all older task groups sleeping the same amount. This in-cell potential sleep may compensate for what would otherwise indicate an exceptional increase of sleep in an aging animal (Klein et al. 2008)."

"Honey bees face variables such as temperature and position of resources within their colony's nest that may impact their sleep. Klein et al. (2014) mapped sleep behavior and temperature of worker bees and produced maps of their nest's comb contents as the colony grew and contents changed. By following marked bees, they discovered that individuals slept in many locations, but bees of different tasks groups slept in different areas of the nest relative to position of the brood and surrounding temperature. Older worker bees generally slept outside cells, closer to the perimeter of the nest, in colder regions, and away from uncapped brood. Younger worker bees generally slept inside cells and closer to the center of the nest and spent more time asleep than awake when surrounded by uncapped brood. The average surface temperature of sleeping foragers was lower than the surface temperature of their surroundings (Klein et al. 2014)."

"Honey bee foragers shift their work schedules, but how flexible they are in the timing of sleep as they shift the timing of work is unknown, despite the importance of colony-level plasticity in the face of a changing environment. Klein and Seeley (2011) hypothesized that sleep schedules of foragers are not fixed and instead vary depending on the time when food is available. They trained bees to visit a food source made available for several hours in the early morning (AM) or several hours in the late afternoon (PM), then monitored their sleep behavior for 24 hours after training, specifically comparing their sleep during the AM and PM periods previously designated as training periods. Following AM training, honey bee foragers slept more during the afternoon than during the morning, but following PM training, the same bees 'slept in' the next morning, and so slept more in the morning than in the afternoon. Although foragers did not change the total amount of time devoted to each of their behaviors (including sleep), the timing of their sleep did change. Thus, plasticity in timing of foraging was matched by plasticity in timing of sleep. The apparent correlation between the timing patterns of foraging and sleeping demonstrates temporal plasticity of sleep under ecologically realistic conditions (Klein and Seeley 2011)."

"Rest at night in forager honey bees meets essential criteria of sleep. This study reports the effect of a 12-hour total sleep deprivation (SD) by forced activity on the behavior of these bees. The behavior of sleep-deprived bees was compared with that of control bees under LD [periodic alternation between light (L) and darkness (D)] 12:12 hours. Sleep deprivation for 12 hours during the first D period resulted in a significant difference with respect to the parameter 'hourly amount of antennal immobility between sleep-deprived and control bees during the remaining L and D periods. This difference did not occur in the L period following the deprivation night, but rather it became obvious at the beginning of the following D period. The increase of the amount of antennal immobility in sleep-deprived bees was accompanied by an increase of the duration of episodes of antennal immobility. Moreover, the latency from lights off to the first episode of antennal immobility lasting 20 seconds or longer (deep sleep latency) tended to be shorter in sleep-deprived than in control bees. Disturbing the bees during the day (L period) did not result in such

differences between disturbed and control bees. Highest reaction thresholds in sleeping honey bees occur during long episodes of antennal immobility. Sauer et al. (2004) concluded that honey bees compensate a sleep deficit by intensification (deepening) of the sleep process and thus that sleep in honey bees, like that in other arthropods and mammals, is controlled by regulatory mechanisms."

"Even though sleep-like behavior has been studied in honey bees, the relationship between sleep and memory formation has not been explored. Hussaini et al. (2009) described a new approach to address the question if sleep in bees, like in other animals, improves memory consolidation. Restrained bees were observed by a web camera, and their antennal activities were used as indicators of sleep. They found that the bees sleep more during the dark phase of the day compared with the light phase. Sleep phases were characterized by two distinct patterns of antennal activities: symmetrical activity, more prominent during the dark phase; and asymmetrical activity, more common during the light phase. Sleep-deprived bees showed rebound the following day, confirming effective deprivation of sleep. After appetitive conditioning of the bees to various olfactory stimuli, they observed their sleep. Bees conditioned to odor with sugar reward showed lesser sleep compared with bees that were exposed to either reward alone or air alone. Next, they asked whether sleep deprivation affects memory consolidation. While sleep deprivation had no effect on retention scores after odor acquisition, retention for extinction learning was significantly reduced, indicating that consolidation of extinction memory but not acquisition memory was affected by sleep deprivation."

"Honey bees can signal the destination of a food source with a waggle dance, but when sleep-restricted, dancers perform directionally less precise dances (Klein et al. 2010)." "Klein et al. (2018) analysed dance follower behavior with respect to a dance's directional precision and whether or not the dancer had been sleep-restricted. Followers were more likely to switch dances if following an imprecise dance and more likely to exit the nest if following a precise dance. Followers were also more likely to exit the nest after following a dance composed of more iterations (waggle phases), but only if the dancer was sleep-restricted. Bees appeared to follow fewer waggle phases of a dance that was less precise, but, again, only if the dancer was sleep-restricted. Following fewer waggle phases has been shown to decrease a bee's flight accuracy, so results suggest that cues associated with sleep loss could affect a follower's foraging success." BC

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Apiary Inspectors of America

Apiary Inspection Maryland

Cybil **Preston**

We have one full time Apiary Inspector, four contractual part time seasonal human bee inspectors, two seasonal K-9 Foulbrood detectors and two open contractual seasonal inspector positions. Our human bee inspections start in April and run through mid-October. We open colonies when temperatures are above 60 degrees. The majority of Maryland's beekeeping industry is hobbyist/backyard beekeepers with a small percentage of small scale to commercial beekeepers.

When temperatures are below 52 degrees (typically our Winter weather starts in November and runs through March) we utilize the two certified foulbrood scent detectors to inspect the commercial operations that move out of state for pollination contracts. The foulbrood detector K-9s certify between 2,000 and 3,000 honey bee colonies that move to California for almond pollination. They also inspect the small operations that produce nucs for sale. The K-9 inspectors are on vacation from April through October. During that time Mack, Tukka and I do educational outreach on why bees and beekeepers are important and what we do to help bees and beekeepers. We do school talks, Beekeeping Association meetings and visit the state fair. We even go so far as to wear bee costumes and promote honey bees, honey and beekeeping.

During our inspection season Maryland also participates in the National Honey Bee Survey with BIP and the Giant Aiain Hornet Invasives survey. I try to get out in the field inspecting bees at least three days a week.. – weather permitting. BC

Minding Your Bees And Cues

An Interview with Dan Whitney

Becky **Masterman &** Bridget **Mendel**

Our favorite beekeepers are bee habitat obsessed, like Dan Whitney, owner of Whitney Lone Star Queen Company and Dan's Honey Company. Dan's operations are based in Jasper, Texas and Ottertail, Minnesota. Along with his beekeeping business, he has worked hard to advocate for bees and beekeepers. He served as president of the Minnesota Honey Producers Association for over six years with his term ending in 2019 and is currently on their board of directors. In these roles, he has worked closely with legislative efforts and state policy development. We are grateful that Dan agreed to be interviewed and excited to share part of his bee story with you.

Q: Tell us about your beekeeping business. How did it start, and what does it look like now?

A: I got into bees as a high school summer job. I worked for Jack and Russel Hoffman, around '88, '89. I grew up on a small farm, so I worked for farmers, and for beekeepers when they were busy.

Through them, I heard about Bob Walkin; he was a commercial beekeeper looking to retire. He had a thousand colonies and wanted to sell to a younger person. I was 21 when I started working for Bob. After one year, we went 50/50 on expenses. That was 1994 when I started keeping bees commercially.

Beekeeping is an apprenticeship. I got all my knowledge from a number of older beekeepers who have passed on now. You learn a lot from those old beekeepers…scientists have a lot of information, but when you run thousands of colonies, you have to find out what's practical. So scientists can learn a lot from us, too.

Now I run about 2000 colonies for honey production. I would not want to run many more than that. If you run too many hives, you're just managing people, not bees.

I consider myself a honey producer, but I also produce queens. We raise about 25,000 queen cells and produce 4000 mated queens. I love producing queens, and I wish I could only do that, but it doesn't pencil out. In the future, maybe queens will be worth more, and I can focus less on honey production. But then again, how do you do that? The bees are gonna produce honey, and there's the labor to process that honey.

We also sell about 1500 nucs each year. And typically, we send a load of bees to California, and a load to Texas. Then, we split those, and start the year over. Everyone winds up in Texas to get split, receive new queen cells, build up, then they come back to Minnesota.

Q: Are there any tasks that you find yourself doing as a beekeeper businessman that might surprise readers?

A: We wear a lot of hats as beekeepers. I also have a farm, and I plant a lot of flowers. It costs a lot for those seeds, but I enjoy it. We love wildlife, and we hunt. We're right on the edge of Northern Minnesota.

There's also a lot of work to do with visas for my employees. I have three great workers from Honduras. Two of them are brothers, the other is their cousin. I've known their family for decades. These guys have been with me for about six years, and now we are pretty close to getting their green cards. Then they can travel back and forth more easily. Through the H2A program, they stay for about 10 months at a time. That's tough, that's a long stretch of time to be away from home. I couldn't do it… it's hard work. But with green cards, I could fly them up to Texas for a few weeks as needed, then they could go back home.

Q: Beekeepers are facing a lot of challenges, some of which we hear about often: lack of forage, pesticides, mites, etc. What keeps you up at night?

A: Mites that are resistant to Amitraz! Our mite counts in August this year were too high (I consider anything over one mite per 100 bees too high). When that happens, I always panic and think "This time it's resistance to Amitraz." It turned out fine; we got the mites under control now, but resistance would be a game changer for commercial beekeepers.

There's nothing else out there where you can keep your mite counts low enough to avoid PMS etc. We need better products. We need a better quick-hitter. There's too much focus on not killing any bees. If you aren't killing a few bees, you probably aren't killing the mites. The tradeoff for a healthy hive is worth it. It's like chemotherapy. We need something practical to use that works in our industry.

The other thing I worried about is *Tropilaelaps*…if that mite gets to us, that would be a mega-game changer. Commercial beekeepers would have to increase their employees just to manage that new mite.

Dan Whitney, owner of Whitney Lone Star Queen Co. and Dan's Honey Co. wearing a unique beard of bees. Photo provided by Dan Whitney.

Setting out queen mating nucs in Texas. Photo provided by Dan Whitney.

Q: Are you worried about climate change? If so, how do you think it will affect beekeepers ? If not, why not?

A: I'm not worried about climate change. I think it's real, but I can't control it. The earth is always going through changes. My job is to deal with it. Last year at this time we had a foot of snow. This year is warm. The weather has been so unpredictable in the last 20 years. The one predictable thing is unpredictability.

As a beekeeper, you just have to adapt. It's hard to change, but the beekeepers who are still in the business are savvy people who are willing to adapt. You can't be a calendar beekeeper. You have to react to the particular year and stay on top of it.

Q: What is something you wish hobby beekeepers understood about commercial beekeepers?

A: We're not the enemy. We do care about our bees. Beekeeping is animal husbandry. I've seen grown men cry when they lose a living thing. It's your life, it's your livelihood. I grew up on a farm where we brought animals in the house when there's a blizzard. I wish hobbyists would care for their animals. Commercial beekeepers might replace their queens every year, but letting your hives die due to mites is crueler than replacing your queens every year.

We wish hobbyists would take better care of their hives, and keep their mites under control. It affects us all if they don't keep their bees healthy through managing mites.

Q: If you weren't a beekeeper, what would you be doing?

A: I could see myself being a family practitioner. That's interesting to me. I like small towns, so I would still be living in a small town. I would never want to live on the coast, or in a big city. 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. Photos of Becky (left) and Bridget (right) looking for their respective hives.

BEE VET

An Interview with Dr. Britteny Kyle, DVM, MS

Dr. Tracy **Farone**

For BC's interview issue, I sat down (over ZOOM) with Dr. Britteny Kyle, a Canadian veterinarian whom I met in the Fall of 2019 at Apimondia (the World's bee conference) when it was held in Montreal, Ontario. After hanging out a bit with Britteny at the conference, she introduced me to the Honey Bee Veterinary Consortium (HBVC). An organization, which she served as the president-elect at the time. During our conversation, I asked Dr. Kyle to share her journey as a veterinarian finding her way into the world of honey bees. Now she is truly on a mission to help bees and beekeepers! Here are some questions I posed to her:

1. Describe your journey as a veterinarian in discovering bee medicine.

"I was a small animal vet. I graduated in 2009 and did general practice and emergency. I loved some parts of practice, but it was not 100% the right fit for me."

After working part-time, moving, and taking time off for three maternity leaves, Dr. Kyle was struggling with the decision to return to general practice or stay home with her kids, when she saw a continuing education course on honey bees for veterinarians. " I was so excited! I had never considered that vets could work with honey bees!

Growing up I was always out in the garden, and I loved insects," she explained. "It (honey bee medicine) was a way to find something I was fascinated with and combine it with the aspects of veterinary medicine that I loved. I love the challenges of diagnostics, working with clients, whether cat owners or beekeepers. It felt like the right fit."

After taking her first continuing education course on honey bees, Dr. Kyle attended the HBVC conference and applied to be an officer on their board. She was soon elected as president-elect, which she discovered was really a "three-year" position, as president-elect moves to president and then past president. Britteny currently serves the HBVC as past president.

Dr. Kyle continued to do whatever she could to learn more about bees. "I took an eight-month beekeeping course and read as much as I could."

Dr. Kyle considered opening a practice to serve honey bees but in Ontario, Canada, veterinarians are required to work out of an "accredited" hospital, which requires an investment in infrastructure and inventory beyond what she expected to be able to recoup.

Even as a mobile veterinarian, she realized she would still have an incredible amount of overhead and could not afford the cost to attempt to serve perhaps just a few honey bee clients. Telemedicine alone is often used for honey bee visits in Ontario and prescribing antibiotics routinely is common practice.

These realizations led Dr. Kyle down a different path.... "There wasn't enough evidence for me to safely prescribe prophylactic antibiotics or not. So, I thought if we didn't have enough evidence, I better go get some! That's when I started my master's and now, I'm working on my PhD."

2. Describe your recent grad school studies and what you are doing now.

Dr. Kyle's Masters in epidemiology focused on geographical study of AFB cases in Ontario. Dr. Kyle is currently pursuing her PhD in epidemiological studies focusing on American Foulbrood and looking into the proper use and risk of using antibiotics to treat AFB. She is also looking for affordable and effective alternatives in managing AFB for beekeepers. Her mission is definitely underway!

3. Describe the plans and purpose to start a honey bee medicine certification program for veterinarians.

Working with her colleagues at HBVC, Dr. Kyle, helped to develop an idea to provide a veterinary certification program for veterinarians interested in honey bee medicine. This 150 -hour program will be designed to provide a structure and course that will provide the veterinarian with basic competency for working with beekeepers and honey bees.

The development of this new certification program is rooted in an effort to better serve honey bees

and address concerns of beekeepers. Dr. Kyle explains…"By attending beekeeping meetings, I heard from a number of people in the industry and beekeepers that there was a real concern that veterinarians did not know what they were talking about with respect to bees, and we (vets) were just going to come in and mess things up. I think that is a valid concern on the beekeeping side but from the vet side , we look at it like… "Do you know how many things we learn in practice that we haven't seen before?" Veterinarians are accustomed to learning on their feet! But I can understand the lack of trust from beekeepers due to this new relationship. We need to earn it."

Bees are an animal and much of the principals, knowledge, and skills veterinarians learn in veterinary school can be translated to honey bee medicine, however Dr. Kyle acknowledges that bees are "different" enough to warrant special study, for example how to perform a proper hive inspection.

" The program is a way to build a bridge to show beekeepers how veterinarians that take additional certification and training are serious, really care, and have taken time to gain knowledge to serve beekeepers and bees."

4. How do you think veterinarians can best serve honey bees and their beekeepers?

"Personally, I think I can best serve beekeepers to assess disease risk and how to mitigate that risk for their bees…biosecurity is an area where veterinarians can really make an impact in apiculture. I believe antibiotics can be used more judiciously and I would like to bring more awareness to the multiple aspects of treatment decisions."

"I look at this as a really exciting opportunity to form relationships that haven't existed before, and I hope that beekeepers can also look at it this way." Dr. Kyle hopes, "Beekeepers understand that veterinarians who are interested in working with bees really care, are interested, and want to help." BC

An Interview with Dr. Mohamed Alburaki

USDA-ARS Bee Research Laboratory

Jay **Evans**, USDA Beltsville Bee Lab

This month I was eager to interview my USDA-ARS Beltsville Bee Research Laboratory colleague, Dr. Mohamed Alburaki. Mohamed is the most recent scientist to join our group and he comes with a strong interest in queens, genetics and colony health.

Where are you from originally?

First of all, I want to say thank you, Jay, for this interview and for *Bee Culture* which does excellent work translating and simplifying honey bee science for all of us.

I am originally from Syria. I was born in Damascus and as my father was planning to pursue his Ph.D. studies on honey bees in France, my family moved to France where I spent most of my childhood.

How did you get interested in honey bees?

As I often say, love for honey bees and beekeeping runs in my family. Some of my earliest memories are of my grandfather's colonies in his backyard. My grandfather's passion for bees grew to a more professional level when my father decided to study bee behavior and became a professional beekeeper and scientist, keeping hundreds of colonies in Syria and France. As a child, I was exposed to the fascinating world of bees on a daily basis from a very young age. So, bees become your companion in life, you take care of them and every season they bestow their sweet honey on you. The more you get to know bees, the more questions arise in your head and the result, in my case at least, was that the father's passion for bees was fully passed to his child. Since I mentioned Syria and France, I would like to share some beekeeping pictures with your readers that I took in these countries during my travels.

The amazing Syrian honey bee Apis mellifera syriaca *in its native environment (Syria). Phenotypically very similar to* ligustica *but slightly smaller in size and more defensive. Note, ~90% of* syriaca *bees are hosted in regular 10-frame Langstroth hives.*

Traditional cylinder hives made of mud still used to host the Syrian honey bee Apis mellifera syriaca *in the northern parts of Syria.*

Where did you go to school and what did you study?

My early desire to pursue studies on honey bees has shaped my entire education choice and career. In order for me to participate in honey bee research (my main objective), I had to first strengthen my knowledge in agricultural science. Coming from a family with an agriculture and farming background, this was kind of a natural choice for me! I obtained my Bachelor's degree in Agricultural Science from the University of Damascus in Syria. I opted for the Department of Entomology, which would put me right on the doorstep of my main goal, honey bee research. But unfortunately, this was not enough to reach my ultimate goal. Since my deep interest was to explore and link honey bee behavior, phenotype, subspecies and diseases with bee genetic background and diversity, molecular knowledge and skills had to be acquired. Therefore, I pursued an international program led by the European Union and obtained a Master's Degree in Biotechnology. During my master's program, I conducted preliminary genetic analysis on honey bees at the CNRS institute in France and subsequently deepened my knowledge with a Ph.D. degree from the University of Pierre et Marie Curie – Paris, France.

The Black European honey bee Apis mellifera mellifera *hosted in a 10-frame Dadant hive, France.*

Beautiful Native French queen, drones and workers from the West Mediterranean lineage M, France.

What drove you to become a scientist?

The real desire to become a scientist for me was simply to find answers, answers to questions that were often not asked by others or remained unanswered. That being said, my case might be a bit different as my father was a honey bee researcher before me and one cannot minimize a parent's inspiration on a child.

How did you start your career after school?

Well, the least I can say about my career is that it has been a real international and complex one! After I finished my Ph.D. in France, having already at this point left my birth country (Syria) for a second time and for over six years, I decided

to conduct my first postdoctoral research in investigation of the impact of pesticides on honey bee health at Laval University in Quebec, Canada. I continued my research on the same topic during a second postdoc at the University of Tennessee in the USA, followed by a short third postdoc at the University of Southern Mississippi, in which I was looking at honey bee transcriptomic responses to biotic and abiotic stressors. Two years ago, I was fortunate to join the Bee Research Lab in Beltsville (USDA-ARS) as a Research Entomologist, working with a brilliant team of honey bee researchers, all united to find solutions for the betterment of honey bee health and beekeeping.

Where have you travelled in your studies of bees, what was most memorable?

During my exciting bee research and studies, I have been fortunate to travel and reside in many countries. As a Ph.D. student and postdoc, I have attended and presented at many bee conferences such as Apimondia, EurBee, ESA, and at many other local conferences and symposiums in the USA, Canada, France, Syria, Lebanon, Belgium, Ukraine and Turkey.

From a beekeeping stand point, these opportunities are immense! The ability to exchange expertise and discuss face-to-face with peers and colleagues from all over the world is absolutely priceless! I guess the most memorable thing to mention to your readers Jay, is that beekeeping practice and ideology are completely different from one country to another! Particularly, when we talk about countries located in different continents and with significant ecological and environmental variations. We have so far identified approximately 28 different honey bee subspecies! They may share general characteristics, nonetheless, each subspecies has some unique attributes still to be discovered and revealed. To make it short, experiencing first-hand bee local adaptations in their native environments and how the amazing diversity of honey bees is directly translated to behavioral changes, these are definitively the most memorable things in my mind.

What are the biggest challenges facing beekeepers moving forward?

This is a tricky question and the answer might vary slightly from one country to another. As I explained in the previous question, beekeeping practice varies between countries, which means that beekeepers worldwide are destined to face two types of challenges: firstly, universal challenges across the globe, and secondly, local problems related to each country's conditions and beekeeping practice. Nowadays and due to the astounding and fast development in transportation and communication, the world has become a small village; which means that we need to look at both points I mentioned earlier concurrently. Honey bees have been gifted to all human kind after all, and it is our collective responsibility to take care of them and ensure their continuity and wellbeing. In my opinion, the biggest challenge facing beekeepers in the USA is our capacity to come together with stakeholders, farmers, ecologists and environmentalists and to demonstrate willingness to implement necessary changes and modifications in our beekeeping practices for more sustainable beekeeping and preservation of our ecosystem. Such changes would be guided by collective scientific outcomes and would significantly help to mitigate many of the problems facing the beekeeping industry as a business and the honey bee as an indispensable ecological resource.

What gives you hope? What are the best recent discoveries in bee science?

Hope is always there! We are a nation of great problem solvers, we have been and will always be, this is as long as we stand together and base our decisions on hard core scientific findings. We must lead this effort too, as we do in many other fields. I am hopeful because I know that we have a great number of fine professional and hobbyist beekeepers, queen breeders and producers in this country, as well as bee research laboratories working around the clock to find solutions for beekeeping problems and honey bee health challenges as soon as they appear.

Recently, I have read a few interesting discoveries in the realm of honey bee behavior and pathology that I would like to share with your readers:

How do bees in a swarm locate their queen? In a recently published study, Nguyen et al. were able to show that bees locate their queen by performing a cascade of "scenting" events where individual bees direct their pheromone signal by fanning their wings. During this process, the bees create a dynamic spatiotemporal network that recruits new broadcasting bees over time. The authors used a newly developed high-throughput machine learning tool, allowing them to identify the locations and timings of scenting events [1]. From a pathology stand point, a group of authors from the University of Texas described a promising new molecular method that can suppress deformed wing virus infection in bees and also reduce the rate of varroa mite infestation. The authors engineered a symbiotic bee gut bacterium to produce double-stranded RNA which can induce RNAi immune response in bees and in the parasitic mites as well [2]. This method was used to improve bee survival after a viral challenge. The downside of this method is potential alteration in bee physiology and behavior due to the introduction of dsRNA, which is still to be debated for many years to come. Nevertheless, this tool provides new insights on bee functional genomics which can help to perfect sergical use of RNAi approach for disease control in the near future.

Do you have hobbies and other interests beyond bees and science?

I must admit that most of my time is spent in science and honey bee research including beekeeping. In terms of sports, I have been a professional Karate player and coach for a long time, I like exercising and gardening too. Reading is a natural thing for me, I read books and articles in different languages on a wide range of topics such as religions, history, economy and politics. BC

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An Interview with Dr. Jamie Ellis

University of Florida's Honey Bee Research and Extension Labratory

Malcolm **Sanford**

Meet Dr. Jamie Ellis, from the University of Florida's Honey Bee Research and Extension Laboratory.

Dr. Ellis (Jamie) remembers his earliest memory of honey bees and beekeeping occurring in Kindergarten. This was followed by a dream about keeping bees, and reinforced by seeing a house on his bus route with a backyard beehive. At eight years old, he first pitched the concept of getting a beehive to his parents, but not until around age twelve was he able to get his first colony.

Mentioning to his sixth grade teacher, he was interested in honey bees, resulted in her uncle providing an empty hive. Locating an ex-beekeeper through his father, he found a mentor, who unfortunately died too early. He left Jamie an apiary of 15 or so colonies, and he never looked back.

In middle and high school, Jamie's interest in science matured. It was meeting with Dr. Keith Delaplane at the University of Georgia, however, and working in honey bee science in his undergraduate years, that firmly converted him from a potential career in medicine into a Ph.D. bee scientist.

Serendipitously, this choice appears to have led him to meeting his wife, Amanda. Working together at a local church revealed common interests; her undergraduate degree was in wildlife biology and she went on to get an M.S. in zoology and Ph.D. in entomology (honey bee pollination ecology). Small wonder they became close. Married in 2002, they now have four children.

Jamie was fortunate to obtain an overseas learning experience while finishing his Ph.D. at Rhodes University in South Africa, working on a USDA project looking at the newest beekeeping problem in the U.S. at the time, small hive beetle, a native to South Africa.

Returning to the United States, Ph.D. in hand, Jamie worked with Dr. Delaplane for two more years. This also allowed him to partner with Amanda in the same lab as she completed her Ph.D.

In 2006, Jamie was offered and accepted a job at the University of Florida, which has a large entomology department, currently ranked number one in the world. He faced many challenges at the start of his career, including confronting significant challenges from a vibrant beekeeping industry, and incorporating appointments in all three realms common at land grant universities, teaching, research and extension,

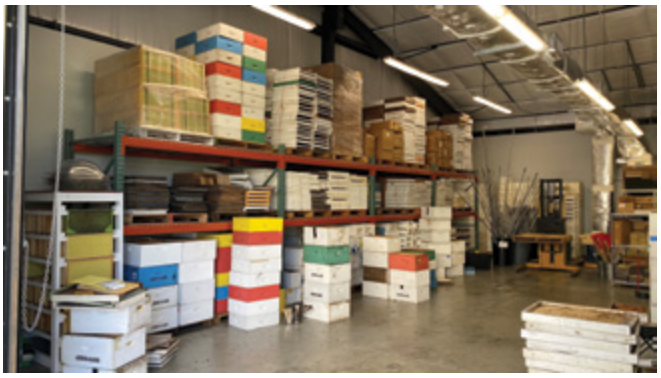
Once at the University of Florida Jamie developed a lasting partnership with beekeepers, students, faculty and other collaborators, such as the Florida Department of Agriculture and Consumer Services, Division of Plant Industries, and the Florida State Beekeepers Association. This led to a concerted effort to construct a honey bee research laboratory. The effort took several years, but to the surprise of all, after almost declared dead several times, the political stars aligned with the state's governor giving his blessing. Starting at $2 million the project quickly morphed to a $4.5 million world-class facility. Ground was broken in 2017, with the first building occupied the following year.

Jamie gives thanks to all those contributing to the facility, but much of the success is due to his leadership and commitment. He is the main advocate of the facility, giving lectures and tours with such flair as to be on everyone's list of invitees.

Most recently, this has extended to an invitation to give the summer 2021 commencement address by the University president with the following introduction:

"Jamie is among the most sought-after lecturers on beekeeping topics globally. Regarding his extension work, Jamie created the UF/IFAS Bee College and the UF/IFAS Master Beekeeper Program. As an instructor, Jamie supervises PhD and masters students and has contributed to the development of five courses on beekeeping at UF. Currently, Jamie and his team have over 30 active research projects in the fields of honey bee husbandry, conservation and ecology, and integrated crop pollination.

"Jamie has received many state, regional and national awards for his work with honey bees. These include the National and Southern Region Excellence in Extension Awards (American Association for Public Land Grant Universities), Roger Hoopingarner Award (American Beekeeping Federation), Roger E. Morse Award for Teaching/Extension (Eastern Apicultural Society), Ed and Elaine Holcombe Distinguished Speaker Award (Eastern Apicultural Society), Research Foundation Professor (University



of Florida), Superior Accomplishment Award (University of Florida), Outstanding Specialist (Florida Association of Agricultural Agents), and Entomologist of the Year (Florida Entomological Society)."

In this address, we get an idea of Jamie's essence: "I have a recurring dream. In that dream, I am back in high school, usually involved in some sort of sport. I dream about not trying very hard in that sport, realizing that my time in school is near completion, and having no opportunity to do better. I wake up a bit ashamed that I did not try harder when I had the chance.

"I do not usually put much stock into dreams, but I do know why I have this dream. I played football my senior year in high school. In practice, we had a drill in which our coach ranked us from fastest on the team to slowest on the team. He then divided us into groups of three and made us race one another the entire length of the 100-yard field. If the designated fastest person in the group did not win, and the second-fastest come in second, etc., he made us all run the drill again.

"Unfortunately, rather than pushing to run faster, my teammates and I ensured we finished in the order in which we were expected to finish so that we would not have to run the drill again. As you might guess, our team was not very good.

"Exceptional individuals do not cut corners. They embrace opportunities for self-improvement." **https://tinyurl.com/xhjf8pm** BC

An Interview with

James T. Key

While there are African American beekeepers in the United States, generally speaking with a few notable exceptions (such as the city of Detroit), they tend to be few and far between. When I had the privilege, pre-Covid, of offering a bee presentation to beekeeping groups across the country, I would never see more than two or three African American faces in the crowd, if there were any, even in states with high populations of African Americans.

The state of Vermont where I live is not a big state. The latest census figures (2020) peg the population of Vermont at 643,077, the third smallest population in the U.S. behind Wyoming and Washington DC. Vermont is also one of the whitest states in the union trailing only Maine in the percentage of the population who are white. So when I met beekeeper James Key at Northeast Organic Farming Association (NOFA) winter conference a few years ago, he made an impression: not just because of his passion for bees, but because he is the only African American beekeeper in the state of Vermont that I have met in over 30 years of keeping bees here.

James graduated with a B.A. from Norwich University with a self-designed major that focused on Ethno-botanicals and their healing properties, and has published a couple articles on the subject. For awhile he owned a café and sold sushi and other foods to some of Vermont's largest grocery and health food stores before transitioning to his other interest, health. As James tells it, "Over the last nine years before Covid, I worked in the lab at UVM Medical Center. My work there ended when the outbreak began, during the spring of that year. While working at the hospital, my interest in beekeeping began, out of trying to solve the problem of why there wasn't a presence of honey bees around my garden."

James started keeping bees in the spring of 2018 and has built up his apiary to 10 hives of locally raised bees with up to five nucleus colonies to use for queen replacement if needed. He is hoping to expand to 25 colonies and a second bee yard in 2022.

It has been my pleasure to be of occasional assistance to James during his beekeeping journey, and being the resourceful man that he is, he has tapped other Vermont beekeepers as mentors as well, including current Vermont Beekeeper's Association President, Andrew Munkres, as well as picking the brains of notable Vermont beekeepers, Bill Mares, and Michael Palmer. As James explains, "My hive management philosophies are gathered from a host of beekeepers before me. Some are my current mentors and some from beekeepers like Kirk Webster, Tom Seeley, Randy Oliver and Brother Adam. I practice treatment-free beekeeping using IPM management, green frames for drones, brood breaks by making splits, through working with bees that have VSH behavior and certain traits for living with mites, and adopting newer proven methods that are being developed as we speak."

Marketed under the "Farmer James' Apiculture" label, James produces honey, candles, lip balms, lotions handmade soaps, and honey sticks. His primary markets are in Vermont such as the local farmers' markets, but he also is branching out and marketing his honey at the "Eastern Market" in Washington, DC. However, producing products from the bee hive is not James' pri-

mary motivator. "The thing I'm most passionate about in keeping bees is that it keeps me involved with my natural environment, learning how the changes in that environment not only affect the bees but humankind. They keep me motivated to learn how to keep the population of bees flourishing and healthy for the survival of them and humanity," says James.

James achieved his Vermont Beekeeper Certification two years ago and when I asked what it's like being a beekeeper in the lily white state of Vermont, he said, "All my experiences are unique in one of the whitest states in the Union. Some people can describe such uniqueness as color difference but for me it's all about my encounters. I've told many people how my goals and pursuits in this state have been supported by white people. Really, people who are "color" blind, and want to support me as an individual, as a person, like them with a common goal. That is to live a happy, healthy life. There's more classism than racism in this state. Some people here do lack the willingness to support a person like me, fearing unforeseen reprisals they may get from their neighbors. Many in this state feel that supporting diversity means giving up Anglican values or losing their heritage." James continues, "…the best thing is seeing people's faces that come visit Vermont and are so taken aback, that I'm the first and only African American, Vermont Certified Beekeeper. They are amazed and supportive of me in such a homogenized farming profession."

I also asked James to share his thoughts on the current state of beekeeping and what the future may hold. He replied, "My thoughts about beekeeping in the U.S. are all over the place. I have thoughts about migratory pollinating, toxins used on farms and in neighborhoods that have minimal regulation, mono-crops, the list grows. Specifically, I would say that beekeepers need to be more involved in their communities, focusing more on the survival of bees and the ecosystems in which they live in their states. Simply, I feel that some of the practices of beekeepers need to change, but what exactly those changes are, I'm still figuring out. This is my third full season and I still have so much to learn in my own backyard about beekeeping."

James practices what he preaches about getting involved in the community, and at the 2021 Summer meeting of the VT Beekeepers' Association, he was elected to serve on the VBA board of directors. BC

The Beekeeping Journey of a Biologist – An Interview with Slava Strogolov

Biologist at University of Wisconsin - Milwuakee

Earl **Hoffman**

Question: Please share your background. Why did you choose to become a beekeeper?

A: I am a biologist working in the agricultural sector of microbial products. My undergraduate and graduate degrees are from the University of Wisconsin – Milwaukee. My research there involved immunology, microscopy, molecular biology, microbiology. I worked as a scientist in the industry before starting my own probiotic company. In 2014, I became a beekeeper to develop probiotic supplements for pollinators. I needed hands-on experience to understand the results of probiotic research. I completed the online beekeeping course with Dr. Mariann Frazier at Penn State University to get the foundational knowledge of beekeeping. EAS Master Beekeepers Earl and Carol Hoffman of Essential Honey Bees LLC provided my first colonies and extensive instruction. I took a queen rearing course with Dr. Marla Spivak and Gary Reuter at the University of Minnesota. I am constantly working to further improve my beekeeping knowledge and skill for the successful propagation of bees.

Question: What is your passion? What motivates you?

A: Keeping the colonies alive and thriving! Honey bees are sentinels of agriculture that allow us humans to have a plethora of food variety that depends on pollination.

Question: How many years and how many beehives do you normally run?

A: I have been a beekeeper for six years and typically run 20-40 colonies. It's urban, rooftop beekeeping. My hives are on the roof of our manufacturing facility. The city of Milwaukee allows just two hives per permit. I had to meet with the City of Milwaukee Commissioner because two hives was not enough to study probiotics. I explained my background and intent and received a special permit to do this. We are now running three different types of colonies: Italians, Carniolans, and Russians. We work very diligently to control our mite loads. We used almost all registered mite control substances with successes and failures. The current method that we prefer is 3% oxalic acid dribble (25mL/ hive). The alcohol mite washes show zero or one mite per 300 bees. So these are research hives, but we also make some honey.

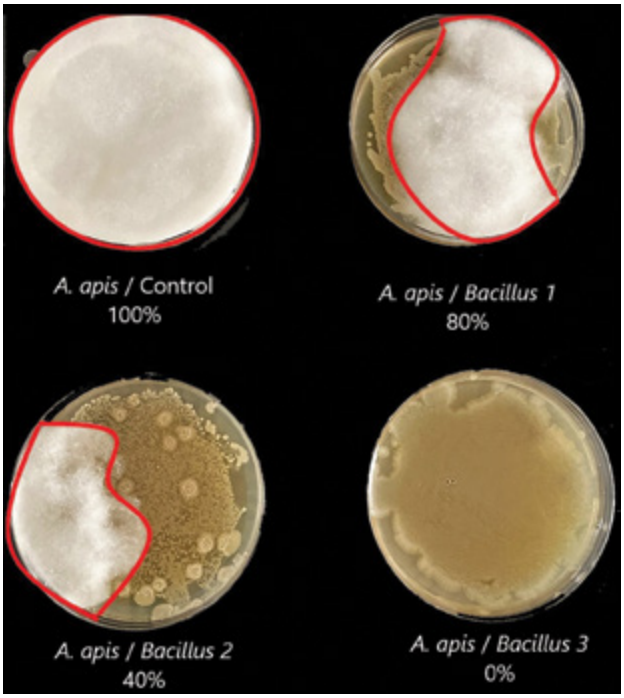
Question: Since you are both a beekeeper and a scientist, tell us what experiments you have done with your bees?

A: First, we looked at all the practical aspects of feeding different bacteria to the honey bees. I needed to understand what kind of food bees consume and how much, whether bees will eat the bacteria, as well as the safety and efficacy of different probiotic formulations. We analyzed samples of honey. We looked at individual honey bee and colony health. We measured frames of bees, brood patterns, queen status, adult bee weight, brood and gut pathogens, *Varroa* counts. Also, I rated antimicrobial substances used in beekeeping for their effect on beneficial bacteria in the gut of the honey bees. This work was done with the help of beekeepers, assistants, and student interns. My wife and I presented the results at beekeeping conferences, including at Apimondia in 2019. At Apimondia, I saw that honey bees have the same health issues around the globe. Gut health is one of the imperative parts of successful beekeeping.

I wanted to look deeper at different diseases that present challenges to honeybees. Learning how to grow chalkbrood pathogen, fungus *Ascosphaera apis*, opened a way for us to screen probiotic bacteria for the ability to inhibit the fungus. I am attaching a photo of one such experiment. *Ascosphaera apis* forms a white colony covering the entire surface when it grows uninhibited, as you can see in the Control petri dish. It has the texture of cotton wool. What was super exciting was that probiotic *Bacillus* bacteria can be grown on the same petri dish as the fungus. *Bacillus* bacteria are yellow and less prominent. And these bacteria inhibit the growth of *A. apis* 20, 60, 100%. I used a red outline to show the area of the fungus on each of these plates. We were able to work with commercial beekeepers to replicate these results in the field, the reduced incidence of Chalkbrood due to the fungistatic activity of the probiotic bacteria.

Finally, I find that research on pesticides and the capacity of bacteria to remove them from the environment is very important right now.

The fungi experiment



Question: Did you work with aggressive bees?

A: I was running experiments on colonies located in northern Florida. The weather for that particular sample collection day was less than optimal. Very cloudy and just about to start raining. As I was pulling into the bee yard, the signs of mean bees were apparent. Bees were stinging the tires of my truck and hitting its windshield and body. I suited up in the truck, quickly lit a smoker, and started my work. Unfortunately, it also started to rain, which added to the honey bee colony irritation. I could not quit, because my flight home to Wisconsin was that same evening. A few hours later, I finished my work and decided to drive away from the yard about 200 yards before taking the suit off. Not far enough! As I removed the veil, I heard a high-speed buzzing sound. The honey bee had such momentum, that the sting felt like a smack. The swelling in half of my face happened so quickly and was so large that the facial recognition system in the airport failed to recognize me. I was asked for my ID and boarding pass multiple times during my travel home.

Question: How do you include your family and friends in your beekeeping journey?

A: My family is comfortable with honey bees. My wife and our two children work with me to do hive inspections and honey extraction. It is a joyous and rewarding activity.

Question: What is the most important thing you have learned about beekeeping so far?

A: There are 1000 different ways that support the success of your beekeeping operation. Timely treatments and hive health observations help prevent issues from happening in the first place.

Question: Last question. What are your goals for the next five years with your bees and your bee journey?

A: I want to raise all my queens. I plan to continue learning about bees and improving my beekeeping skills. Commercial beekeeping is very challenging due to many different inputs that can affect the success of the operation. I plan to continue to visit commercial beekeepers and show that probiotics can mitigate stress factors that come with commercial pollination.

Question: Thank you for your time and sharing with us your incredible experience with honey bees!

A: I wish all *Bee Culture* reading a healthy and happy New Year! BC

The Doctor is In

An Interview with Oregon's Dr. Ramesh Sagili

Dewey **Caron**

Oregon State University's (OSU) bee position dates back to 1919. Herman Scullen was hired so OSU would have a "bee man" to offer beekeeping to the anticipated surge of WWI veterans returning to what was Oregon Agriculture College. He retired in 1953. The bee position remained unfilled until Dr. Michael Burgett was hired in 1974. His position was a result of the creation of a higher education budget line item of the 1973 state legislative session directing OSU to hire an apiculturist. This was the culmination of a long standing, on-going, lobbying effort of agriculturalists, beekeepers and the Oregon State Beekeepers Association.

Mike would remain Oregon's Bee Doc until the University needed to downsize. As senior faculty, Mike was offered a generous retirement package, so he officially retired in January 2003. Unofficially he was at his bee lab the next day, pretty much continuing what he had been doing prior to "retirement". In fact, today you can find Mike most days still in a University lab, unless he is in the field doing research.

While a faculty member, Mike had established a unique teaching/research apiary on unused land on the edge of campus adjacent to Oak Creek, a small campus stream. When the OSU Entomology Department was merged a decade ago, Burgett "saved" his apiary by joining it to the Horticulture department. Today the apiary continues as part of the Oak Creek Center for Urban Horticulture and Bees.

Following his retirement, the Oregon beekeepers once again sought legislative help in obtaining an apiculture position at OSU. An endowment was established to solicit donations and as the funding grew over $300,000, the Legislature again stepped up by funding a two year fixed term apiculture research and extension position. A national search led to hiring of Dr. Ramesh Sagili.

Dr. Sagili earned both Bachelor and Masters degrees in the mid-1990s from Andhra Pradesh Agricultural University (renamed as Acharya N.G. Ranga Agricultural University in 1996), one of the largest Agricultural Universities in India. It features multi-disciplinary programs with emphasis on outreach to farmers. As part of the curriculum, students are required to work directly with farmers. This program called RAWEP (Rural Agricultural Work Experience Program) mandates direct stakeholder contact and basic, practical training for students who are placed directly with farmers during their degree programs.

The Bachelors in Agricultural Sciences degree program includes all aspects of agriculture including entomology. Ramesh said he liked the entomology experience the best. He recalls an earlier experience when on visits to his grandparents' farm he observed and helped his grandfather pollinate hybrid sunflowers by hand. His grandfather explained there were not enough bees in the region to properly accomplish pollen transfer, so humans had to transfer the pollen.

After finishing his masters, Ramesh investigated Centers in India for apiculture education. He found they were designed to teach beekeepers and not set up to conduct advanced bee research. So, in communication with friends, he investigated the possibility of coming to the U.S. to continue his studies. He found a graduate assistantship at Texas A&M University, one of the largest entomological graduate programs among U.S. Universities. Upon acceptance, he took an assistantship with Dr. Tanya Pankiw to pursue honey bee research. He started his PhD at Texas A&M in 2003, graduating in 2007.

His PhD research focused on examining effects of brood pheromone on worker foraging behavior and colony growth of honey bees. The research unraveled the appropriate blend of chemicals to stimulate foraging in honey bees. With Dr. Pankiw and students of the program, he has published several research papers detailing these ground-breaking studies. The University patented the chemical blend and a delivery system. A commercial brood pheromone was sold briefly by Mann Lake, marketed by a Canadian pheromone specialty company. The research remains an important demonstration of development and practical application of pheromone management of bees. The pheromone is no longer available for general use, but the blend of 10 chemicals is known and has been duplicated for other researchers.

Following completion of his degree, Dr Sagili remained at A&M for two years as post-doctoral researcher. Although he could have stayed longer at Texas, he began to investigate University faculty openings, including mine at University of Delaware. Oregon State was advertising for a two year fixed-term position in the Horticulture Department. He applied and was hired before Delaware could grab him.

Two years later the University reopened the apiculture position as a tenure-track, Assistant Professor rank. He was rehired after a national search from a highly qualified final pool of candidates. In 2017 he was promoted to Associate Professor and now is being evaluated for promotion to Professor by OSU faculty.

I started my interview asking him about his coming to Oregon from Texas.

Q: What attracted you to leave the postdoctoral position at Texas for a fixed two year term temporary position in Oregon?

A: After conducting multiple studies on brood pheromone of both basic and applied nature as a post-doc, I thought it was time to look for a more permanent position where I could expand my interests and pursue research to address more pressing problems related to honey bee health. The Oregon position was attractive since it was initiated by the beekeepers who had diligently pressured the Oregon legislature to reinstate the OSU honey bee program. I was aware that Oregon was a state with huge diversity of crops and many of those crops were dependent on honey bee pollination. I was ready to expand my research and extension efforts in Oregon.

Q: When beginning a new position in a different region of the U.S. what did you do to determine what aspects of beekeeping to investigate?

A: I initially arranged a series of meetings with stakeholders. I talked extensively with both beekeepers (commercial beekeeping was identified as the position priority) and farmers who were dependent on honey bees. The beekeepers identified three major aspects where research was needed, varroa mite control (at this time Apistan resistance was becoming widespread), bee nutrition and pesticides. The grower groups identified areas where they needed answers as to why the yields were low in certain crops. They wanted to know if poor yields/seed production was due to lack of adequate pollination or poor plant attractiveness to bees. This was especially the case with hybrid carrot seed production in the dessert area east of the Cascades.

Dr Sagili describes his current program at OSU as a three-part related approach to sustainability in apiculture and pollination. The effort includes both a basic and applied approach. The three major areas of research are: *(1) honey bee health (2) honey bee nutrition and (3) honey bee pollination.* A majority of the research projects are collaborative efforts, involving stakeholders (beekeepers, growers, general public interested in bees), OSU colleagues and collaborators from other universities, nationally and internationally. His work has achieved international recognition.

In 2016 Dr. Priyadarshini Chakrabarti, whom we know as Priya, joined the OSU Honey Bee Lab as a post-doctoral researcher. Ramesh enticed her to Oregon from India, where she was conducting top-notch research with Asian honey bees at the University of Calcutta. They have subsequently established a significant collaboration in bee nutrition.

They cooperated in securing a $500,000 USDA NIFA (National Institute of Food and Agriculture) grant to investigate several aspects of bee nutrition. A portion of the OSU grant will now be shared with Mississippi State University where Priya has started as Assistant Professor. The grant will support comprehensive analysis of both macronutrients and micronutrients in pollens available to bees, using techniques developed by Priya and Ramesh. They will build a database of nutritional composition of pollens from different plant sources available to bees. The proposal calls for determining nutritional values of more than 100 bee-pollinated crops, including native plants and commonly used ornamental plants. Both of them plan to recruit graduate students to work on this new endeavor.

A unique aspect of the grant will be to gather as wide a range of specific pollens as might be possible. For this analysis they will recruit a team of volunteer citizen scientists to assist in pollen collection. Since honey bees have floral fidelity, meaning honey bees forage on one specific flower species during each foraging trip, they will ask individuals to collect honey bee pollen foragers on target plant species to obtain source-pure pollen for analysis. The collection will not involve killing foragers - bees will be immobilized in a freezer and released after pollen is removed. If interested first contact Dr. Sagili at **ramesh.sagili@oregonstate.edu**. The pollen collections themselves will not begin until next year (2022 Spring).

Another aspect of the study will examine the impacts of certain fungicides – called sterol biosynthesis inhibitors (SBI) on the bee diet. Pollen sterols are a type of lipid that bees require for their development and growth which they cannot synthesize but must obtain from their diet. Priya and Ramesh have looked at the major plant sterols and their impact on bee nutrition. The grant funds will allow them to examine if the use of certain fungicides could compromise the quality of pollen that constitutes part of the bee diet.

Befitting his accomplishments, Ramesh has been the recipient of several awards. In 2019 he was recognized for Excellence in Post-Doctoral Mentoring by OSU and the year before for his excellence in Outreach and Engagement. Earlier he was recognized as an Outstanding Young Faculty and for an Excellence Award for his leadership in the Oregon Master Beekeeper program. The Entomological Society of America, Pacific Branch, recognized him for his research excellence in their section of Physiology, Biochemistry & Toxicology in 2017, and the Eastern Apicultural Society presented their J. I. Hambleton Award for Research Excellence in Apiculture the same year at their Annual meeting in Delaware. The Oregon State Beekeepers Association has also recognized him with an Honorary Lifetime Membership.

Q: I finished my interview by asking Dr. Sagili how moving from a fixed term position to a permanently funded University position had changed his research emphasis?

A: I continue to dialogue with beekeepers, including additionally backyard hobbyists. My effort now allows me to have a long-term vision and focus on longer-term research projects on bee nutrition and varroa control. I can now do some more basic research while continuing to directly address some of the beekeeper concerns with applied shorter-term projects.

As regard to pollination, we have been able to look at blueberry, an emerging major crop in Oregon. Colonies moved to blueberry seem to become stressed and exhibit higher EFB disease expression. We are

testing several hypotheses to resolve this issue including examining the role of poor nutrition and fungicides in incidence and prevalence of EFB.

Q: So what is a more basic approach to bee nutrition?

A: The area of bee nutrition has been under investigated. The USDA did some decent work on bee nutrition in the 1970s and 1980s at Beltsville under your PhD student Elton Herbert but following his sudden death the studies were discontinued. The Tucson Bee lab has hired researchers and have nutritional studies underway. We have barely scratched the surface in terms of understanding nutritional requirements of bees. Our newest USDA NIFA grant funding will help us explore the most important sources of pollen for bees and build a nutritional composition database of those pollens that might be most critical. We are also investigating the optimal requirement of micronutrients for bees (e.g., sterols). We have several aspects of our nutritional studies completed or in pilot project status that might be revealing.

Q: The Oregon bee position includes extension as well as research. How important is that for a fulfilling bee lab program?

A: I believe that research and extension go hand in hand and are complementary. Having both research and extension has allowed me to understand the immediate needs and priorities of the stakeholders (beekeepers and farmers) and set up my research objectives accordingly. I started talking to beekeepers and farmers when I started my position and I continue those dialogues I give numerous presentations, visit apiaries and maintain regular contact with my stakeholders. The pandemic has limited the amount of direct contact since last year, but we organized several zoom sessions for the beekeepers to keep them and conversely us updated. We also offer pest and disease diagnostic workshops for beekeepers and veterinarians. I constantly learn and keep current by talking with beekeepers and farmers who always have great insights.

Q: What do you feel are the greatest impacts of the OSU bee lab's extension program?

A: To cater to the needs of new beekeepers, we initiated and developed a unique Master Beekeeper Program in Oregon in collaboration with Oregon State Beekeepers Association. The Oregon Master Beekeepers program has taken the training of new beekeepers to a new level. We continually seek to refine our program. With the pandemic, we developed an option that delays mentor involvement, but still provides quality introduction to beekeeping. The program matches new beekeepers with mentors and offers beekeeping instruction (now virtual due to the pandemic). We have recently initiated bee mentor training to standardize the program. We will soon incorporate education on bee sting reactions for our mentors.

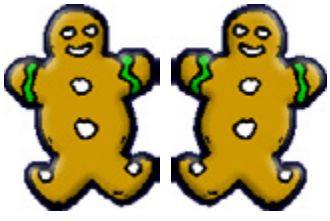
We have collaborated with the Oregon Department of Agriculture pesticide division to train their field personnel on how to recognize and distinguish colony losses from pests, diseases, starvation versus potential pesticide damage or kill. We are also training veterinarians in the state on diagnosis of honey bee brood diseases, so that Oregon beekeepers that need antibiotics have access to trained veterinarians to obtain prescriptions.

We have published several useful extension publications on several timely topics during the past decade that include publications on Asian Giant Hornet, Enterprise budgeting for commercial beekeeping, evaluating hives for pollination, how to establish nucleus hives, and methods for varroa sampling. Our publication and an app on how to reduce bee poisoning from pesticides (PNW 591) has become a major source for information on pesticides for both farmers and beekeepers. We have also prepared an informative flyer on small hive beetle, something that appears to be increasingly of concern in honey house management and for beekeepers managing weaker colonies.

Q: You have even taken on some teaching of beekeeping? How do you integrate the classroom and e-campus teaching into your research and extension efforts?

A: It is important to expose our students who will be the future farmers of Oregon to honey bees. We have over 20 crops common in Oregon that require or benefit from bee pollination. Farmers and beekeepers need to communicate with each other to insure adequate crop pollination. Although only a lecture course, I take the students to our teaching apiary to give them real-time exposure to bees. I started teaching in the winter quarter as it was less disruptive to our research, but later switched to teaching in spring term due to overwhelming demand from students to teach in spring. Our e-campus (distance learning) course has become a popular option for students across the nation and abroad. And I might add that I am always looking for students to assist with our research projects. If they have taken my course, I know they have been exposed to the basics of beekeeping and hence need less training when assisting with research.

Dr Sagili represents the latest in a series of Bee Doctors on the faculty at Oregon State University. The program is robust, very much alive and works well in conjunction with and for the benefit of beekeepers and those who benefit from bees in Oregon and across the nation. BC



An Interview with Dr. Humberto Boncristiano

InsideTheHiveTV, the Show about Bees

Malcolm **Sanford**

Growing up in a beekeeping family, with a father as a commercial beekeeper near Sao Paulo, Brazil, it wasn't always taken for granted that young Humberto would join the family enterprise. It should be said that in fact he tried to distance himself from honey bees as much as possible. Reasons seemed natural given the circumstances. To begin, while his father was in fact allergic to honey bee venom, and more than a few times the family had to get him to an emergency room, where it often seemed a miracle that he survived. In Brazil, the so-called Africanized honey bee reigned supreme, with a fearsome defensive reputation, and Humberto's father actually preferred these "hot" bees, which he insisted protected the apiary and environs. The fact that Humberto himself became allergic to honey bee venom also seemed to indicate that beekeeping was not to be in his future.

One potential legitimate escape for Humberto was to train as a geneticist and academic. His first employment in this arena took him to the city of Rio Claro. This is the very place in Brazil where Dr. Warwick Kerr introduced his storied honey bees from Africa that became sensationalized in the rest of Americas as "killer bees." He then moved to the Sao Paulo University campus at Ribeirão Preto. Unfortunately, this location was even more involved in apicultural research, continuing today to lead in that activity. At both places, Humberto's research had nothing to do with honey bees, instead he became a molecular biologist, generally involved in studying viruses, and seemed well on his way to escaping the honey bee research trap.

In 2006, something known as Colony Collapse Disorder (CCD) took the apicultural community by storm. The call went out from the USDA ARS Beltsville Bee Laboratory in Maryland that positions were open for the very skills Humberto possessed in virus biology. Once again, he seemed caught up in *Apis mellifera* research, and made plans to move to the United States. This was a difficult family conversation, but his father gave his blessing, when he understood his son was leaving on an important mission to help the honey bee at this critical time.

Three years of work at Beltsville provided a good foundation in honey bee biology and was a profitable move. It also hooked Humberto up with his wife, who continues to be employed at the Beltsville Lab. They raised two daughters together. Although ostensibly working for the storied Beltsville bee lab, Humberto was in fact paid by the National Academy of Sciences, and was also appointed Adjunct Faculty member at the University of North Carolina, Greensboro, where he spent two years.

In 2013 he was hired as Chief Technical Officer at Forrest Innovations Ltd. This startup established management and operational teams in three strategic locations (Israel, USA and Brazil). Forrest Innovations had one simple mission: to develop novel biotechnological solutions for real world problems. Forrest Innovation's main focus involved two significant challenges: Mosquito Population Control, and Citrus Greening, which continues to effect the citrus industry in Florida.

Within two years, Humberto found himself again in academia as a research associate at the University of Maryland. It was at this time he realized he was back at square one, and would finally surrender to the realization that his future history would be intricately bound to the honey bee and beekeeping. Thus, in 2018, he accepted a position with the University of Florida Honey Bee Research and Extension Laboratory as a "Honey Bee Husbandry Researcher." This job included conducting bioassays in colonies using various *Varroa* control materials, and most importantly, visiting Florida beekeepers to understand how they might be assisted by the lab going forward.

Although a rewarding employment prospect, the family determined not to translocate to Florida, and so Humberto decided to move back to Maryland to begin a brand new startup activity serving the beekeeping community called **https://www.insidethehive.tv/** This entity is a combination of various activities that take advantage of one of his long-time interests, professional photography.

At present, the project is based on producing an extensive array of videos about honey bee biology and beekeeping on the youtube.com platform **https://www.youtube.com/c/insidethehivetv**. The majority of these are categorized into "play lists/," each consisting of a series of related productions. The one on *Varroa* mites is perhaps the largest, and includes the following videos: "Is *Varroa* Really the Honey Bee's Worst Enemy?" "The *Varroa* Mite's Best Friend," "Honey Bee Survival Stock Lesson," "*Varroa* Mite Egg or Something Else," "*Varroa* Mite Resistance to Amitraz," and "Langstroth Hive Better Than Tree Cavities."

Other play lists include videos related to small hive beetle, probiotics, honey, Apimondia 2019 in Montreal, pesticides, a beekeeping career (Malcolm Sanford), Susan Batra presentations "Batrafest," and others. A series of individual videos are also found sprinkled throughout the site.

The Youtube.com platform is

based on free videos, each containing a four-second advertisement that can be skipped (clicked off). In order to support the entire project, however, Humberto has added to the programming mix activity on the Patreon platform **https://www.patreon.com/InsideTheHiveTV/**. This seeks to develop a fan base that will contribute funding to the project going forward.

Another interesting possibility is now being produced through a process called "livestreaming." These are real-time conversations between Humberto and invited guests, open to all during production, and recorded for viewing in posterity. The latest of these discusses propolis (bee glue) and one entitled, "My Beekeeping Journey," which in fact is the source of this article.

In the future, Humberto will be hosting a podcast. The first edition is expected to be a discussion between him and Dr. David DeJong, a Cornell University graduate, and student of the U.S. dean of apicultural extension programs, Dr. Roger Morse. Dr. DeJong resides full time in Brazil. On the horizon will also be a series of programs dedicated to teaching/understanding honey bee science. What might be characterized as an InsideTheHive.TV beekeeping academy.

The plethora of activity produced at InsideTheHive.TV in a short period of time is astounding. There are many presentations on Youtube and other platforms that are in competition for the beekeeping community to enjoy and reflect on. Few, however, have the passion and scientific rigor found in those developed by Dr. Humberto Boncristiani. BC

An Interview with Dr. Marla Spivak PhD

Univeristy of Minnesota

John **Miller**

Bee Culture Magazine tasked contributors to interview a person in our industry.

I have long admired Dr. Marla Spivak Ph.D. of the University of Minnesota.

In the early 1990's Dr. Spivak filled the position formerly held by Dr. Basil Furgala in the Department of Entomology at the UMN Bee Lab. Dr. Spivak poured her considerable energy into the program and the personnel in the program. Dr. Spivak originated the Hygienic bee line. In 2010, Marla was recognized in Entomology by the Macarthur Fellow Program, and in 2016 the new Bee Research facility opened, which allowed her and Professor Dan Cariveau to expand their research and outreach to include native bees and the flowering landscapes that all bees need to thrive.

Dr. Spivak's work has produced an astonishing number of bee industry scientists and contributors, including Rebecca Masterman, PhD.; Dr. Katie Lee, PhD.; Mike Simone-Finstrom PhD [USDA Baton Rouge]; Mike Gobrilisch, PhD. [USDA-Mississippi]; Judy Wu-Smart PhD. [U. Nebraska]; Autumn Smart, PhD. [U. Nebraska]; Renata Borba, PhD. [Alberta, CA Tech Team]; Jodi Lepsch, Chippewa Valley Technical College [beekeeping]; Hollie Wall Dalenberg, [Masters program]; Marla's current students are Katie Klett and Maggie Shanahan [both PhD.'s] and The Bee Informed Partnership personnel: Phoebe Koenig, Garrett Slater, Nelson Williams, and Ben Sallmann.

Below, excerpts from our interview:

JM: Lots of people are interested in improved [bee] genetics. I understand you are making another push for an improved line of bees. Can you share some insights?

MS: I am selecting for colonies that survive with no treatments, and then investigating the behaviors and genetics of the parent colonies of the survivors to understand the genetic and behavioral mechanisms and reasons for their survival. The work is at the UMN Ag Experiment station property, near Rosemount, MN.

JM: Who was the person most influential in your decision to work with bees?

MS: I think Martha Gilliam and Steve Taber III really encouraged me to pursue bee research, rather than just beekeeping.

JM: When did you know you'd become Marla Spivak, PhD.?

MS: The day I presented my thesis defense, in May, 1989 -- and actually passed -- was the day I finally believed I would actually get a PhD. I began grad school in 1981; I was married at the time had a baby in July the next year. My point is, it took me a little longer than usual to complete a PhD, as I became a single parent in 1984, then moved to Costa Rica for two years to complete my PhD research on Africanized honey bees [ecology and identification]. My PhD journey was a long one, and I wasn't sure I would finally be a PhD until the committee said I passed. [My son came to my thesis defense and held up a sign from the back of the room that said, 'I'm bored'. Sigh…]

MS: The biggest challenge in beekeeping since 1980 are *Varroa destructor* mites and viruses, for sure. It's hard to keep colonies alive now.

JM: What is the most important un-answered question in beekeeping?

MS: How can we wean the bees off of so many mite treatments and still have them thrive?

JM: Industry icon Liz Venoski was fond of placing one of Marla's quotes on her mementos: "Bees teach us how tso be better stewards of the earth."

MS: Yes

JM: Seems to me we don't very often learn from bees; imposing our ignorance of bees on bees.

MS: I agree.

JM: What three things must we learn in the next five years to stay in business?

MS: I think commercial beekeepers may need to learn to diversify their income sources in case a catastrophe happens in the almond orchards (e.g., lack of water, almond disease). And commercial beekeepers may need to dedicate someone on their crew to taking mite samples regularly so they can keep on top of the mites. Finally, hobby beekeepers (who don't keep bees as a business), may need to think hard about the reasons they are keeping bees and make sure their bees are not contributing to the transmission of bee diseases and viruses.

JM: Your front yard on Otis Street is legendary. Can you describe the seed mix?

MS: About six years ago, I burned off the front lawn, and planted it to prairie. The first seeding came from a company called Prairie Restoration. It was a mixture of native perennial flowers and grasses. After that, I added in plugs from native plant nurseries.

JM: Care to elaborate on how your neighbors received and later embraced Marla?

MS: At first I received citations from the city of St. Paul to mow it down. Then I put up a sign that says: "Pollinator Habitat" to make sure people understood it is a project, not a neglected weed patch. Now people stop and smile…

JM: Did you get the Covid shots? Will you get the booster?

MS: Yes, got the Covid shots and if approved, I will get the booster, but I also really want vaccines sent all over the world.

JM: What is the Marla legacy you hope endures?

MS: One of my former students, Joel Gardner, named a sweat bee after me: *Lasioglossum spivakae.* I hope that bee lives forever. BC

An Interview with Hector Alvarez

California Beekeeper From Mexico

Ettamarie **Peterson**

I first met Hector Alvarez at the Sonoma County Beekeepers' Club (now an association) meetings twenty-eight years ago. I was a brand-new beekeeper and he was already a seasoned beekeeper in spite of his young age. He was only twenty-four years old at the time. We became good friends through the years. He has always impressed me as an extremely hard worker and excellent beekeeper. When I have a problem with my bees, I can ask him for help and know I will get sound advice based on his years of working with his bees and expanding his own knowledge.

Hector came to California from Mexico at the age of sixteen in 1984 with the original goal of being able to make enough money to go back to Mexico. He wanted to be a beekeeper with his father's beekeeping operation in Mexico. His father had worked in Northern California off and on many years. He had been able to build some beehives that he left behind when he returned to the family in Mexico. These hives were made from plywood in the way they kept bees there. The typical Mexican hives were built deeper than the Langstroth boxes. Hector's brother was already in Sonoma County and was able to show him where the father's hives were. There were three and they had survived on there own since his father had left a few years before. This was before mites had become a problem. Those colonies were the start of what Hector has now built into his successful business he calls, "Hector's Honey".

One of Hector's first jobs in Sonoma County was helping a business that built houses. His responsibility was to clear away a lot of lumber. He got the idea to glean the lumber to build his own bee boxes instead of just dumping it in the dumpster. He filled his first homemade boxes with his father's bees. Then Hector built more boxes and filled them with swarms A few years later he had twelve to fifteen hives. While working for another company that was a nursery, he was helping at their booth at the Sonoma County Fair. Nearby the nursery's booth he spotted the Sonoma County Beekeepers' Club's booth. On his break, he went over to talk to the volunteer beekeepers. He made friends with them. Soon one talked Hector into taking his bees to pollinate the almonds, offering to help get the bees over to the Central Valley and back. This was in 1988. At first, because he was living in an apartment and had no space of his own, the owner of the Urban Tree Farm let him use a work area and tools. Later Hector was able to buy his own truck and had increased his number of hives to take to the almonds. Years later he had expanded from a truck and flatbed trailer to a huge truck with a boom. He bought it from an Idaho migratory beekeeper. It is amazing how by his hard work he has built up his business to be the best known and have the highest respected bee keeping business in Sonoma County.

Hector Alvarez with just some of his many bee boxes. Photo by Ettamarie Peterson

Last year he took his best 512 colonies to the almonds. Over the years he has met various almond growers. For many years he maintained contracts with the same ranches. He has contracted with growers up and down California's Central Valley. Now he works with a broker. Hector prides himself on taking only good strong colonies. He over winters all of them in various apiaries around Sonoma County. He does not have to feed his bees because he always leaves enough honey on each colony to be sure they are ready to go to the almonds around the first week of February.

In 1990 he married Sandra. She is also a very hard worker, helping Hector with a multitude of tasks in the honey business. One of her most import jobs is selling honey at various farmers markets and at the Apple Fair Booth. She does many other behind-the-scenes jobs such as cleaning pollen and helps with making candles. They have two lovely daughters who have also grown up helping in the family honey business.

The oldest daughter is now married and has three wonderful children. The younger daughter has studied making herbal medicines and uses Hector's propolis in a tincture. She is now studying nutrition at University of California at Davis. Both girls proudly tell everyone how many generations of beekeepers are in the Alvarez family and are extremely well versed on the benefits of honey, pollen and propolis.

At first Hector sold his honey in the Sonoma County Beekeepers' Club's booths at the fairs. Then he found some health food stores that would sell his honey. After that he discovered a farmers' market and asked if he could sell his honey, pollen and candles. At one point, I remember, he told me he was selling at eleven different farmers' markets, but he has cut back on that number now. At this time, he and Sandra sell at eight different farmers' markets. They sell their refrigerated pollen in a few health food stores.

Slow Food USA, according to their website, "reconnects Americans with the people, traditions, plants, animals, fertile soils and waters that produce our food. They inspire individuals and communities to change the world through food that is good, clean and fair for all." This organization invited Hector and his family to go to their five-day international convention in Italy one year as their guests. Hector was honored to be chosen to carry the United States flag in the opening ceremony along with people from all over the world. He will never forget how proud he was to do this. They told him he was chosen for his hard work and building his business up all on his own. This was truly a great time for Hector and his family. It was a very well-deserved honor.

Speaking of honors, Hector has won numerous prizes for his honey, wax displays, pollen and honey comb. He has so many trophies from the fairs he has lost count. He always puts aside the best honey, pollen, wax and frame of capped honey for the competitions. I remember one time when the Sonoma County Beekeepers' Association was ordering the Sonoma County Harvest Fair trophy someone on the committee said, "You might as well put Hector's name on it because he will win it again!" He had a good laugh when I told him that! He always brings some of his awards to show his Farmers' Market customers. It is a great marketing help. People love to go home with a product from Hector's award-winning business.

Hector Alvarez in screened tent at Gravenstein Apple Fair. Photo by Ettamarie Peterson

Hector is a wonderful teacher. One time I had a problem with a very defensive colony. I called him up to ask him if he would come over to help me with it. I thought maybe I might have to requeen it or something and needed expert advice. Well, Hector opened that hive and immediately saw what the problem had been. He explained the colony had been too crowded and just swarmed. He pointed out the new queen. When I asked him how he knew it was a new queen, he nicely explained that she was running around. He told me virgin queens do that until they are mated. Once they are mated, they settle down and walk much more slowly. He also showed me the hatched queen cells and the torn down swarm cells. He read the frames like a person reads a book, showing me all the signs of a recently swarmed colony. By this time the colony was no longer defensive, by the way.

Every August there is a wonderful small fair put on by Sonoma County Farm Trails, a marketing organization made up of Sonoma County farmers and agricultural related businesses. This is the Gravenstein Apple Fair. The Sonoma County Beekeepers' Association has an educational booth for this three-day fair and members can also sell honey there. Visitors love their booth and especially enjoy tasting the many varieties of honey Hector brings. His wife, daughters and Hector are always there introducing people to the many tastes of local honey. Hector also takes a turn going into their screened tent to demonstrate how to open a beehive. The public is fascinated by his explanations of what is in a typical beehive. He walks around, holding a frame of bees, pointing out various things such as the queen, brood, pollen and honey.

Hector's year is extremely full. Getting hives ready to take to the almonds is not just loading a bunch of bee hives on pallets and putting them on a truck. The colonies are constantly evaluated. Decisions have to be made as to what hives should be combined, left behind or taken as is. In January he goes to his various out apiaries to check the strength of each hive. He decides what needs to be done to make sure he has only colonies that will be accepted as eight strong frames or better. This may mean he has to move frames from one colony to another. Sometimes he will combine two small colonies together to make one strong one. Sometimes he needs just to add a frame or two to a colony.

In February, he has to be heading for the almonds around the 8th of the month. This means a lot of loading up and hopefully in good weather! The almonds usually start blooming in mid-February. Hector does have an advantage of being a California beekeeper year-around and not having to haul the hives thousands of miles. Going to the Northern almonds can be about three hours or more from his

Hector's wife Sandra Alvarez selling candles, pollen and honey at the Gravenstein Apple Fair. Photo by Ettamarie Peterson

base in Fulton. Going to the Southern almonds can be four hours or more.

In March in the middle of the month to about the first of April, depending on the orchard manager's wishes, Hector pulls the colonies from the almond orchards. He brings them back to Sonoma County. He has decided months before which colonies he can make new queens from and which ones he wants to make splits from. Those colonies are marked so then he can make the splits with those good queens. Besides doing his bee work, this is the month he plows and plants his crops on his two-acre home farm and the fourteen-acre farm he bought nearby. This produce is also sold at his farmers' market booths.

In April, he returns colonies to the various apiaries depending on how dry they are. If the areas are too wet, he has to consider where to locate the colonies until they dry out. Swarming season is happening at this time, so he has to be on top of everything making divides and new queens. He wants to do this as early as possible to have good strong colonies for the next winter.

May is the major nectar flow in Sonoma County so this means he is busy adding supers. Going from apiary to apiary doing this and selling his products at the farmers' markets, keeps him moving constantly.

In June and July Hector is pulling supers out and extracting the honey. He has hives in various locations with different floral sources. Some of his honey is lavender, some blackberries, some yellow star thistle and other varieties including mixed floral. People love to taste all of the different varieties when they go to the Hector Honey booths at the farmers' markets and the Apple Fair.

In August and September, he is harvesting the last honey and getting the hives ready for winter. He will combine the weakest ones. He is careful to always leave enough honey for each colony to make it through the winter. The wet frames are over wintered in his huge workshop and not returned to the colonies. He feels that would cause robbing. The wet frames are given back in the spring.

In October he moves bees to winter locations before the rains come. Of course, then he has the huge tasks of cleaning up bee equipment! Besides the bee work, he has his two farms to ready for winter crops.

In November and December, Hector is kept busy checking the hives for adequate food and the never-ending tasks of cleaning equipment.

Hector Alvarez, as you can see, is one of the most industrious beekeepers in the business. I am proud to call him my friend and mentor. BC

Hector's daughter Cynthia Alvarez helping Hector at the Gravenstein Apple Fair. Photo by Ettamarie Peterson

From Kim Flottum –

Kathy Summers started life in a small town on the Texas panhandle. When she was in junior high school she moved with her family to California because her father got a good job in 1966, and she graduated from Mt. Diablo High School in 1972. After graduation she worked for a bit for the city while still living at home.

After a couple of years she married, moved to Medina, her husband's home town and she worked for the phone company for a bit then a short stay in Houston, Texas, then moved back to Medina, Ohio for a job he had taken. She did a stint at the A.I. Root Company in Medina, working with their Church Sales unit and also worked in a bakery for a while, but children made her pause in the work-a-day world to be a mom. She stayed that way with her two sons for a couple of years.

In 1988, a friend who was working in the Root Company's main office, and whose son Kathy was babysitting during the day, told her of a job opportunity in the Root Company's Publications office. Typing. Typing book copy.

It seemed the Editor was interested in pulling together a series of articles that Richard Taylor had published in their magazine over the years and gather them together into a collection to be called *The Best Of Bee Talk*, Richard's monthly column in their magazine *Gleanings In Bee Culture*.

The hours were good for both family and work, and the work was pretty straight forward, and, being an excellent typist she signed on. She shared an office with the lady who was doing layout and design for the magazine at the time so Kathy quickly became acquainted with both her and the Editor of the magazine – that would be me.

After a bit she began to pick up some of the tricks of layout and design by both watching and listening, but didn't actually do much in that line. Then, her office mate took what was to be a short leave to start her own family, and because Kathy at least knew how to turn the computer on she got a raise, changed chairs and began a career.

She was supposed to return to typing books, but the lady she replaced decided that returning to work wasn't in the cards, so a temporary position became permanent. At least until the end of December this year, when she will retire.

Her early years as designer were a bit hectic because it was strictly on the job training, and there was always, always that deadline. But she squeezed in a few classes on this or that on occasion, and because she enjoyed the challenge and had to do it every day, she became quite skilled at this new life task.

One of the other tasks she came to really enjoy was helping at the vendor booth when *Gleanings In Bee Culture* went to beekeeper's meetings. And *Gleanings In Bee Culture* went to a lot of meetings. Meeting new beekeepers and chatting with those she met last year, or 10 or 25 years ago is still the best part of her job she will tell you.

I had been on the EAS Board Of Directors for Connecticut for a couple of years when I moved to Ohio, but then Chairman Dewey Caron kept me on as an appointed director in charge of membership. So EAS quickly became a regular tour for the magazine people. Summer conferences lasted nearly a week, what with before and after meetings, and Director's meetings were always a weekend. In 1995, Jim Tew, the Ohio State Extension Specialist and regular contributing author, and *Bee Culture* put together an EAS Conference in Wooster, and Kathy played a huge role in planning for that meeting.

And in 1994, because of her continued involvement with the EAS Board and her role with The Ohio State Beekeepers, she was elected President of EAS by the Board of Directors of The Ohio State Beekeepers, which meant she was in charge of next year's EAS Conference, which, coincidently, was the 50th Anniversary of the EAS organization. So, it had to be special.

About 1998, the EAS Newsletter Editor left the position, and Kathy took on that role which she kept for about 15 years. She also was Editor of the Ohio State Beekeepers Association newsletter for several years during this time.

I had become Chairman of the Board for EAS by then, a role first held by John Root quite a few years before this, so we were able to invite all of the Chairmen over the years, and many of the Presidents, for a gathering like no other for the group. The Conference was held at Kent State University, about a half hour's drive from our office, and we got to know the route pretty well during that year. Kathy was still Editor, so she and I put together the history of the group from the first thought of forming a group like this, including the first actual Conference and every one since, right up to the anniversary Conference. She got Keith Delaplane to begin the meeting walking up to the stage playing his bagpipes!

Over the years we were able to attend an Apimondia meeting in Canada, followed by another in Ireland, and the last one we went to was in Canada again, all having a huge vendor area that we were a part of. Then we were invited to our first National Honey Show in London, followed by several more over the years, each in a different location in the UK. We've

made long and lasting friends on those visits, mostly, I'm pretty sure, because of Kathy.

But always there were deadlines. When we first began the magazine usually had only 56 pages, then for a time it moved up to 64 and now it is routinely 100 pages a month. Much of this because of the increase in advertising, driven by the increase in circulation. But we didn't think she had enough to do, so a few years back we started another magazine, a quarterly called *BEEKEEPING: Your First Three Years,* aimed exclusively at those folks just starting out. That ran for several years until a distribution issue came up and it was decided to merge that content into what is now just *Bee Culture*. The *Gleanings in* was discontinued about 30 years ago.

One task that never went away was dealing with the authors. As we expanded, so did the number of people involved in getting information to us to publish. We love our regular authors, actually we love all of them, but unfortunately they have lives too, and sometimes our deadlines and their events didn't mesh as well as we would have liked, and the deadline wasn't about to change. So, some months, right at the very end of time, it was hurry up and go, go, go. Of course, there are those special few who are always early, by a week or two and sometimes a whole month early. They are really easy to like. Nevertheless, either way some of these regular contributors have become very close friends over the years.

For several years we were involved in the Mother Earth News Shows, which took us to some familiar, and some not familiar places over the years. Besides learning more about chickens, Kathy managed to sell books and give away magazines to the hundreds of attendees at these and all of the meetings we went to. She did the work, while I was off trying to be important for somebody.

During the Obama Administration, when there was a bee hive at the White House for the organic garden that had been planted, we visited with the White House beekeeper, Charlie Brandts several times. And wouldn't you know, Kathy got to work at the table sponsored by the local beekeeper's club during one of the events out on the lawn. But we got to meet many of the staff (the pastry chef was from Ohio which made interesting conversations), and had special tours of the grounds.

The past couple of years have ended traveling however, and attending meetings pretty much came to a halt. However, when things open up again, Kathy won't be selling books or giving away magazines any more. Nope, she will be sitting in the audience, listening to whoever is speaking for a change. That will be different.

I have to say, over all these years, Kathy has become a very good beekeeper. I'd like to think it was her teacher, but she is much better than I am. She has a very gentle touch when working a hive, slow, soft and easy. I tend not to be that way because I'm always in a hurry. Not Kathy. And she knows her bee stuff very well, always ready to answer a beekeeper's question about who, what, how, when, why or why not and what tool to use, problem to look for or piece of equipment to fix. She definitely became an asset for all of the folks in the Publications Department.

We've worked together now for 33 years, and, I'd like to think, have pretty much enjoyed every one of them. Her two sons are now grown, both living in Medina again, so that part of her life is settling in just as she hoped it would all those years ago when all she did was type.

It's been quite a story so far Kath (my shortened name for her), so get ready for your second chapter. I know you can handle anything that comes along. And, by the way, thanks for being you. BC

American Foulbrood

A Hobbyist's Experience

Charlotte **Hubbard** & Robert **Candido**

Opening a hive and deeply breathing in the scent, seeing those shiny, curious faces staring back, and (most of the time) watching bees do their thing without too much concern about the beekeeper; don't we all love the simple joys of beekeeping? That magic of communing with another species will often push aside troubles and bring about a special sort of meditation.

Of course, not every visit is all sunshine and plump pearly larvae. Sometimes there are small hive beetles (satisfyingly squishable) and queen issues (solvable over time). Sparingly, across the season, chalkbrood or European Foulbrood (sigh) may appear. Never American Foulbrood (AFB) though. That's something that only happens to others far away, right?

Wrong. Oh, the endless learning curve of beekeeping. While routinely checking hives in July, my buddy Robert found what sounded possibly like AFB, presenting as spotty, discolored brood and disconcerted bees—but no detectable off-putting or remarkable odor. Knowing something was amiss, Robert field-tested for AFB (piercing a capped pupa with a small stick to see if it pulled out ropy and long). It did not. He texted me brood photos, seeking insight.

The photos definitely depicted an ugly brood situation. I was out of town and referred Robert to another local beekeeper, Todd Smith, who hopped in his big white truck (not a white horse, but similar). Todd helped Robert accurately test for AFB. Robert had been piercing healthy capped brood, not those that were sunken, so he had not seen the telltale ropiness. Todd made sure to pierce and test sunken, diseased looking cappings, which revealed AFB's characteristic ropiness.

Figure 1: AFB brood frame
Photo by Robert Candido.

I can't say I was sorry to be out of town. My AFB experience thankfully has been limited to reading and lectures, but I've heard the horror stories of beekeepers burning entire apiaries. Robert's tribulations made me immediately fearful. Learning that conscientious beekeeper Robert--who has always focused on disease prevention and safety--had found AFB in his operations, well, it steals some of my beekeeping joy. The one degree of separation of Robert's experience now gives me pause every time I crack open a hive. There is the possibility that I'll be in similar beekeeping boots someday, or someone else I know will.

But as I learned through Robert's situation, AFB is manageable with quick and extensive action. He and I teamed up to further share this experience, in hopes that it will help others.

Addressing AFB

In Robert's apiary, the infected pupae roped out more than 2 cm, and AFB was confirmed by Todd with the Holst Milk Test. After discussions of possible remediations, they elected to apply the shook swarm method[1] – involving lots of work and new equipment. This effort was combined with antibiotics, requiring a Veterinary Feed Directive (Robert worked with a local veterinarian introduced to him by Todd), and lots of ongoing aftercare, including:

- Implementing strict bio-security protocols in the effected apiary. No equipment from the apiary has been transferred elsewhere. The effected frames, hive bodies, bottom and top boards were all burned and buried.
- Robert also follows extensive sanitary procedures throughout his operations, (as should we all). As examples: All hive tools are scrubbed with Bar Keepers Friend to remove all remnants of propolis and then fully heated with a propane torch. Robert wears nitrile gloves, changed between each hive in the apiary. High touchpoints on toolboxes and smokers have been covered with duct tape so he can use isopropyl alcohol to remove residues from his equipment. After each use, tools go into a bucket to be cleaned and sanitized. Only clean tools and equipment are carried in his beekeeping toolbox. No honey was collected from this apiary this year; it's unsafe for humans because of the antibiotic use and unsafe to be fed to other bees because it may contain AFB spores. Jackets and veils are now regularly laundered with chlorine bleach.

Days after discovering the first AFB incidence, Robert visited his second apiary. Immediately upon opening a hive, he smelled AFB, noting, "I can identify foulbrood without difficulty now. I found suspect brood and checked them with a stick; they strung out. I confirmed with a commercially available AFB test kit. It returned positive, almost immediately."

Robert didn't have the time or equipment for another shake remediation. He dug a large pit, asked his wife on an unusual date, grabbed some lawn chairs, and later that evening, began burning. A documentary from New Zealand[2] recommended euthanizing using gasoline, which Robert felt was very effective and minimized suffering, noting "about a pint of gasoline took down a 3-deep hive with a super in an instant." The burn took about four hours.

This approach was also a lot of work, but Robert felt it to be less stressful than the shake method and all the aftercare it requires. "I wanted to save the bees given all the resources one needs," he continued. "but I didn't have those this second time, and honestly…burning the hive

[1] https://static1.squarespace.com/static/56818659c21b86470317d96e/t/5ad797d9aa4a996c2d3fe5da/1524078557790/American-Foulbrood_Milbrath_2018.pdf

[2] https://www.youtube.com/watch?v=yeQRUfV3XSA

is the best way. Handling AFB in that yard is now done [it was an apiary of just one hive] and I can now give full attention to my other hives."

The aftercare of the shook swarm method, Robert reports, is very involved. Installed on all-new equipment, the colony was fed constantly to help them draw comb and dosed with the prescribed medication. To spot AFB as early as possible, he has been making weekly full inspections looking for suspect larvae not just in that colony, but in all colonies. He installed robbing screens to prevent robbing by nearby hives. He requeened from a Varroa Sensitive Hygiene (VSH) supplier to mitigate the risk of unhygienic behavior. Finally, he has been acquiring, assembling, and painting new equipment to replace all that he burned, an expensive and laborious exercise.

Happily, Robert's third bee yard shows no signs of AFB, and months later, the colonies in the first effected apiary look healthy. Fingers crossed (and monitoring continues), Robert sees no more signs of AFB. He is unsure of the AFB source and probably never will be.

Upon reflection

Robert infers that there was a lot of value in the skills acquired to nurse an AFB hive through the shook swarm method, but the time required to be as diligent as necessary about the process was demanding. He shared, "The expense of rebuilding is the same really no matter what path you choose. Disposing of the effected equipment must be done. It's really an expense of time. If you only have one or two hives and you can carefully and regularly inspect them in order to catch active infections as soon as symptoms appear--it may be worth trying the shook swarm method. Though, it must be early enough in the season for the bees to draw out a full hive. Otherwise, you may consider the burn method to be more practical, as I concluded the second time."

The work, the stress, the sadness of having to kill a colony -- Robert confesses to several moments when he was ready to give up beekeeping. "But, I focused on the next step and did that, and have decided to move forward." (I was very relieved to learn about that decision. Robert has now paid a steep price for education. Bees will be even better served with his increased knowledge.)

Always striving to do better (and, like most beekeepers, passionate about beekeeping), Robert has reflected extensively on the experience. He shares two lists hoping the lessons from his horrifying discovery will help others.

<u>What was done right</u>

- Studied enough to be able to recognize a serious issue.
- Got help from more experienced beekeepers (Thanks, Kalamazoo Bee Club!).
- Dealt with it (Note: special salute Robert! Ignoring the problem spreads it).
- Affirmed that AFB happens; what matters is taking appropriate action to contain the disease.
- Rigorously followed good sanitation practices.
- Tracked each hive's history to trace disease. "I also track resource movement," he shared. "For example—recording the parent hive and location of each split. Coincidentally, the first colony I found with AFB had been split (because they were doing so well), and the split was the second and only other colony with AFB."
- Physically distanced hives in the same apiary as much as possible.

<u>Areas for improvement</u>

- Wearing nitrile and not leather gloves (possible transfer of diseases). Robert quickly made that change and has become accustomed to nitrile gloves, noting, "Bees seem to bounce right off the gloves when they get feisty. Nitrile gloves also remind you to move slowly and be gentle because they can still sting through the gloves."
- Better vet the bee source. Robert strives for a self-sustaining apiary, but if he decides to expand beyond that, he will attempt to buy local, from beekeepers equally vested in the health of honey bees in his area and isolate them until they prove healthy.
- Equipment disposal: Robert started marking the year of each frame's entry into a hive about three years ago to ensure aging equipment does not build up to lethal concentrations of chemicals and latent diseases. Aging frames can be removed now when they are deemed expired after a few years.
- Design a one-way flow: Robert has three apiaries. Self-contained, closed apiaries would be ideal, but at his hobbyist level, he's decided on an apex of disbursement of nucs and resources. The main apiary is the resource for the others, with everything flowing outward—new bees or old equipment is never moved into the main, priority apiary.

In summary

AFB happens … in sloppy beekeeping operations and in the best of them. It is, unfortunately, a part of beekeeping. Although unlikely for most beekeepers--it does us no good to rationalize that it will never happen to us. Robert's experience shows that even AFB can be managed. For the sake of the insect we all cherish and the joy we receive from caring for them, we need to continue our perpetual education and vigilant hive inspections to keep our colonies healthy. Lastly, when issues arise, we must appropriately and promptly deal with them.

A great educational resource for AFB, which includes links to other excellent resources, is **https://pollinators.msu.edu/resources/beekeepers/diagnosing-and-treating-american-foulbrood-in-honey-bee-colonies/**. BC

Special thanks to Meghan Milbrath, PhD and Ana Heck, MSU Extension for their advice and insights.

Figure 2: Burning the second hive with AFB was the right decision for Robert's situation. Photo courtesy of Robert Candido.

A LEGAL REMEDY FOR MISBRANDED AND ADULTERATED HONEY

John A **Fraser III**[1]

The June 2021 *Bee Culture* included an article by Pamela Parker quoting a number of beekeepers and honey producers and sellers. Uniformly, they cried out for a legal remedy for products offered to consumers as "honey" that are in fact concoctions of some honey and other products. In the law, this is called "misbranding" and "adulteration." There is a legal remedy.

As *Bee Culture* readers will know, honey is a "thick, sweet, syrupy substance that bees make as food from the nectar of flowers and store in honey combs." To simplify, "misbranding" occurs when a food package is labeled as honey and yet it contains other substances.[i] "Adulteration" occurs when a packer of honey includes substances other than honey and yet attaches a label claiming that the product is honey.[ii]

The U.S. Food and Drug Administration (FDA) is charged with enforcing the Food, Drug & Cosmetic Act (FD&C Act),[iii] which has been on the books for over 100 years. The FDA has the power to adopt definitions and other regulations that define what is permissible under U.S. law in regard to the marketing of honey as a food. The FDA also has the power to bring enforcement actions against violators in the federal courts.

However, the FDA is not the only source of enforcement of the FD&C Act. A competitor who is harmed by misbranding or adulteration of honey can also sue to enforce the FD&C Act by invoking the enforcement powers of the Lanham Act.[iv] *See* POM Wonderful LLC vs. Coca Cola Co., a 2014 U.S. Supreme Court decision.[v] Under the Lanham Act, honey producers (for example) who can prove certain facts can sue competitors to stop misbranding and adulteration and to recover damages. [Consumers – people who buy honey for personal consumption – can also sue under a variety of state laws that are not covered in this article.]

WHO IS A COMPETITOR?

A competitor is a business that offers the same (or a a very similar) product for sale in the U.S. market (often defined by wholesale or retail segment) and that is affected by the unlawful practices of another business. If you sell honey, a seller of honey products whose unlawful practices undercut your honey price is a competitor. A seller of honey who makes a greater profit by misbranding or adulteration of honey in your market is also a competitor.

WHAT DOES A HONEY PRODUCER HAVE TO PROVE TO WIN?

As the core of a Lanham Act case for misbranding or adulteration, you have to prove that the competitor has offered "honey" for sale in commercial quantities, that the product has been misbranded and/or adulterated, that the competitor was able to undercut competition and/or achieve greater profit margins by this conduct, that the competitor was given 60 days' written notice to cease and desist, and that the competitor continued the misconduct. You also have to show how this damaged your business.

You should also expect to prove that your honey business offered a properly-labeled and packaged product, and that you gave the written notice to the competitor to cease and desist, and that your business was damaged by reduced sales – or that the competitor achieved greater profits at lower cost by cheating. In particular lawsuits, your honey business will have to provide proof to satisfy other evidentiary requirements that are determined by the facts of each case.

IS EXPERT TESTIMONY NEEDED?

You need to be prepared to have a knowledgeable expert(s) testify about how the practices of the competitor cause harm, how wholesale buyers or consumers were misled, and what profits were achieved by the shabby practices that your suit challenges. The profits achieved by cheating are just one measure of damages. Other issues may come up that require expert testimony from beekeepers, chemists, accountants, competitors, and consumer survey experts.

HOW MUCH DOES IT COST TO PROSECUTE A SUIT?

Federal lawsuits against competing businesses will cost thousands of dollars to initiate and tens of thousands of dollars to pursue. But, when a lawsuit is successfully resolved, the other side should be required to pay for the privilege of having its business practices corrected.

WHAT IF A HONEY PRODUCER'S LABELING/PACKAGING IS NOT PERFECT?

Before casting stones at someone who packages, labels and sells honey, make sure that your own packaging and labeling is correct. It is hard to convince a judge to grant relief to someone who engages in similar bad practices. As a competitor, your

[1]B.A., J.D., LL.M. The author is a U.S. Administrative Law Judge and beekeeper in Western Pennsylvania. The views expressed herein are entirely those of the author.

[i]Food Drug & Cosmetic Act, 21 U.S.C. Section 343(i); 21 CFR 102.5(a)

[ii]Food Drug & Cosmetic Act, 21 U.S.C. Section 342

[iii]21 U.S.C. Section 301 et seq.

[iv]15 U.S.C. Section 1051 et seq.

[v]POM Wonderful LLC v. Coca-Cola Co., 573 U.S. 102 (2014)(a statutory private right of action under the Lanham Act is available to a competitor to enforce regulatory provisions of the Food, Drug, and Cosmetic Act.)

business can receive a Lanham Act suit as well.

CAN COMPETITORS BAND TOGETHER TO OBTAIN RELIEF?

The Lanham Act provides a class action remedy where a group of honey producers (for example) can file a suit to seek damages and other relief against a single defendant or a group of defendants who have engaged in similar misconduct. Please note that federal class action relief is much sought-after and only sometimes achieved. Instead of complex class suits, it is sometimes better to file multiple lawsuits in the same court against one defendant and then manage costs and effort through one managing counsel. The managing counsel coordinates strategy and timing, as well as aiming for cost control.

HAS THIS BEEN DONE BEFORE FOR HONEY?

Yes. The footnote contains citations to legal reports available online of honey misbranding and adulteration cases under the FD&C Act and the Lanham Act.[vi]

CAN THIS BE DONE WITHOUT A LAWYER?

The short answer is "no." If your business is going to sue another business under federal law, 99.99% of the time, you will be in federal court with an experienced litigator. If you can master the fraud pleading and proof requirements of Federal Rule of Civil Procedure 9 under the Lanham Act, without a lawyer, then you may be able to do without an attorney. Because this is a difficult task for an accomplished litigation attorney, few business owners will attempt Lanham Act litigation without an attorney.

WHAT DO YOU GET IF YOU WIN?

Injunctive relief (an enforceable court order stopping the misbranding or adulteration), money damages, and costs of suit. The Lanham Act doesn't give much guidance on when attorneys' fees may also be awarded: "The court in exceptional cases may award reasonable attorney fees to the prevailing party."[vii] Therefore, experienced attorneys will include additional causes of action in the complaint to support an award of attorneys' fees to the prevailing party.

WHAT PERCENTAGE OF THESE CASES SETTLE WITHOUT TRIAL?

Very few of these cases go to trial because – once the facts are clear – there is not a great benefit to a trial and trials are costly. Over 95% of these cases settle.

HOW DOES A HONEY PRODUCER FIND AN ATTORNEY COMPETENT TO PROSECUTE A LANHAM ACT SUIT?

Presumably, you have had legal work done for your business by a competent lawyer who has handled business formation and liability issues. Ask her to refer you to a federal litigator who is competent in this field. If not, then ask your local or county Bar Association to give you a referral to an attorney who conducts federal civil litigation. Do not pay a penny for the referral or for the initial consultation with counsel. If an attorney will not meet with you for an initial evaluation without payment, then you have found the wrong attorney.

IS THIS LEGAL ADVICE ?

No. This is very generalized legal information. To determine if it applies to your business, or if it is remotely useful, you need to give this article to a competent federal litigator and provide factual information about your business and how it is being harmed by competitors. That can lead to legal advice.

THERE IS A REMEDY

At the start of the article, the June 2021 *Bee Culture* article by Pamela Parker was referenced. The honey producers in that article provided examples of harm caused by a variety of shabby honey marketing practices that harm honest businesses and generate profits for their competitors. This article points the way to a remedy for those wrongs. BC

[vi] *See*, e.g., Brod v. Sioux Honey Ass'n., 2015 WL 394282)(9th Cir. 2015); Pierce et al. vs. North Dallas Honey Co., No. 3: 19-CV-00410-X (N.D. Texas 2020); Pope vs. Kroger Co., 2020 WL 3402223 (S.D. Ohio); Romero v. Flowers Bakeries, LLC, 2015 WL 2125004 (N.D. Cal. 2015); In re Honey Transhipping Litigation, 87 F.Supp. 3d 855 (N.D. Ill. 2015).

[vii] 15 USC § 1117(a)

Bee Culture
The Magazine Of American Beekeeping

Christmas Booklist 2021

FIRST TIME BEEKEEPING

Kim Flottum SKU: X230 **$20.00**

This absolute beginner's guide for first-time beekeepers will teach you how to set up and care for your first colonies, from choosing a location for your new bee colonies through natural bee care and harvesting beehive products.

WORK I KNEW I MUST

Tammy Horn Potter SKU: X228 **$20.00**

Jane Cole's "Reminiscence of Forty-One Years of Factory Life" and selections from A.I. Root's "An Eyewitness Account of Early American Beekeeping."

QUEENSPOTTING

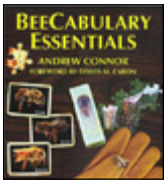
Hilary Kearney SKU: X226 **$21.95**

At the heart of every bee hive is a queen bee. In *QueenSpotting*, experienced beekeeper and professional "swarm catcher" Hilary Kearney challenges readers to "spot the queen" with 48 fold-out visual puzzles — vivid up-close photos of the queen hidden among her many subjects.

NATURAL BEEKEEPING

Ross Conrad SKU: X220 **$35.00**

Whether you are a novice looking to get started with bees, an experienced apiculturist looking for ideas to develop an integrated pest-management approach, or someone who wants to sell honey at a premium price, this is the book you've been waiting for.



BEECABULARY ESSENTIALS

Andrew Connor SKU: X225 **$36.00**

If you are curious or confused about honey bees or starting a bee hive, this book has all the special terminology about bees and beekeeping. Here is the answer to your need for short and concise definitions of the vocabulary of beekeeping.

BEEKEEPER'S LAB

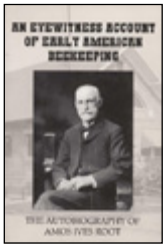
Kim Lehman SKU: X222 **$25.00**

Beekeeping's popularity as a hobby continues to skyrocket. *Beekeeper's Lab* gives you 52 bee-inspired labs to do all year long, and are accessible enough to share with the family.

IN BUSINESS WITH BEES

Kim Flottum SKU: X223 **$26.00**

This book takes serious beekeepers past the beginning stages and learning curves and offers practical, useful advice to move your passion into a part-time or full-time career with measurable results. This **beekeeping business how-to guide** offers all of the in-depth advice you need, in one place.



AN EYEWITNESS ACCOUNT OF EARLY AMERICAN BEEKEEPING: THE AUTOBIOGRAPHY OF A.I. ROOT

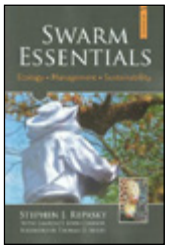
SKU: X1 **$10.00**

Explore the birth of Modern Beekeeping from the perspective of Amos Ives Root. Beekeeping, Beekeepers, and a Profound Religious Conviction are all engaged. The first of many things we still do today!

A CLOSER LOOK - BASIC HONEY BEE BIOLOGY

Clarance H. Collison SKU: X219 **$10.00**

Collison has collected much relevant biology in one place, updating our knowledge of what makes bees so interesting and distinctive organisms. Suitable for master beekeeper programs, college-level courses and general knowledge beekeeping.



SWARM ESSENTIALS

Stephen J. Repasky SKU: X213 **$25.00**

Swarming is perhaps the most powerful instinct beekeepers encounter while working with bees. Swarm Essentials outlines the ramifications of swarming behavior, the benefits of swarming, proven swarm management techniques, and how to recover and even prosper from a swarming event.

BEE-SENTIALS - A FIELD GUIDE

Lawrence John Connor SKU: X210 **$15.00**

A basic beekeeping book you have been looking for with some 'meat on it's bones' for continued study by any beekeeper. This a book focused on compassionate animal husbandry. There is a strong 'natural' focus for beekeepers who want to avoid or minimize pesticides and reduce stress on the bees.

GREAT MASTERS OF BEEKEEPING

Ron Brown SKU: X204 **$36.00**

It'll appeal to beekeeping historians, journalists, biologists and book collectors as well as all beekeepers with an investigative mind who will find many answers to their queries in these pages.

GOOD GARDEN BUGS

Mary M. Gardiner, Ph.D. SKU: X199 **$25.00**

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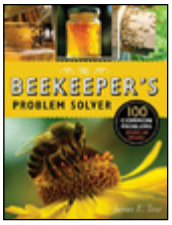
BEESWAX ALCHEMY

Petra Ahnert SKU: X197 **$25.00**

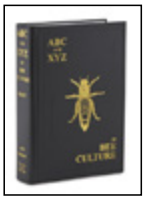
Beeswax Alchemy is your first step towards using excess beeswax to make beautiful, useful gifts for friends, family, and even yourself. It offers a basic introduction to the art of extracting and purifying beeswax, as well as countless ideas for what to make with it.



THE BEEKEEPER'S PROBLEM SOLVER

James E. Tew SKU: X198 **$20.00**

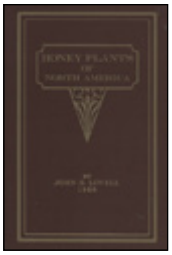
Getting the basics right is essential, and this demands a solid appreciation of important areas such as hive management, breed choice, and health requirements.



ABC AND XYZ OF BEE CULTURE

SKU: X5-42 **$64.95**

42nd Edition of ABC & XYZ of Bee Culture Since 1877 Leading the Way to Successful Beekeeping. Over 800 pages packed with information. Hundreds of color photos and illustrations . A mix of reference, the how and why things are done and a history of how beekeeping got where it is today! A MUST for every beekeeper.



1926 HONEY PLANTS OF NORTH AMERICA

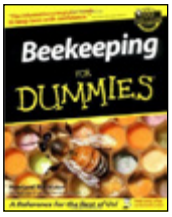
John H. Lovell SKU: X74P **$10.00**

A reprint of the original Honey Plants book, published by A.I. Root. nearly 1,000 plants, 408 pages, paperback. Measure 6" x 9". Black and white.

THE BACKYARD BEEKEEPER

Kim Flottum SKU: X141 **$25.00**

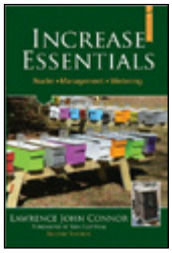
The Backyard Beekeeper, now in its 4th edition, makes the time-honored and complex tradition of beekeeping an enjoyable and accessible backyard pastime that will appeal to urban and rural beekeepers of all skill levels.



BEEKEEPING FOR DUMMIES

Howland Blackiston SKU: X98 **$25.00**

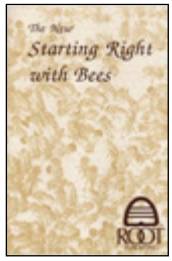
In this easy-to-follow guide, Howland Blackiston, one of the nation's most respected authorities on the subject, takes the mystery (and the sting) out of beekeeping.



INCREASE ESSENTIALS

Lawrence John Connor SKU: X163 **$25.00**

This book explains why and how beekeepers can use increase nuclei to solve problems in the beeyard and use them to winter colonies and provide a reliable source of fresh bees, locally acclimatized queens, replacement hives and colonies for operational growth or sale.



THE NEW STARTING RIGHT WITH BEES

Kim Flottum & Kathy Summers **$9.99**

This book's primary intent is a learning tool for beginning beekeepers, but it is an exceptional source of information for anyone interested in the fascinating world of honey bees. SKU: X219

WHAT DO YOU KNOW?

Clarance H. Collison SKU: X2 **$20.00**

A comprehensive study guide for every beekeeper, at any level. Test yourself to see what you already know, and what you need to know. Everything you've ever wanted to know about Honey Bees, Beekeeping, Beekeepers and the world they inhabit.

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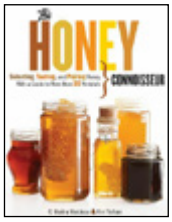
Lawrence John Connor SKU: X165 **$20.00**

This is another book in the Essential Series by Larry Connor regarding the management of honey bee production. It covers drones, queens, the mating process, colony genetics & more.

QUEEN REARING ESSENTIALS

Lawrence John Connor SKU: X177 **$22.00**

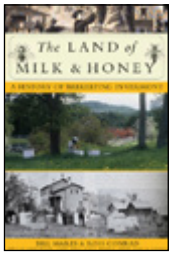
In this post-Varroa, post-Colony Collapse Syndrome era, beekeepers everywhere are developing localized, mite-resistant bee stocks. Key to this is their ability to raise queen cells and queens.



THE HONEY CONNOISSEUR

C. Marina Marchese & Kim Flottum

The Honey Connoisseur teaches consumers everything they need to know about how to taste, select, and use a diverse selection of honeys. The authors introduce the concept of terroir and the notion that soil, weather, and other natural phenomena can affect the taste of honey. **$30.00** SKU: X181



THE LAND OF MILK & HONEY

Bill Mares & Ross Conrad **$30.00**

This book is a must read for anyone interested in how bees and beekeeping got to where they are today in Vermont and the US. The Land of Milk and Honey provides a powerful testament of the state's oversized leadership to protect our nation's pollinators and challenges other states to write their own beekeeping histories. SKU: X229

Multiple Applications of Vaporized Oxalic Acid

for the Control of Varroa destructor in Honey Bee Colonies

Jennifer **Berry**

Oxalic acid has gained popularity in the United States over the years, because it is highly effective at killing *V. destructor* (mites) on contact, and is relatively cheap. The downside to OA, it does not penetrate the wax-capped brood cells where the majority of mites reside. The best time to apply OA and reduce mite populations is when colonies are broodless (without capped brood), thereby, rendering all mites phoretic on the adult bees and vulnerable to OA. At this time, there are three legal methods of applying OA: drip/dribble/trickle, vaporization and spraying. All three methods can be used on existing colonies, packages or swarms.

Out of these three legal methods, we have consistently used OA vaporization as our "go to for mite treatment". For those who are not familiar with this method, let me explain. You start with a vaporizer, which is a metal wand with a plate at one end and a cord on the other which connects to a battery or other energy source.

Vaporizer

One gram of oxalic acid is placed in the metal plate and then slid into the entrance of the colony. Once connected to an energy source, the plate heats up causing the oxalic crystals to melt and turn into a gas (vaporize). The vapor will hopefully permeate the entire colony and kill any mites it encounters. There are many types of vaporizers available, but we have always chosen OxaVap vaporizers since they are built well and last. One word of caution when using a vaporizer, you must wear a respirator for safety and you **Do Not** want to inhale the vapor!

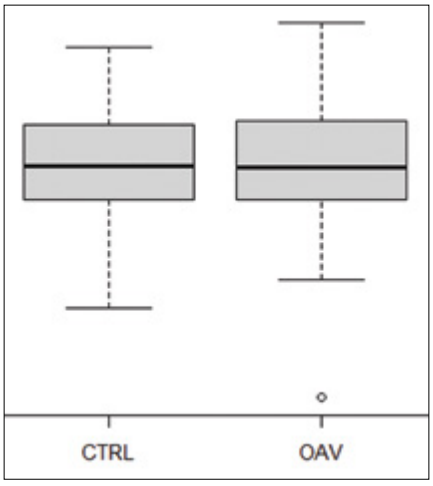
One popular method among beekeepers is to vaporize with OA four times, five days apart while brood is present. The rationale for this 19-day interval being that this schedule exposes all the mites as they emerge alongside their parasitized hosts, however, beekeepers still complain of little to no control after using this method. To date, there has only been anecdotal evidence that this protocol controls mites. Other studies that have examined the effect of repeated applications of the labeled rate of OA, either by liquid trickling or vaporization, have not shown OA to be effective during the brood rearing season (Gregorc et al. 2017, Jack et al. 2020, 2021). We, the UGA Bee Lab and Auburn University Bee Lab, decided to put this multiple application treatment for mites to the test. In 2019 & 2020 we tested the efficacy of repeated OA applications (seven times/five days apart) against mites during periods of brood rearing. Let's start with the design of our study.

Experimental colonies were established and maintained in two deep Langstroth hives at the University of Georgia (UGA) Bee Lab and Auburn University Bee Lab. Prior to the beginning of the experiment, colonies were assessed and only those that were healthy with productive queens were included. Colonies were randomly assigned to one of two treatment groups: (1) vaporized with OA every five days, for seven applications or (2) an untreated control group. The seven application regimen was chosen in order to capture both worker (21 day) and drone (24 day) developmental times.

At the beginning and end of the experiment, mite levels were determined by alcohol washes. For each colony, ~ 300 adult bees were collected from the brood nest and placed into a Varroa EasyCheck device filled with alcohol. This euthanizes adult bees and phoretic mites. The container was sealed and shaken for 60 seconds to dislodge mites from the adult bees. We would count and record the number of mites settling to the bottom of the container after each wash. This process was repeated until no mites were recorded for two consecutive washes. All of the bees were counted by hand, giving an exact number of adult bees. Mites per bee was calculated by dividing the total mite count by the number of adult bees in each sample.

OA was applied to colonies by vaporization according to the label instructions for the OxaVap ProVap 110 Vaporizer. Prior to vaporization, colony entrances were sealed with blue shop towels and screened bottom boards were sealed using corrugated plastic boards. The nozzle of the device was inserted into the entrance where it remained for 30 seconds to ensure that the full dose (1g / super) was vaporized and delivered into the colony. Once completed, the device was removed and shop towels and plastic corrugated boards left in place for an additional 10 minutes per hive. For the safety of all persons applying the OA, full face respirators with OV/P100 cartridges were used and gloves were worn.

Colony strength variables (adult bees, capped brood, and honey) were measured for each colony at the beginning and end of the experiment as well. It is critical that we know the beginning and ending bee, mite and brood populations, in all colonies in order to determine how well the treatment is working and if it is harming bees and brood. After all the data was collected and analyzed, here are the results. But in a nutshell, this method of applying OA multiple times, while brood is present, **did not reduce** mite numbers; at best, it held them static.



Comparing mite numbers in control colonies to those that received 7 OA vaporization treatments. There was no difference between the two treatment groups.

Based on our results, colonies vaporized with OA multiple times did not experience a reduction in mite infestation levels, and so treatment was ineffective. Because of this, we do not recommend employing this method for controlling mites when brood is present, *especially* as a summer or fall treatment option when infestation levels are at or above the treatment threshold.

For a mite treatment to be successful, especially when mite populations have reached or exceeded the economic threshold, they must significantly lower mite numbers and not simply keep them at the same level, which is what our study showed. It is important for beekeepers to adopt reliable and effective treatment programs along with realistic, IPM approaches to sustainably reduce infestation levels of mites. Now, this does raise the question, if colonies are treated with vaporized OA, multiple times, well before mites levels reach the treatment threshold, can suitable mite control be achieved? Not sure, but this could explain anecdotal evidence from beekeepers that multiple applications are working.

Our second objective was to determine if multiple applications of OA in a colony have measurable effects on adult bees, brood, and stored honey amounts. Our results showed no significant differences in changes in adult bees, brood or stored honey when colonies were exposed to OA. This supports previous studies with gaseous OA (Jack 2020, 2021, Al Toufailia et al. 2015). We consider our results here to be among the strongest demonstrations of the relative safety of OA to honey bees since we vaporized seven times. Perhaps future experiments may want to explore the long-term effects and over wintering ability of colonies after being treated with increased levels of oxalic acid?

It was already widely known that the most desirable time to treat with OA is when colonies are broodless. There have been a number of studies over the years that have shown OA works when incorporated with these broodless periods, thereby rendering all mites phoretic on adult bees and vulnerable to OA (Charriere & Imdorf, 2002, Gregorc & Planinc, 2001, Gregorc et al., 2016, Gregorc et al., 2017, Rademacher and Harz, 2006). Broodless periods naturally occur when the queen seasonally stops laying eggs. Many beekeepers (commercial and backyard) take advantage of these natural brood breaks during the winter months and treat with OA to reduce mite populations. Brood-free intervals are brief or absent altogether in some warm latitudes, raising the need

for alternative treatment schedules, therefore, it may be necessary to take advantage of broodless periods as part of a normal management plan, such as when making splits, requeening or forcing a brood break.

It is also a question whether 1g OA/super is an effective dose. Al Toufailia et al. (2015) working in the United Kingdom found that vaporizing with four times the US-label rate of one gram per brood box resulted in a 98.2% reduction in mite levels. Recently, Jack et al. (2021) demonstrated in Florida that colonies vaporized with 4g of OA while brood is present had significantly lower infestation levels of mites than those vaporized with only 1g per brood box. Because of these results and others, we conducted a study this summer in which we investigated vaporizing with increased doses of OA, in conjunction with and without a brood-break. We are wrapping up the analysis now and will be publishing our results soon.

Recently the EPA approved the use of OA while human consumable honey supers are on the hive. This was due in part to research revealing no increase in OA amounts in honey that had been treated with OA. This is good news. The bad news, multiple applications of OA while brood is present does not decrease mite populations, hence, is not an acceptable method for controlling mites in your colonies. Unfortunately, vaporizing with OA does not penetrate the wax capping of the brood cell where mites are reproducing and likely accounts for much of the variance in reported

success with OA. Numerous applications of OA while brood is present is not capturing all the mites since they are constantly moving in and out of cells and not on a 19 or 21 day cycle. However, incorporating an OA application this winter, while colonies have little to no brood, as part of your yearlong mite treatment control program, will decrease mite populations. Please make sure to do it safely! Hope your family, your bees and you have an awesome Christmas and Happy New Year! 2022 is going to be spectacular and hopefully mite free!!! BC

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Beekeeping Youtubers You Might Like

Stephen **Bishop**

It used to be if you wanted to get into hobby beekeeping, first you planted a little garden, then you got chickens, then you started a blog, then you got bees. Tomatoes, chickens, blog, bees – that was the natural progression of the homesteader's journey to beekeeping. But this is 2021, and, let's face it, blogs are dead. I mean, for reasons unbeknownst to me, I still write a weekly blog post, and the last time I checked the statistics, the blog was getting about as much traffic as a dead-end road in the middle of the Sahara.

Today blogs have largely been replaced by other social media platforms, and none is more popular among beekeepers than YouTube, which is not surprising. If we're being honest, most beekeepers are a little bonkers. In fact, the only people I know who wear white jackets and talk to themselves are beekeepers and the certifiably insane. Sometimes while I'm working hives, people will sneak up on me while I'm conversing with myself. It's pretty easy to do because usually I'm in the beekeeping zone, focused on the inner workings of the hives, and thus I lose awareness of things in my immediate vicinity, like the location of my hive tool, the dwindling fire in my smoker, and the neighbor who just snuck up and listened to me mutter to myself for minutes before finally asking if I have any honey for sale. It's a little embarrassing, but I guess it's only fitting–add a few straps here and there and our modern beekeeping garbs would bear a striking resemblance to the early 1900s fashion trends at the looney bin.

Anyway, the point here is that it's not a big leap to go from talking to yourself to talking to a camera. Enter YouTube.

Nearly all the YouTube channels I follow are beekeeping-related. There's a couple of Star Wars channels and sports channels thrown in, but my video history is heavily dominated by people jabbering to their cell phones or GoPros about *Apis mellifera.* So in an effort to share my YouTube addiction with others, here are some of my favorite beekeeping YouTubers:

Ian Steppler (A Canadian Beekeeper's Blog): Ian lives in Canada, but don't hold that against him. His videos provide great insight into the hard work it takes to be a full-time professional beekeeper. He may have an Ezyloader, but commercial beekeeping isn't easy, and his videos prove it.

Kaylee Richardson (The Honeystead): Kaylee is an up-and-coming beekeeper, and bees are a major part of her small-scale homestead operation. If you're wanting to get into homesteading, her videos would be a great place to start.

Bob Binnie (Bob Binnie): Bob is the Mr. Rogers of beekeeping YouTubers – wisdom flows through his calm and soft-spoken voice. Bob is a full-time commercial beekeeper and owner of Blue Ridge Honey Company.

Kamon Reynolds (Tennessee's Bees): Kamon is a commercial beekeeper in Tennessee. His videos are very informative, but I also appreciate the fact he's willing to video himself doing stupid stuff, like standing on an empty bee box atop the roof of his car to catch a swarm in a tree overhead. It makes me feel good knowing I'm not the only who does dumb things.

Richard Noel (Richard Noel): I know nothing about France except that it contains the Eiffel Tower and Richard Noel. Richard is a French beekeeper who is documenting his leap to full-time commercial beekeeping. Thankfully, he speaks English, so I didn't have to subscribe to Rosetta Stone to follow him.

Mr. Ed (Jeff Horchoff Bees): Mr. Ed is the beekeeper for a Benedictine monastery in Louisiana. He is quite possibly the world's most positive and happy person, even when he's extracting mean bees from walls. He is a master of cut-outs and removals.

The Dirt Rooster (628DirtRooster Bees): Another master of the cut-out is the Dirt Rooster. Occasionally, the Dirt Rooster and Mr. Ed will team up for a cut-out and appear in each other's videos, at which point it's like watching a major superhero crossover movie. YouTubers, assemble!

I could go on and on – if someone talks about bees on YouTube, I probably follow them. And I hate to leave anybody out, but, as the humor writer, I have a very limited word count (if I go too long, Jerry's inbox overflows with complaints that *Bee Culture* prints too much fluff).

Thus, I'll end there. But, as an expert YouTube watcher, my advice to anyone who wants to start a beekeeping YouTube channel is pretty simple: just hold the camera still and jabber – you'll have at least one follower. BC

You can see more of Stephen Bishop's work at ***misfitfarmer.com*** *– his blog where he posts his deepest and darkest secrets because no one reads it, not even his wife.*

Delaminating Communities ...Beekeepers Too

John **Phipps**

Ever since reading Robert Putnam's seminal work on American communities, ***Bowling Alone***, I have looked at my tiny neighborhood differently. Meanwhile, the rapid adoption of laminated lumber in the construction industry offers an analogy that may be helpful. By gluing thin layers of wood together, longer, stronger and more stable lumber is displacing sawn boards, especially for long beams and joists.

Like-minded neighbors with similar socioeconomic status form layers that when bonded together with the glue of institutions like church, school, and geography adhered to common values, creating communities stronger than the sum of the layers. Without sound communities, commitment to national values is even less likely.

Depopulation, income divergence, associative mating, alternative online pseudo-communities, and intense partisanship are dissolving those bonds. These causes can be reinforcing. Lower populations and birthrates mean fewer parental interactions at basketball games, for example. Church identification with political positions repel possible members who share religious but not political beliefs. Loyalty to your layer is the highest virtue.

This has happened before, especially in the late 19th century as people gravitated to others most like themselves. Other layers were seen with disapproval or outright animosity, such as the anti-Catholic/Irish hatred of those times. Racism was so entrenched as to be assumed a normal part of life.

Community importance and commitment were revived last century primarily by war, especially WWII, as the very real prospect of losing everything shifted our attention from internal differences to foxhole tolerance. In fact, one of the great levelers of that time was universal conscription. Population was growing (notably the Baby Boom) so all layers could be gaining members without diminishing other groups.

As Putnam noted, we have become a nation living alone together. Critical mass needed for viable laminated communities passed a tipping point, as cultural bonds disappeared in rural America.

This magazine speaks to one layer in particular – relatively prosperous farms who often are the highest income group in tiny communities. There are even sublayers between small or agrarian farms, livestock producers, and specialty crop growers (Beekeepers). The need for distant outside members to form a peer group is not only for different perspectives, but to make social interaction possible and comfortable.

This stratification of our culture has several consequences but one of the first to be noticeable is longitudinal or intra-layer bond intensifying. As we avoid other layers, our links to those like us intensify to compensate for our smaller personal circle of friends. In our shrunken groups we encounter fewer contrasting ideas and reinforcement of our prior beliefs.

As the U.S. reproduces to a **population of all minorities as soon as 2045**, that perceived threat weakens interlayer links, especially for the white population in which recent census numbers show an unprecedented decline. The pandemic exacerbates the loss of cohesion in rural America, adding more outward signals – mask wearing, vaccination – to further corrode the bonds between layers.

I wish I had helpful examples and guidance how to offset this fracturing, but history has no example of free people rebuilding interlamination bonds without an immediate threat to all. Oddly, we have such a threat. Global warming is difficult to deny, but its catastrophic consequences are cumulative and slow by human life standards. Without a shattering event like Pearl Harbor, this looming danger will not solidify our communities or nation, even as it poses a far greater risk than war. BC

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WHY DIDN'T YOU LISTEN TO YOUR MENTOR Part 1

Ed **Simon**

The three parts of this collection are subsets of the 263 hints, definitions and informational tidbits gathered in over twenty years of beekeeping. I hope they are helpful.[1]

Air Conditioning – Hot Hives

On a hot day or when the nectar needs to be dehydrated, bees will form at the entrance to the hive and force air through the hive to cool the insides.

Note: All the bees are facing one direction.

Ants – They will find an easy meal.

Cinnamon powder sprinkled around the feeder rim and on the inner cover takes care of the ant problem.

Attaching Wild Comb – Attaching comb to a frame.

After you have collected a wild colony and need to attach the wild comb to a frame, be sure to keep the top at the top. Comb cells have a definite slope to them. When you attach comb to your frame use rubber bands. They work great and will eventually be removed by the bees.

Bearding – This is not, and I repeat not swarm preparation.

On a hot day the bees will congregate on the front of the hive. It is hot inside, so they decided to cool themselves off and reduce the heat being produced inside the hive.

Bee Development – The standard schedule for an egg to bee development (*Apis mellifera*)
See Table 1

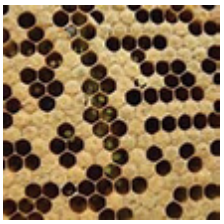
Note: A drone bees life span is limited. If the drone mates he will die after the mating ritual. If a drone does not mate, he is evicted from the hive in cold weather.

Note: Africanized bee development time is shorter.

Bee Space – The space needed for a bee to move within.

If a small space is less than ¼ inch or 6.4 mm, the bees filled it with propolis. If a space is more than ⅜ inch or 9.5 mm, the bees will fill it with comb. This concept was recognized and defined by L. L. Langstroth.

Brood Pattern – Every cell filled with eggs, larvae or capped brood is the perfect brood pattern. Depending on the percentage of missed cells the pattern ranges from perfect to rotten.



Cells – Cell count

The possible number of cells on a frame
See Table 2

Cells – Cell identification

The caste of the bee larvae residing in a cell is easily identified by the capping on the cell.

Worker – Flat cap – the most prevalent of all castes

Drone – Domed cap that has the shape of a 22-caliber bullet

Queen – Extended cap that has the texture of a peanut shell. The location of the cell often identifies the cells' purpose. This is not an absolute indicator of the purpose for building this queen cell.

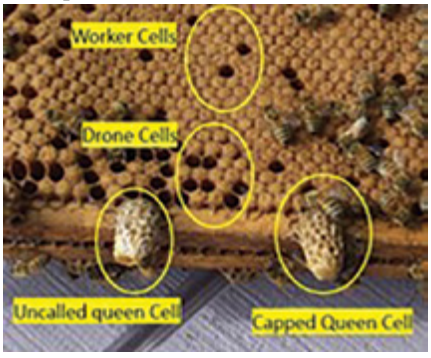


Table 1

Type	Egg	Larva	Capped	Pupa	Avg. Dev, Time	Life Span
Queen	*3*	*5.5*	*7.5*	*8*	*16*	*1-3 yrs*
Worker	*3*	*6*	*9*	*12*	*21*	*50-70 days*
Drone	*3*	*6.5*	*10*	*14.4*	*24*	*5 mos. Max*

Table 2

Frame Size	One Side	Both Sides	
Medium	*2240*	*4480*	*Maximum (approximate)*
Deep	*3440*	*6880*	*Maximum (appropriate)*

[1]A complete list of all the entries collected is published in "Build Beekeeping Equipment". It is available through www.LULU.com. It contains a full set of unabridged entries in a chapter called "What Your Mentor Forgot to Tell You." Under the LULU sales section, search for "Beekeeping" to find this publication.

Crystallized Honey – Shake the bear up.

Crystalized honey in a plastic bear can be liquefied in the microwave. The outside of the honey will heat faster than the inside of the honey. To stop the plastic from melting and causing the bear to nod its head, only heat the bear 20-30 seconds at a time. Between each heating shake the bear/honey up to distribute the hot honey. It may take four of five repetitions to completely liquefy the honey. But it is still quicker than sitting the bear in a pan of hot water.

Dry Honey Supers – When you put your honey supers away for the winter with all the honey removed. This can be easily accomplished by allowing your supers to stacked where the bees can rob the remaining honey left over from extraction.

Entrance Reducer – They never fit correctly.

When building an entrance reducer, make sure the entrance reducer is smaller than the smallest opening you have on your bottom boards. Then when installing the reducer, use a wad of newspaper on one end to work as a spring and force a tight fit of the reducer.

Extraction – Multiple beekeepers.

If you are extracting with a group of beekeepers and you need to account for the honey for each individual beekeepers, Mark the side of each super with its original weight. Then after extracting the honey, reweigh the super. The difference is the weight of the honey from that super. Even if the frames do not get returned to the same super, the total extracted honey weight will be correct.

Note: The capping wax weight is accounted for as honey.

Extraction – Easy frame Popper.

Put two - 2" x ??" x 14" pieces of lumber on a large cookie sheet (commercial cookie or cake sheet). Then force the honey super down on the lumber. This will raise the frames 1½" above the top of the box, making it easier to separate them for a move to the uncapper.

Extraction Clean Up 1 – Let the bees do the work.

Move your equipment outside of the extraction area and let it set for a couple of days. All the junk honey that you would normally wash away will be reused by your bees. Wipe up the thicker/deeper puddles of honey with a wet rag so the bees won't drown and then hang the rags up for the bees to clean the honey.

Festoon – When the bees develop a chain where one bee hangs from another bee is called a festoon. This often occurs when the heat inside the hive is too hot and the workers go outside to cool off. This activity is often accompanied by bearding.

Gargoyle – Easy hive body removal.

The gargoyle is a hive body modification which allows a hive tool easy access to the top corners for box separation. Use a sander to remove the top corners of hive bodies. This removal gives you an easy way to place your hive tool between boxes.

Hand Holds – Hive body handholds need to be wide.

Double cut hand holds for your hive body when cutting with a dado blade on your table saw. Reposition the saw fence further from the saw blade and recut the handhold. This will widen the hole so your fingers can curl into the hold without gouging into your fingers.

Hive Air Flow – A stick will do it.

Placing a stick or a piece of wood between the inner cover and the top cover will allow a better flow of hot air from the hive during the summer months.

Hive Dimensions – Langstroth.

The dimensions of a Langstroth hive may very a little from one manufacturer to another. The generally accepted dimensions are:
See Table 3

Hive Placement – Do not place your hives in straight rows.

If hives are placed in a row, the end hives will eventually have more bees. Bees tend to drift to the hives at the ends. Place your hives at

irregular distances and at angles to one another.

Hive Stand – Keep your stands low.

Be careful when placing your hive stands. The higher your hives, the higher your supers are when you want to remove them. When full they weigh about fifty pounds each. You do not want to climb a ladder to retrieve a super.

Hive Stand – Make sure your hive stands have a solid base.

Spend the extra time to ensure your hive stands are on a solid/ level base. You don't want them to tip over as you add hive bodies and supers.

Honey Storage – Five-gallon pails

Five-gallon pails are an extremely easy to use and a great way to store honey. If you fill them full, they weigh about sixty pounds. Before placing the lid on make sure the rubber gasket is in place.

As was noted at a bee club meeting, when selecting pails for honey storage do not and I repeat do NOT, NOT, NOT use pails that were used to store dill pickles.

Honey Supers – Pulling honey.

When pulling honey, after you eliminate the bees cover the bee-free super with a wet sheet. The wet sheet will cling to the super and is heavier so the wind will be less likely to blow the cover away.

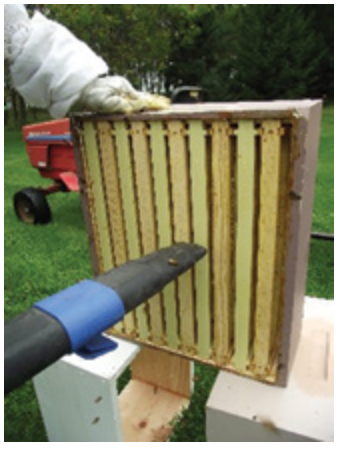


Table 3

	Length	*Width*	*Height*
Shallow	*19⅞*	*16¼*	*5 11/16*
Medium (money super)	*19⅞*	*16¼*	*6⅝*
Deep (brood)	*19⅞*	*16¼*	*9⅝*

Honey Supers – Pulling honey – Excess bees

Sometimes things just don't work out. If the number of bees remaining in the supers is too great, then a blower can help solve the problem. A gas leaf blower works great. A hand held Battery-powered blower is even better.

Hot Hive – This is not, and I repeat not swarm preparation.

On a hot day the bees will congregate on the front of the hive.

They are not getting ready to swarm. It is hot inside, so they decided to cool themselves off and reduce the heat being produced inside the hive. It's like you sitting on the front porch in a cool breeze. This is called bearding.

In-frame Feeder – Bees will drown or get stuck in syrup.

When using the one or two-gallon frame feeders or division feeders that sit inside a hive body, add straw, wood chips or a screen before filling the feeder. These provides a foot hold for the bees. It will allow them to escape if they get stuck in the syrup.

Inner Cover – This unit is used to isolate the telescoping cover from the bee's propolis or gluing. Without it the bees would glue the telescoping cover to the top hive body. Since there is no way to insert a hive tool under the telescoping cover it would be difficult or impossible to remove once it is glued to the hive body. (If you forget one you will find out what I mean!)

Inspection – Positioning hive bodies?

When removing hive bodies practice the same ritual every time for the placement of the removed boxes. When you restore the boxes, you can keep the order and the orientation of the box identical to when it was removed.

Inspection – Setting hive bodies?

When removing hive bodies and you set the hive bodies individually on the ground, be sure to set them so the frames are vertical. If they are horizontal, they can and probably will collapse on themselves.

Inspection – Setting hive bodies?

When removing hive bodies and you set the hive bodies on an upturned telescoping cover. Set them crosswise so the minimum amount of box surface is in contact with the cover rim. This minimizes the number of bees that could be crushed.

Installing Bee Packages – They will miss the hive.

Even though you spray down the bees before shaking your new package into the hive, they seem to miss where you want them to go. To eliminate some of this, use an empty hive body and place it on top of the target hive. Then keep the shipping box inside the top hive body while shaking the bees into the bottom box. This will help channel the bees into the lower hive box. BC

BIGGER PICTURE

Jessica **Lawrence**

An Interview with Benjamin Vazquez

For the interview edition, I wanted to put a highlight on beginner beekeepers. They face obstacles now that make it even harder than it was before for the rest of us, and not just pests and diseases. With the pandemic wreaking havoc, it's now harder than ever to find mentors or help for advice or in-person problem solving. Benjamin Vazquez is a beekeeper I met when I gave a presentation about pesticide research to the Stokes County Beekeepers. It turns out my son coached his daughter in soccer and we had some things in common. He is the perfect example of the challenges facing the beekeeping hobbyists and hopefully will give you something to think about.

Q. Tell me about your history, where you came from, how long you've lived here, family, all that.

A. My name is Benjamin Vazquez, I was living in the state of Texas before I came to North Carolina in 1987. I met my wife, Carolyn Vazquez in Allegheny County, North Carolina. We got married and had four kids, two boys and two girls. I found a job in the lumber business working for a sawmill since 1990. We produce about 220,000 board feet in 8 hours. That's how I make a living. I played soccer for an adult league for a long time, until I started coaching an adult team. After I got tired of coaching adults, I decided to coach in the youth league working with kids, and that was a whole lot more fun than coaching adults. I coached kids for 10 years. Then I met a referee that was refereeing my game and he thought I would be a good referee the way I talked to the kids so he asked me to take the class to become a referee and even offered to pay for my class if I wanted to take it. His name was John Nelson. So I took the class, passed the test with a 98% score, and I refereed for 13 years. I worked my way up to become a higher grade besides middle school. One of my best games that I referee was a team from Canada vs a team from Georgia. I have very good memories, but I quit because my knee gave up on me. So, my new hobby became raising meat goats. I found a lot of help on how to raise meat goats. I met somebody who came to my house several times to teach me how to raise goats - how to give them their vaccine shots, and what kind of medication to get for different symptoms. It seems like there was a lot of help out there that every time I talked to somebody that had goats they were willing to help me, vs raising bees; it is very hard to find somebody that will take their time to teach you about bees.

Q. How long have you been beekeeping? What made you start keeping bees? How many hives do you have?

A. In Spring of 2020, I saw an ad on a marketplace where somebody was selling bees and I decided to get into beekeeping in memory of my grandpa. When I was about five years old, I remember that my grandpa would collect honey from his bees, so I was too young to know anything about bees. And now I'm 52 and didn't know anything about bees when I bought nine hives, and going on a year and a half and I still haven't found much of a help on how to raise bees.

Q. Has it been hard for you to find beekeepers with more experience to mentor you or to answer questions?

A. It has been very hard to find somebody that will teach me how to raise bees. When I find somebody that has bees, I try to get as much information as I can and 50% of people will tell you that if you need help to let them know and they can come and help me when I tell them the issue that I'm having and I don't know what to do they just say that they don't understand why I'm having those problem. Nobody will offer to come to my house and take a look at my bees or tell me what I'm doing wrong and I am too shy to come out and say "will you please come and help me."

Q. How often do you go to the local beekeeper meetings? Regularly, or semi-regularly? Do you think they're useful for newer beekeepers? Who do you think gets the most out of the meetings? What kind of information would be the most useful to you to see?

A. So I decided to go to a local beekeepers meeting once a month but I still haven't found much information because in those meeting it's mostly older beekeepers, somebody that have been doing it for years and to me it's more like a get together for the older beekeepers then teaching the brand new beekeepers on how to raise bees. When they talk about a treatment, they move on so quickly on when they use them, what kind to use because they understand each other, they been doing it so long that they know what those treatments are but for new beekeepers everything is new to us, we don't know any of the medication that they use and we don't know what they are talking about. They don't hand out any literature for us to read. I basically have been on my own. Until I met somebody with a good heart.

Q. What has been your best source of reliable information? Has anything or anyone given you bad advice? What was it?

A. On 10/13/21 I met Mr. Frazier, somebody that has been in beekeeping before I was even born and like I said I'm 52 years old, and he had bees way before I was born. So I have learned a whole lot from this man. After talking to him about my bees, he asked me a whole lot of questions, questions that I didn't not know why he was asking those kind of questions, like how many supers do I keep on my hives, how do I prepare my bees for winter, when he got done asking all of the questions without me saying I had a problem he knew I did so he threw me a whole lot of ideas. I have never talked to this guy before but he knew I had a problem after talking to me. I lost eight hives because of robbing, after I told him this he said "what are you doing this Saturday" I said "I don't know whatever comes along" so he said "can I come this Saturday October 16th to look at your bees and bring some of my equipment to see what we can do with your bees and prepare them for winter" I felt like giving him a hug because finally I found somebody that cares about new beekeepers. But I couldn't because of this covid. Before he came and helped me with my bees, my bees were robbing a different hive every day. He came and showed me what to do, how to treat bees, when to treat them, and what kind of medication to use for different treatments. He finally gave me some literature to read on what to get for my bees. He spent all day long from 10am to 4pm working with my bees! And he found out I also had two queenless hives and he showed me what to do with the queenless hives. He came back the next day after church, and spent the whole evening working with my bees and teaching me how to take care of them and promised to come back every so often. So now after learning a whole lot from him I decided to buy 14 more hives. I'm so excited I already put a down payment on these bees until I come and pick them up. Mr. Frazier stays in touch with me every two days. I hope that next year I can extend my apiary and be able to keep my new swarms and not get robbed. my source of information was the internet until I met Mr. Frazier.

Q. Do you think beekeeping is expensive for people to start? Have you been able to make any money with your beekeeping skills or do you plan to?

A. Beekeeping can be expensive if you don't have the right education on how to be successful on beekeeping, my advice is to start with one hive to start practicing. Second, find you a mentor as soon as possible when you think you found the right person ask that person if he/she would come and help you with your bees. A year later you can start making a little bit of money with your bees, instead of losing money like I did.

Q. Do you treat your bees for mites? Do you know your mite loads?

A. Yes, I do treat my bees for mites and yes I do now, know my mites loads.

Q. Does your family help you in bees? How do they like beekeeping?

A. My daughter Silvia helps me with my bees and she loves it, she's always ready to go when it comes to working with bees.

Q. What parts of beekeeping do you think you need the most help with?

A. The part that I need help with is other places to put my bees besides my house.

Q. What do you hope to get out of beekeeping?

A. I hope to increase the honey bee population to help with pollination, and to make money instead of losing money. BC

Check your mailing label for how many issues you have left! You don't want to miss out on our 2022 Calendar so if you have none left, RENEW TODAY!

How to Inspect a Hive Part 1

Darryl **Gabritsch**

Inspecting a hive is only one part of colony management. If you see an issue while inspecting a hive there are various management techniques to do depending on what you see. This article will be three parts. Part 1 covers the concepts behind a hive inspection. Part 2 covers pre-inspection procedures. Part 3 covers the actual hive inspection procedures.

How often and when you inspect a hive totally depends on your lifestyle, beekeeping experience, what your philosophy is and what the purpose of the inspection is. All inspections should be systematic and have a specific purpose. Why are you opening a hive? Are you simply lifting the hive body to check under the frames for swarm cells (cold months)? Are you opening the hive to remove frames to do a detailed inspection (warm months)? Are you opening the top to simply look at the cluster location and strength, or simply checking a hive top feeder?

Most of us are just hobby beekeepers and have work and home life to balance along with beekeeping. Ask yourself: How much time can I dedicate to beekeeping? What skill level are you at? Are you a beginner beekeeper, a Master Craftsman beekeeper, hobby beekeeper, sideliner beekeeper, or commercial beekeeper? How much time do you have to manage the colonies? Do you mind if the honey bees swarm? Do you simply want to help the honey bees? What is the purpose of the inspection?

A cold weather hive inspection is very quick compared to a detailed warm weather inspection. In cold temperatures you might only open the top to look down at the frames to see the brood cluster and food stores, or you might tilt the hive body up to quickly check for visible swarm cells without removing frames. Remember the bees will form a cluster in the hive to protect the brood and queen when the temperatures get down to 57 degrees or lower. Don't be confused if you see individual bees flying in lower temperatures. I have seen them do cleansing flights in temperatures as low as 45 degrees.

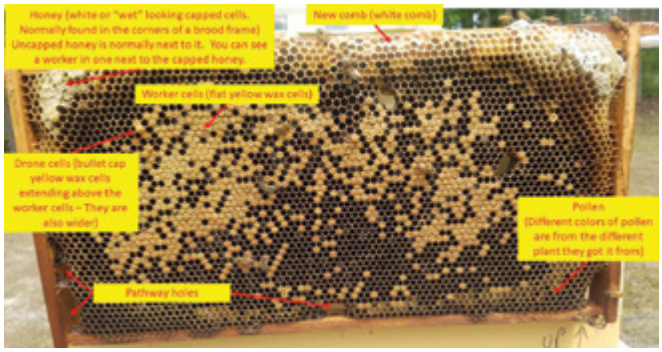
In warm weather you can do a detailed inspection by removing frames. As a general rule of thumb, I only open a hive and remove frames if the outside temperature is at least 64 degrees or higher, and if it is not raining to prevent killing brood and bees by hypothermia. I like to remove frames when it is on the cooler side of temperatures if possible and after the foragers leave the hive to forage.

How often you inspect a hive depends on your time available and philosophy. Remember the timeline from a new queen to emerge from an egg to emerging as a queen is 16 days. When you inspect a hive, you disrupt the bees for a few days while they figure out what you did; especially if you don't put the brood back in the order it was found. To prevent putting the frames back in backwards I simply draw a line across the top on one end of all frames with a black Sharpie pen to help me keep all drawn lines on one end of the hive. Draw the line on the frames before you first put them in a hive since the bees will coat the frame with a thin layer of propolis. The marker won't easily stay if you try to mark it after the propolis is on the frames.

We encourage new beekeepers to inspect their colonies at least once every ten days to stay ahead of the swarm cycle and to learn what right looks like inside the hive. I recommend simply inspecting the colony once a week to keep a simple schedule. Ideally you have at least two hives, so you can compare one hive against the other if you see something weird in the hive. You can also take parts from a strong colony to give to a weak colony. Do you have a very weak colony? Give it a frame of brood, nurse bees, and food stores from a strong colony AFTER you first check the frame for the queen. All beekeepers should review reputable beekeeping sites to learn what the various diseases and pests look like, so that you will be able to recognize them when you see them.

New beekeepers may take 30 minutes or longer to inspect a hive while learning what right looks like inside a colony. A very experienced beekeeper can inspect a colony in about five minutes. Most beekeepers fall between the two extremes. Experienced beekeepers who don't mind if their colonies swarm might only inspect every few months, or when they see indicators of issues such as pests, disease, very defensive colony, etc.

There are many ways to inspect a hive. Remember the adage: Ask 10 beekeepers how to do something and



you will get 12 answers; all will be right. This is how I do it: Do all preparations before opening a hive, inspect the hive, take appropriate management steps during or immediately after the inspection, and finally I mark the hive with notes and/or a signal such as a full red brick, half red brick, or stick depending on what I find.

Summary. Learning how to inspect a hive is a crucial step in your beekeeping journey. Having a systematic, purposeful inspection process will keep you focused on the steps needed to conduct a thorough, and eventually a quick, hive inspection. Knowing what to look for will help you determine what is normal and what requires further diagnosis and remedies. Beekeeping is both a science and an art. Beekeeping science is knowing the cause and effect of diseases and pests. Beekeeping art is balancing the various management techniques to keep healthy, strong colonies. BC

Darryl Gabritsch is a North Carolina Beekeepers Association Master Beekeeper and lives in NC with his family.

A Student's Perspective

Proving Stereotypes Wrong

Madison **Miller**

Through the eyes of the uneducated, me and my fellow drone honey bee's have been accused of being "lazy", "Ne'er-do-wellers", and "good for nothing". This stereotype often stems from the fact that we, as drones, have no stingers, glands, nor pollen collecting devices like workers or queen bee's do. We also are unable to lay fertilized eggs unlike the other bees. However, I am a highly important part of my colony and perform the vital role that nature has left in my hands. To prove this stereotype wrong, I will take you through my role as a drone, and by the end, you will realize just how essential me and my friends are to our colony. To do so, I will start at the beginning.

My life starts the day a queen or a worker bee lays an unfertilized egg in a cell. In order to start my development, workers will feed me royal jelly for only the first two to three days. Afterwards, my protein will come from honey and pollen. By day ten, my cell is capped, and my larva spins its own cocoon while inside the cell and develops into a pupae. By day twenty-four, I am a grown adult bee and ready to emerge from my cell to start my life duty. Once I am an adult bee, I will be larger and more robust looking than the workers and queen in my colony. My eyes will be larger in order for me to easily scope out a virgin queen when it comes time for our nuptial flight, and my abdomen will be thicker. I will also have more antenna receptors and longer legs. Of a colony, about twenty percent are drones and around eighty percent are workers. Therefore, there will be roughly around five-thousand to twenty-thousand of us drones per colony. However, this will also depend on the colony's strength and what time of the year it is. Drones are needed more towards spring and summer when the virgin queens are ready to mate.

An unfertilized egg means that I have no father, however, I do have a grandfather. Since a queen did not need to mate with a male in order to lay my egg, I would be considered a haploid. Haploid means that I have only sixteen chromosomes compared to queens and workers who have thirty-two chromosomes. All sixteen of my chromosomes came from the queen who laid my egg. However, if a queen wanted to lay a fertilized egg in order to make a new queen or workers, she would need the help of a drone bee. A worker cannot mate with a queen, only a drone fulfills this role. During mating season, a swarm of drones will fly from their hives and convene in the sky. These are called Drone Congregation Areas (DCA). This congregation will take place about ten to forty meters above the ground and about ninety to one-hundred and twenty meters away from the apiary. These congregations can get up to thirty to two-hundred meters in diameter. A virgin queen will then leave her hive and join our cloud of drones. As soon as the queen enters our swarm, around seventeen to twenty-four different drones will actually get to mate with the queen. Each one of us provides eight to eleven million sperm, and the maximum capacity for a spermatheca is around five and-a-half million sperm. In that case, only a small percentage of each drone's sperm will migrate into the spermatheca of a queen, but each drone will mostly be equally represented. Unfortunately, after one of us mates with the queen, we will die. This happens because our endophallus is quite literally ripped from our abdomen after mating occurs and sticks to the now not so virgin queen. Therefore, without me and the other drones, queens would not be able to lay fertilized eggs since our semen is necessary for the production of these fertile eggs.

With mating being the one huge role I play in my colony, it is easy for that stereotype to come back and deem me and my fellow drones as the useless bees throughout our hive. The people making these stereotypes fail to think about how essential this role is for the future of our colony's genetic diversity. Genetic diversity is the range of different inherited genes within a species. In these Drone Congregation Areas where a queen will mate with around twenty different drones, these drones can be from all different colonies causing the genetic pool to broaden. Genetic diversity has many positive effects such as enhancing a bee's chance to resist pathogens, harmful pesticides, and allows the colony a greater chance at adapting to changing environments. With climate changing as it is today, this will become more and more important. It is crucial for a colony's success because the greater the genetic diversity, the greater the chance the colony has to survive.

You may be wondering what happens if one of us does not fulfill our role of mating with the queen. The drones that were unable to mate in the Drone Congregation Area fly back to their hives. After the mating season, the weather starts to get colder as fall approaches. Soon, one by one, the workers kick us out of the hive. Literally! Queens do not necessarily mate in the colder months, but instead more around summer time. Since our bodies are larger and take up more space in the hive, and since we do not do much housekeeping around the hive, we get the boot. Unfortunately, this leads to our deaths. We can die from being painfully stung by the workers, the harsh weather, or from simple starvation.

When it comes to the colony, we as drones are not useless nor unimportant. Although we only have one major role to play, queens would not be able to lay fertile eggs without mating with us. In that sense, no more queens nor workers would be able to be born since their eggs must be fertilized. Therefore, no colony would survive. As said earlier, we bring the genetic diversity to the colony as well making the hive successful. We may not have all of the tasks and housekeeping duties as a worker bee does, but that worker bee exists because of us drones. Every one of us has an important role in the colony, and our hive would not thrive with the absence of any of us. BC

Madison Miller wrote this as an essay for Jennifer Berry's class. The essay was required to be bee related.

Obituary

Stephen Andrew Conlon died in Morgantown, WV on October 20, 2021.

He was born in Abington, PA on February 1, 1952 to Daniel & Emily Conlon.

Steve circumvented the world at just 17-years-old by train, motorcycle, and sea. A few years later he met his wife Ellie at Abington Friends Quaker Meeting and they moved to the hills and hollers of West Virginia as part of the back-to-the-land movement. They were foster parents for hundreds of kids and founded ThistleDew Farm Inc. The Beeman appeared on The Tonight Show with Jay Leno, was President of the National Honey Board, and could typically be found in one of his many shops. He was a voracious reader and often provided the counterpoint to conformist opinions. Steve was an avid collector of vehicles that would never run again and jokes that would be rerun many times.

Predeceased by wife Ellie, brother David, & son Kilian.

He is survived by a sister & two brothers, his children: Bob, Roger & Terra, and grandchildren: Mei, Martina, Miranda & Lena.

Ellie & Steve's Celebration of Life was held on October 30, 2021 at the family farm.

In lieu of flowers please send donations to the Kilian Conlon Memorial Scholarship foundation@wvup.edu

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Eleanor Lena Toews Conlon died in Beebe, WV on November 13, 2020.

She was born Elkins Park, PA September 8, 1946 to Rosa and Martin Toews.

Ellie successfully ran a farm and two businesses, and was the glue that connected three families—the Conlons, the Toews, and the Mackleers. Ellie helped to make the Tamarack Marketplace a reality along with the West Virginia Grown initiative for the Department of Agriculture. She served on the Wetzel Co. Hospital Board for many years.

She could often bee found putting in long hours working the land or at the honey shop, and her friends knew she would gladly prepare their taxes in exchange for a homemade pie. For four decades Ellie and Steve were a staple at craft shows, selling honey and teaching about bees by way of Steve's famous "bee beard". She loved big cats and little dogs, seafood, a glass of red wine at the end of the day, and a good German pretzel with her proprietary honey mustard.

Predeceased by son Kilian and sister Edeltrude.

She is survived by sisters: Frieda, Rose & Ann, sons: Bob, Roger & Terra, and grandchildren: Mei, Martina, Miranda & Lena.

A Case for Embracing Smaller Population Beehives

Beekeeping techniques for the faint-hearted Beekeeper

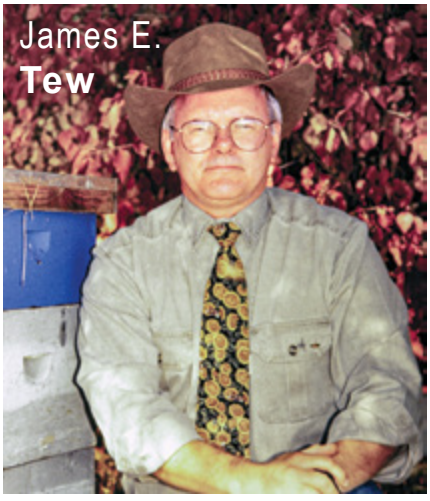
My bees are ageless. I am not.

As have you, I have been through many age-related events in my life. I learned to ride a bike and to swim. I was awarded my driver's license. I grew old enough to vote. Multiple times, I graduated from various educational programs. I was in the military. I married, and my wife and I produced three daughters. I got my first bees. I earned tenure at my university. I worked for decades there and then retired. I became a grandfather. My social security started. I am now at this point in my life – an old guy with a pronounced interest in all things honey bee.

Readers, I don't have a lot of benchmarks left, but there is still at least one that remains – next spring, I will have kept bees for fifty consecutive years. I readily acknowledge all of you who have been with the bees even longer than I, but still – for me – fifty years is a long time. Through all my seventy-three years, I have changed a lot, but my bees are ageless. They have hardly changed at all. They still sting. They still swarm, and they still seem to hate their queens.

Traditional beekeeping

The thing I am calling *"Traditional Beekeeping"* is a moving target. What was traditional when I began beekeeping all those years ago, has moved to different *traditions* now. No more embedding wires in foundation or producing honey in basswood sections. No more honey in metal 60# tins. Nope, today's beekeepers are all about varroa control and foundation inserts and plastic honey jars, or yet another app for our new primary hive tool – our mobile phone.



Fifty years from now, when I am one hundred twenty-three years old, all of today's *"modern"* traditions will seem quaint. Again, the thing I am calling *"Traditional Beekeeping"* is a moving target. Your bee target will move, too.

I can only call it an *"Epiphany."*

During late August, as I have done during so many Augusts past, I went to my bees to take, what I viewed as, my part of the honey crop. As I have always done, I employed *traditional techniques* to produce and harvest this surplus honey. My hives are on hive stands about twenty inches from the ground, and I use maybe two to three deeps as brood nests. My honey supers - filled to greater or lesser degrees - were either deeps or possibly regular supers, and most of the hives housed about 65,000 – 75,000 bees. These were nice, big, producing colonies.

With complete honesty in mind, this honey removal procedure can only be described as sticky, heavy, tiring work. As is always the case, the bees took a very dim view of my actions. I abruptly had a moment of clarity.

Current Traditional Bee Management Theory:

- **Big colonies are good colonies.**
- **Big honey crops are big rewards. Eliminate swarming.**
- **More colonies are better than fewer colonies.**
- **Only the best-bred queens are proper queens.**
- **In all ways, more, bigger, better, heavier, yet even more is better**

On that day, as I struggled, trying to get a full deep of honey off a hive that was five deeps high, twenty inches off the ground, and defended by thousands of hostile and confused bees, I was struck by the abrupt, clear realization – I shouldn't do this anymore. Indeed, I don't even ***want*** to do this anymore.

I have five or six titanium screw anchors in my left shoulder. I have hearing aids in both ears. I have surgical steel staples embedded in my gut. One-third of my teeth have been root-canaled. Cataracts are forming in both my eyes. I am probably forty pounds overweight, and my knees hurt.

On this late August day, I was trying to implement traditional beekeeping as I had always practiced it for the past forty-nine years. For all those years, for me, it was the correct way for me to keep bees. I can only write that I suddenly instinctually knew that I should not be doing this anymore. *"If you tear your shoulder up again.....!!"* This work was too strenuous and the demands on my aging body too great.

But here's the problem – I am not quitting my relationship with the bees. Yet, the bees are not going to change, so I will have to do all the changing. I can only call this realization an *"Epiphany."* Yet, another milestone.

My first action as a Senior Citizen Beekeeper

As I see things for me, the first action that I should take at this time in my life – discard the concepts in

the *Current Traditional Bee Management Theory* that I listed above. Those are the divining concepts for younger, healthier beekeepers. My youthful time has come and gone, but I'm still here.

Essentially, my personal working *senior citizen bee management concepts* would be something like:

- **Single deep colonies can be good colonies.**
- **Some surplus honey is good, but not required.**
- **Occasional swarms may help control varroa populations.**
- **Manage fewer, smaller colonies more easily and efficiently.**
- **Don't aggrandize queens – average may be good enough.**
- **In general, don't worry about the small stuff.**

Then my wife said...

My wife and proofreader said that my comments to this point would be discouraging to young beekeepers. Heavens above, that is not my intent! Young beekeepers, have at it. Build. Develop. Grow. Enjoy. I certainly did when I was your age. Through my years, I have tried most common aspects of beekeeping such as queen production, pollen collection, comb honey production, candle making, homemade woodenware, top bar hives, and so much more. I am now at a point where it seems to be time to again try yet some other aspect of beekeeping – smaller scale, lighter weight beekeeping.

But what I immediately run into is that the generalized management theory for smaller scale, lighter weight beekeeping is not clearly and readily documented. But this is where I am in my bee life, and this is what I would like to write about for the next few articles as I slog through the fog of the unknown.

Beehives come in one size – extra large

Even as a younger, more physically fit man, I could see the reality that successful bee hives were thought to be big, populous monstrosities. In various presentations, through the years, I made light comments about how much more often smaller, more agreeable colonies got inspected in my apiaries. The behemoth units that required moving a hundred pounds of honey supers to get to the brood nest got checked less frequently.

Seven years ago, in 2014, I wrote an article for *Bee Culture* magazine entitled, *Are Big Colonies Always the Best Colonies?* At that time, I decided that they were not always the best for all situations – especially in urban apiaries. Through the years, I have given slide deck presentations about dealing with large colonies. On many occasions, I have asked various beekeeping groups exactly how large of a colony did they ultimately want. The answers were vague and indecisive relative to the hypothetical question that I was asking. But my most aggressive effort, about thirty years ago, while visiting the USDA ARS Bee Breeding and Stock Center at Baton Rouge, Louisiana, was when I asked resident scientists why bee breeders always selected for bee strains that grew to huge populations. The answers to my question got no traction. There was no research interest in selecting for dynamically stable, smaller populations. Big colonies are always considered to be the best colonies. So, there it is. Managed bee colonies come in one size – extra-large.

Will I be able to change decades of management experience and protocol?

Okay, Jim, during the spring of 2022, you are going to keep bees in single deep or two deeps at the most. I must ask my beekeeper self; will I be able to withstand the pressure not to add more space to the brood nest when the colony outgrows the single deep? *"Add more space."* That is what I would have done for the past forty-nine years. *"They're going to swarm."* How am I going to respond to my expected management behavior? I don't know. Yes, I could make splits, but I don't want more and more colonies. I don't have enough equipment, time, or energy to produce splits as a management procedure to prevent swarms. Stand by.

To this point...

I have loved beekeeping for all these many years. Since I am not going to fade away from the craft, I hope that I can keep adapting by changing my ways with the bees. They will not be able to adapt to me, so I must do all the changing. For me, big heavy colonies are no longer practical. I fully realize that for many of you, big colonies and big crops are the way to go. It's your time. Go for it.

In future articles, I will write more about bee life with smaller units and how I hope to still derive big (mental) rewards without all the physical labor that traditional beekeeping frequently requires. I do hope you stay with me through these discussions. My thoughts are not negative – just transitional.

Treasured memories

The December issue of *Bee Culture* Magazine has historically presented interviews with beekeeping authorities who are currently significant contributors to our unique industry. With the magazine editor's approval, I have always elected to use my bit of space on this topic to acknowledge old friends who are not here anymore, but nonetheless, contributed significantly to our beekeeping passion.

Remembering Paul Jackson[1], a good friend of beekeeping

Readers, this is not a formal bi-

[1]Paul Jackson Obituary - https://www.dignitymemorial.com/obituaries/bryan-tx/paul-jackson-6331908

ography for Paul Jackson. These are just some of my personal memories of a good, dependable friend who was in my life for many years. He's been gone for six years, but I still remember.

Paul was the State Apiarist, Texas, essentially forever it seemed. He was there during the Tracheal Mite panic when thousands of hives were killed to control that new pest. That eradication plan didn't work. Paul was left with the fallout from that failed effort. He was the State Apiarist during the arrival of the Africanzied honey bee into the U.S. Texas was ground-zero in the Africanzied honey bee issue for many years. You had to live it to understand that dark, uncertain time. Paul was quickly a "go-to" source of information for the rest of us across the country.

Smoker Bellowes made by Paul.

He was the Texas Apiarist when Varroa overtook that state. By then, he was well established as a practical beekeeping authority. Indeed, he was a steady hand for beekeepers through the biggest changes ever to occur in beekeeping. Yet, Paul was always a solid, practical beekeeper and dependable state employee. He was friendly to a fault, and he was a righteous person.

Uniquely, Paul was a bee smoker collector. He had *the* premier smoker collection in this country, and he would load it up and haul it to meetings and set it out on racks and stands designed for just that purpose. So, you didn't have to go to Texas to see this collection; rather you only had to go to a meeting where Paul was speaking to view the collection. Even without the smoker collection, he always drove to meetings. Multiple times he drove all the way from Bryant, Texas to N.E. Ohio to my meetings. In retrospect, I don't know if he really did not like flying or if he really just liked driving. Regardless, Paul always drove a white Texas State pickup to bee meetings.

Though I never saw any of them, he told me of his Coke Machine restoration projects. I don't know his procedure for finding vintage Coke machines or how he restored them, but he did both. The pictures he showed were of beautifully restored Coke dispensing machines that he then sold *"for big money."* I don't know any other individuals who have done this unique work.

Paul and I were part of a group who visited Australia beekeepers. It was a grand trip that is still a highlight of my life. While there, he and I bought Australian Akrubra (cowboy) hats. We both got the Snowy River model. I still have my hat and wear it regularly. Within the greater travel group, Paul and I looked like a very small sheriff's posse without horses. It was a good trip that yielded good memories (and quality hats).

Though he lived in Texas, he had farmland in Arkansas. He knew farming. He knew all aspects of bees and beekeeping. He knew a good Coke machine when he saw it, and he never saw an old smoker that he did not want to own. A unique memento that I have from him is a woodburning likeness of me that he burned onto the back of a smoker bellows. It hangs on the wall in my shop. Paul, those who knew you do not forget, and we all miss you, old friend. BC

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Winter Honey Recipe –

Shana **Archibald**

Berries & Honey Breakfast Granola

3 cups of rolled oats
2/3 c of honey
2 tsp cinnamon
2 tsp baking powder
1/2 tsp of salt
3/4 c of milk (we like to use oat milk)
2 eggs
1/2 c melted butter
3 tsp of vanilla
1 & 1/2 c of fresh berries of your choice. We like to use blueberries & raspberries. Frozen berries work great too.

Directions:

Preheat oven to 350°.

Mix all ingredients together, except the berries.

After all ingredients are mixed together, fold in the berries, or push them in, on top.

Bake for 30-40 minutes or until the top starts to brown.

This would also make a great (and a little healthier) option for breakfast on Christmas morning

Snickerdoodle Banana Honey Cake

1/2 cup of softened butter
1 C of sugar
1/2 C of honey
2 eggs
2 C of flour
1/2 tsp salt
1/4 tsp baking powder
3/4 tsp baking soda
1/2 c of milk
1 tsp of vanilla
2 ripe bananas

Directions:

Mix all ingredients together and pour into a 9x13 pan. Sprinkle 1-2 spoonfuls of sugar & brown sugar and about 1 tsp of cinnamon on top.

Bake at 350° for 25-30 minutes. Watch closely at the 25 min mark! Poke with a toothpick & if it comes out clean, you're done! This would be a great Christmas morning treat or even something yummy, to leave out for Santa ;)

CALENDAR

♦NEVADA♦

American Beekeeping Federation will be held January 5-8, 2022 at South Point Hotel in Las Vegas.

Speakers include Jamie Ellis, David Tarpy and Judy Wu Smart.

For more information visit **www.abfnet.org**.

♦TENNESSEE♦

Hive Life Beekeeping Conference 2022 will be held January 7-8, 2022 at Sevierville Convention Center, Sevierville, TN.

Keynote speakers: Bob Binnie, Ian Steppler, Kamon Reynolds, Kent Williams, Rick Sutton, and Greg Rogers. Other special guests include: Randy McCaffrey - "628 Dirt Roost," Frederick Dunn, Jeff Horchoff - "Mr Ed," and more. Honey Show and over 24 vendors! $180/pp including lunch each day.

For more information see **http://tinyurl.com/hivelife**.

♦VIRTUAL♦

Honey Bee Veterinary Consoritum will be viewable On-Demand September 18 - December 31, 2021..

Online registration coming soon.

For more information see **www.HBVC.org**.

The honey bee can't be beat
She pollinates plants that we eat!
But while in the hive,
So she can survive,
She makes honey to share, how sweet!

John Simonsen
Johnson City, TN

Several issues back Kim Flottum did a book review on a book full of limericks on insects. There were no references to the honey bee so Kim wrote a couple. This inspired others. Thank you John.

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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. BUT – we need to receive your request four weeks before your event so that we have time to process your request. Please email Emma at Emma@BeeCulture.com with the number of magazines needed, a complete mailing address and a contact person.

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The person who inspired me to start writing about bees 20 years ago was legendary Boulder, Colorado beekeeper Tom Theobald. From 1990 until 2007, he wrote a weekly column for *The Fence Post*, a regional farm newspaper. His "Notes from the Beeyard" was about bees, sure, but there was more to it than that. It painted a self-portrait of a man I much admired, and still do.

I caught up with Tom recently on Skype.

Ed: How and when did you get started beekeeping?

Tom: *I left IBM in June of 1975, not knowing what I was going to do, but I knew I didn't want to spend the rest of my life working inside. I thought , "Wouldn't it be interesting to create a colony or two of bees to supplement the garden?" My neighbor said, "You know, Tom, I think I know an old-time beekeeper. I don't know if he's still alive." I said, "Well, see if he is."*

. . .I called Harlan Henderson that evening and asked, "Would you be interested in having some free help in exchange for the experience?" And I worked with Harlan through the harvest in August and September of 1975, and by the end of the harvest, I was in love. I connected with the bees immediately . . . So Harlan called in October and asked, "Would you like to buy half my bees?" I talked that over with Barbara. She was agreeable, so we did. Together we (Harlan and I) had 80 colonies, and in Boulder County, we were big frogs in a small pond.

Ed: You're known far and wide for your advocacy on pesticides.

Tom: *In October of 1975, Linn Peets, who was the Boulder County bee inspector at that time, called a meeting of all the beekeepers he could reach, and the reason was pesticides. They'd had some serious pesticide kills. If you were a beekeeper in Boulder County and you weren't interested in pesticides, you weren't a beekeeper for long... Linn Peets and I were directed by the Boulder County Beekeepers Association to meet with the county agent and the applicators to see if we could come to some agreeable solution to the pesticide problems, instead of constant warfare . . . which we did. We organized an advisory program where the applicators were called the night before they were going to spray within a mile of a bee yard, and we supplied them with a map locating all the county bee yards. That was the beginning of it all . . . I was the president of the Boulder County Beekeepers for 30 years.*

Ed: Am I dreaming, or did you and Lyle (Johnston) once take a trip together to Washington DC to lobby on (encapsulated methyl parathion) Penncap M?

That's one of those folklore stories . . . I was the vice-president of the state beekeepers, and I had gotten wind of some shenanigans at the Colorado Department of Agriculture. They were going to do something – I don't remember the details . . . and they hadn't said a thing to the beekeepers . . . I called Lyle . . .and I called Paul Hendricks . . . so the two of them showed up unannounced at the beginning of this meeting, to the embarrassment of the Colorado Department of Agriculture, and Lyle and Paul proceeded to rip them a new one.

Ed: You have strong opinions about neonicotinoid pesticides and their effect on pollinators.

Tom: (Paraphrasing Dutch toxicologist Henk Tennekes) *There is no safe dose. It has half-lives of years . . . you can take the smallest possible dose, introduce it into the environment, give it sufficient time, and it will have the same effect as an acute dose, which is death.*

For the past 25 years, we've been putting these neonicotinoids into the environment at phenomenal rates, and we're about to see the consequences. Forty percent of the insect population is in decline. We've seen recently the decline in the bumblebee population in most states . . . the monarch butterflies are about to disappear . . . and Henk warned us about this 25 years ago.

Ed: You pretty much wrote the book on two-queen honey production. How'd that happen?

Tom: *I got 40 colonies that first October (1975) and some packages the following spring. By the end of my first year, I was up to about 100 colonies, with swarms and everything . . . I peaked at about 200, but then I began double-queening – to bring the numbers down but keep the production up . . . my goal was to be a local beekeeper and have a business that was based upon honey production. I realized 200 was far more colonies than I wanted deal with. I began double-queening fairly early on and was a two-queen beekeeper from then on . . . around here (with single-queen colonies) you could expect, average year, average beekeeper, about a 75-pound surplus. With a two-queen system, I could expect (from a good colony) a surplus of about 240 pounds.*

Ed: All right, old friend. What a great conversation we've had!

Tom: *You and I should talk more often, Ed.*

You can get more information about Tom's two-queen hive system at *www.beekeepingtodaypodcast.com/two-queen-honey-production-with-tom-theobald.* Listen to Tom's homespun stories about his life with bees (a new one every Friday!) at *notesfromthebeeyard.buzz.* Treat yourself, but I'm warning you – you might get hooked! These are really good.

Ed **Colby**

Tom Theobald

As this issue was going to press, we found out the same day that Tom had passed away. November 10, 2021.

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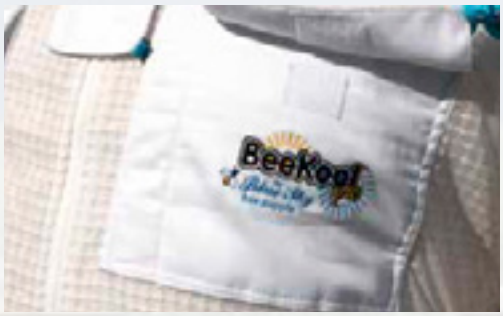

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