WHY DID MY BEES DIE?

MAR 2020

Catch The Buzz™

Bee Culture®

The Magazine Of American Beekeeping

www.BeeCulture.com

Sensor Technology

Hello To All Readers

$4.99


TOP QUEEN BEES
SASKATRAZ
CARNIOLANS
ITALIANS
ECONOMIC SUSTAINABILITY
HONEY PRODUCTION
OVERWINTERING
TOLERANT TO ENVIRONMENTAL CHANGES
• OUR STOCK IS CERTIFIED AHB FREE
• SMALL HIVE BEETLE FREE
• FOUNDING MEMBER OF PROJECT APIS M (PAM)
• FOUNDING MEMBER OF BEE INFORMED PARTNERSHIP
CALIFORNIA
530. 865. 0298
TOLL FREE
877. 865. 0298
HAWAII
808. 328. 9249
OHB
QUALITY QUEENS FOR THREE GENERATIONS
GUARANTEED NEXT DAY AIR DELIVERY
Olivarez Honey Bees
OHBEES.COM
OHBEESHQ

ACORN
BEEKEEPING EQUIPMENT

Ready Now For The 2020 Bee Season!

The New Standard of Excellence in Plastic Frames and Foundations

Pre-Assembled Wooden Frames

- 9-1/8" and 6-1/4" Sizes
- Pre-Assembled With Acorn Plastic Foundation
- Standard, Heavy and Extra Heavy Waxed available

One Piece Plastic Frames

- Flatter, Stiffer, Sturdier
- Redesigned Mega Strong Ears Last Forever!
- 9-1/8" and 6-1/4" Sizes

Plastic Snap-in Foundations

- Fits well in 9-1/8" and 6-1/4" Wooden Frames
- Optional Breakaway Communication Hole

nick@acornbee.com
www.acornbee.com
Nick Lissaman
25 Years Experience
13818 Oaks Ave. Chino, Ca 91710

MORE BROOD! - MORE BEES! - MORE HONEY!

EXCELLENT BEE ACCEPTANCE!

Call For Best Prices!
877-255-6078

VISA MasterCard

PROUDLY Made in USA

SPRING INTO BEEKEEPING

MAKE BEEKEEPING A BREEZE WITH A HIVE KIT!

Our Painted Complete Hive Kit Combo with Wood Frames comes complete with all of the woodenware necessary to successfully start keeping your bees.

HK-385 - 10 Frame Complete Hive Kit Combo - Wood Frames - Painted

- 1 9 5/8" (24.45 cm) Assembled Hive Body; Painted
- 10 9 1/8" (23.18 cm) Assembled Frames w/Natural Waxed Rite-Cell® Foundation
- 1 6 5/8" (16.83 cm) Assembled Super; Painted
- 10 6 1/4" (15.88 cm) Assembled Frames w/Natural Waxed Rite-Cell® Foundation
- 1 Telescoping Cover w/Inner Cover; Painted
- 1 Unpainted Varroa Screen Bottom Board with Removable Drawer

MADE IN USA

PRECISION BUILT

Mann Lake Ltd. FREE SHIPPING

NOW ONLY $159.95

MANN LAKE
WE KNOW BEES

800-880-7694
www.mannlakeltd.com

Hackensack, MN • Wilkes-Barre, PA • Woodland, CA • Marshall, TX • Winter Haven, FL

*Free shipping applies to most orders over $100 sent standard ground service within the lower 48 states. Prices are valid 3/1/20 through 3/31/20.

LOSSES

INSTALL

TRANSFER

COMPLETE VISIT

SPLIT

ORGANIZE.
MANAGE.
GROW.

THE APP

TO GET STARTED OR FOR
MORE INFROMATION VISIT
WWW.THEBAPP.COM

Download on the App Store

ANDROID APP ON Google play

CONTACT US: MARKETING@THEBAPP.COM OR (480)530-4266

Betterbee

Beekeepers Serving Beekeepers

800-632-3379

betterbee.com

2020 catalogs are now available! Call or visit our website to request your free copy.

Gear Up for Spring!

Hive Kits

Betterbee hive kits are fully customizable to fit your needs!

We offer kits in 10 frame, 8 frame, wood, and polystyrene, made by Humble Abodes, Lyson, and BeeMax. If you are unsure which hive would work for you, give us a call and we will be more than happy to help you out!

Join us for Humble Abodes' Open House in Windsor, ME on March 21st!

Proudly carrying: Humble Abodes · BeeMax · Lyson · BeeSmart · Broodminder

Bee Culture

March Features . . .

Page 48

Page 82

800.289.7668
Executive Publisher – Brad Root
Associate Publisher, Senior Editor – Jerry Hayes, Jerry@BeeCulture.com, Ext. 3214
Assistant Editor, Design – Kathy Summers, Kathy@BeeCulture.com, Ext. 3215
Social Media, Event Specialist & Subscription Coordinator – Amanda DeSimone, Amanda@BeeCulture.com, Ext. 3255
Advertising – Jean Newcombe, JNewcombe@BeeCulture.com, Ext. 3216

Contributors
Clarence Collison • James E. Tew • Ann Harman • Kim Lehman • Jay Evans
Connie Krochmal • Jessica Louque • Toni Burnham • Ross Conrad • Jennifer Berry • Ed Colby

POSTMASTER: Send address changes to
BEE CULTURE, The A.I. Root Co., 623 W. Liberty St., Medina, OH 44256

Subscription Information
U.S., one year, $25; two years, $48. Newsstand price: $4.99. All other countries, (U.S. Currency only), $20.00 per year additional for postage. Digital Edition $15. Send remittance by money order, bank draft, express money order, or check or credit card. Bee Culture (ISSN 1071-3190), March 2020, Volume 148, Issue 3, is published monthly by The A.I. Root Co., 623 W. Liberty Street, Medina, OH 44256. Periodicals Postage Paid at Medina, OH and additional mailing offices.

Subscriptions, Book Orders – www.BeeCulture.com • subscriptions@BeeCulture.com

Advertising – 800.289.7668, Ext. 3216; JNewcombe@BeeCulture.com

Get your smoker ready, Spring is coming. Photo by Jim Still-Pepper.

We've got bees!

Pre-order your bees now to be ready for spring!

Package Bees *(Marked queens only)*

- #3 package w/Italian Queen
- #3 package w/Russian Hybrid Queen
- #3 package w/Purebred Russian Queen

Package Bees *(Unmarked queens only)*

- #3 package w/Italian Queen
- #3 package w/Saskatraz Queen
- #3 package w/Carniolan Queen

5 Frame Nuc *(Pickup only)*

- Nuc w/Italian Queen
- Nuc w/Purebred Russian Queen
- Nuc w/VSH Queen

Marked Queens

- Italian Queen
- Russian Hybrid Queen

Kelley Beekeeping

SERVING THE BEEKEEPER SINCE 1924

1-800-233-2899

www.kelleybees.com

FORMICPRO

FOR TREATMENT OF VARROOSIS
CAUSED BY VARROA DESTRUCTOR IN HONEY BEES (APIS MELLIFERA)

CERTIFIED bio gro NZ CERT INPUT FOR ORGANICS

FAST & EFFECTIVE
14 DAY VARROA TREATMENT

NO RESISTANCE. ORGANIC. SAFE WITH HONEY SUPERS. KILLS MITES UNDER THE CAP.

NOD
NATURES OWN DESIGN
APIARY PRODUCTS

Healthy Bees. Healthy Planet.

Available through beekeeping supply stores.
866-483-2929 | nodglobal.com | info@nodglobal.com

@NODAPIARY

Beekeeping & Honey Bees

—Our Business Since 1863—

FREE SHIPPING on purchases of $100 or more. Some items do not apply.

Dadant & Sons has served the beekeeping industry for over 150 years.

From humble beginnings, our company has expanded to 10 branch locations nationwide and 4 manufacturing facilities located near Hamilton, IL.

Since 1863 we've produced and sold the best beekeeping equipment available to beekeepers throughout the world. To this day, we still believe that *"it pays to furnish good goods."*

Dadant

Online dadant.com | **Toll-Free** 888.922.1293

Bee Culture's Best . . .

Page 27

Page 65

In Every Month –

Bee Culture

623 West Liberty St.
Medina, OH 44256
mailbox@beeculture.com

Honey Bee Health Video

Washington State University, Honey Bee Health program has just released a video to help beekeepers improve their stock and overcome some of the obstacles they may face in their breeding efforts. The selection and breeding of honey bees is perhaps the best long term and sustainable solution to the current issues facing beekeepers. Honey bee breeding poses unique challenges in that selection is at the colony and population level. This video presents a review of the complexities and basic selection methods. One of the most successful bee breeding programs, the Page-Laidlaw Closed Population Breeding Program, is described. Beekeepers can implement this program in working toward establishing and maintaining honey bee stocks that are productive, express increased resistance to pests and pathogens, and well adapted to their environment. This video gives an overview of honey bee breeding and selection that will help both the commercial bee breeder and beekeeping collectives trying to develop locally adapted bees. To view the video visit **https://vimeo.com/380776410**

Timothy Lawrence
WA State University
Coupeville, WA

The Good With The Bad

I've been receiving *BC* for four years. The January 2020 issue is filled with such interesting articles, I feel like I've been dormant like a winter bee. Here is the GOOD.

The article on DRONES by Dewey Caron, fascinating and never read characteristics about male bees or discussed in our Bee club as in the article. The Economic Outlook for 2020 Almond Pollination Season I thought was fascinating. We purchase packages of bees that are used in the almond agriculture business in California. The article and charts gave a great economic perspective never before discussed with the connection between bees per acre, costs and the almond industry. And finally The Plains Rich in Cultivated and Native Plants was informative how everything is in such balances with this good earth.

Here's the BAD. Your January 2020 cover gives the feeling of Winter. Being a graphic designer/photographer I may be more sensitive to your choice to use a picture that depicts what one could say is an abandoned Winter hive. It could be argued that the beekeeper swept off the entrance after he took the picture, but to most who probably don't care, the photo seems weak for a magazine that provides it's readers with proper care and practices of beekeeping. I would have much preferred to see for instance a picture of a winter hive as used in the Dadant AP23 ad on page 18. Well there you have it, love the magazine, it's this cover I found a strange choice to publish.

Michael Koscielniak
Michigan City, IN

Found In Translation

It's not easy to translate scientific studies into interesting reading for everyone. Jay Evans does it so well in every issue of *BC* with Found in Translation.

Evans' January summary of three RFID studies is outstanding. I would like to commend both him and the authors of these studies for unveiling the mechanism likely behind CCD. This is the first way of measuring how sublethal effects of stress lead to dysfunctional or failing colonies.

Could BC reprint Andrew Barron's essay "Death of the Bee Hive" to explore this important economic issue with beekeepers?

Vera Strogolova
Strong Microbials, Inc.

Thank You For Your Service

The honey bee enjoys a tremendous amount of goodwill from the public and we, as beekeepers, feel the effects of this goodwill by extension. I had always been aware of the public's appreciation for us, but it wasn't until a couple of weeks ago that I felt the full force of it, quite by chance.

All of my hives are located on the properties of others, and it's the generosity of these landowners that makes my beekeeping possible. One such landowner recently leased out their property, and had told the new tenant to expect to see me on the land from time to time. On meeting the new tenant for the first time, he told me that he had been stung as he walked past the hive (a feral colony that took up residence in an empty hive: very productive but in need of a good re-queening to take a little of the "heat" out of their personality). I braced myself, expecting him to tell me he would be contacting the landowner to have it removed.

On the contrary, he laughed it off and proceeded to tell me what an amazing job I was doing, and how much he values and appreciates the good work done by local beekeepers. Twenty minutes later, this man I had only met was still shaking my hand and thanking me, and I was blown away by the positive light honey bees and their 'keepers are viewed with nowadays. I told him I would bring an extra suit next time, so he could join me, and he emphatically declined! One bee-sting had been enough for him, but his appreciation for the work we do was palpable.

I was reminded of the gratitude I feel towards those who do difficult and often thankless tasks, selflessly and for the good of the community, nation, or world as a whole.

Would I want to don a dry-suit and board a whaling ship, to save endangered cetaceans? Absolutely not! But I am endlessly grateful for the fearless environmentalists who risk their lives to protect our endangered species. The same goes for our military heroes, who perform dangerous duties every day to keep us in the lifestyle we are accustomed to. Doctors, religious leaders, teachers...all people who devote their lives to improving the world, and who we should thank for their service.

The public puts their faith in us, and it strikes me that we owe a duty to them, in return. Beekeepers are increasingly seen as guardians of the environment, in many ways, and that knowledge has energized me to live up to that perception. We can repay those who support us, and the environment that sustains our beekeeping, in a number of ways: maintaining healthy, disease-free hives; maintaining high standards in our honey production; planting native forage, which will in turn assist our native bees and pollinators; providing native bee nesting sites; educating the public on the importance of pollinators, and the dangers of pesticides.

It's my hope that we beekeepers, who already provide a valuable cultural, economic and environmental service, can take our vocation to the next level. The celebrity status of the honeybee and the public's respect for, and interest in, protecting it, gives us enormous power to shape people's attitudes and behavior regarding pollinators and, perhaps, the environment as a whole. If someone shows interest in what you do, why not grab an extra suit and invite them to join you on your rounds? A person's first-time inside a hive is a magical experience, guaranteed to knock their socks off, and you can use that positive association to educate them on actions they and their friends can take to make sure we have a world that can sustain honeybees and their native cousins for generations to come.

Peter Keilty

We have some Great writers and contributors in Bee Culture. I think this is a marvelous gift to have a passion for honey bees and the environment and be able to have that translate into written words. But, I like to know about the people who write for us. Who are they. How did they get to this point in their lives. What has been their life journey and how has it manifested itself with honey bees and now Bee Culture. One of our most popular writers is Ross Conrad. Ross has a mission and he is not one to shirk that or apologize for his beliefs. I wanted to know more about Ross.

We have someone who know Ross probably better than anyone, Alice Eckles, who took the time to interview Ross and share that personal information with us. It is really fascinating. It should be a movie. Take a look you won't be disappointed. Jerry

Alice Eckles – I know you were a communications major in college, how did you end up keeping bees for a living?

Ross Conrad – I got into beekeeping after having a spiritual experience with a honey bee. During the Winter of 1990, I had a job that provided me with a lot of free time during the day and I found myself doing a lot of soul searching about the state of the world and my role in the world.

During this time, I was drawn to reading a number of books by Native Americans, in particular books by a Ojibwa native elder named, Sun Bear. Sun Bear ran a teaching community near Spokane, Washington where he taught native wisdom to anyone who wanted to learn and so that Winter I decided I was going to go out west and try to learn some native wisdom. During my time with the Bear Tribe, I participated in some of the ceremonies they were conducting and one of them was a vision quest, a right-of-passage a native person coming of age would go through as they seek their vision for their future and their path in life.

I fasted and prayed for four days and nights in a place on their land seeking a vision for my future. During my vision quest, I thought a lot about the deteriorating condition of the environment. Although it may seem tame compared to the environmental issues we face today, back then I recall some of my biggest concerns were the destruction of the rain forest and the disappearing whales. I wanted my life to bring healing to the earth in some way rather than to continue to be part of its destruction. I had become more and more concerned about the condition of the environment after growing up on Manhattan Island in New York City, and living in an environment in which all of the natural world had been destroyed and replaced with a man-made environment. I also had worked my way through college by traveling to Alaska for three Summers and working in a cannery that processed seafood. There I saw the tremendous amount of death our society imposes on the natural world in order to feed ourselves. These experiences had a big impact on me.

So, on the second day of my vision quest, I looked down and sitting on my big toe was a honey bee. It kind of startled me as I had not seen it come and land there. I had not heard it, or felt it. It just kind of appeared to me and I was worried at first but calmed down as it did not seem to be coming after me in a threatening way. It was just sitting there. Now one of the things I had learned was that many in the native community believe that everything in the natural world has something to teach us, if we are open to it in our hearts and our minds and so in trying to keep with the spirit of things, I looked at this bee and asked it what it had to teach me. Right then it took to flight and flew around me before landing on me again. It kept this up, flying around a bit and landing on various parts of my body for several minutes before it flew off.

I had never experienced anything like that before and found it kind of strange, but didn't give it much more thought until the next day when I was sitting in the exact same spot and I heard a buzz in one ear and then a buzz in the other ear, and when I looked to see what it was, I saw what appeared to be a bee flying away as if to say, "don't forget what I told you." While the bee seemed to be trying to communicate something, I did not have a clue what it may have been trying to tell me. Then about seven months or so later, after returning home to Middlebury, Vermont a commercial beekeeper, Bill Mraz, for whom I had worked for part-time helping one season with the honey harvest a couple years earlier asked me if I wanted to work full-time keeping bees with him and his father. Now I think most people in their right mind don't jump at a career opportunity to work with millions of stinging insects that can potentially kill you, but because of the experience I had during my vision quest, I decided to take the job. Between them, Bill and his father Charles Mraz of Champlain Valley Apiaries in Middlebury had over 100 years of beekeeping experience and working for the Mraz's turned out to be a great education in beekeeping.

AE – When we first met you were writing a book, Natural Beekeeping, later published by Chelsea Green. What made you realize you had a book to write on the subject?

RC – Once I started working for a commercial beekeeper, I of course wanted to get a few hives of my own. In caring for my own colonies of bees, I refused to use pesticides to control mites and did not want to use antibiotics to control diseases, so I had to find alternative ways to help keep my bees healthy. Back in the 1990s, there was precious little information available on beekeeping without chemicals and drugs. The internet was not as ubiquitous as it is today. Gunther Hauk had written a book on biodynamic beekeeping and the New Zealand beekeepers association had published a book on controlling American Foulbrood without the use of drugs, but that was all I could find on alternative beekeeping methods. This led to a lot of experimentation and trial and error. Once I found a formula that allowed my bees to survive the harsh

From The Editor —

An Interview With Ross Conrad

Vermont Winters most of the time despite being challenged by mites and their accompanying pathogens, I decided to write about it for other beekeepers who might like to learn from my experiences. Someone once said that if you want to read a book about something and find it has not been written, you should be the one to write it, so that is what I did.

AE – Why did you feel you couldn't in good conscience use the same pesticides and antibiotics as the commercial beekeeping operation where you were working and why should beekeepers use alternative and organic methods instead?

RC – Chemical beekeeping with pesticides, antibiotics and the regular use of artificial diets work to control starvation as well as pests and disease (until resistance develops) but they also cause sub-lethal stress that undermines the health of the colony and can compromise the final products of the hive. If diseases, pests and nutritional issues can be controlled without adversely affecting the health of the bees, the beekeeper, or the final product then why would we not prefer that approach? I view this type of beekeeping as simply an extension of what the bees teach us, which is to do no harm, or the smallest amount of harm possible, while at the same time giving back in a way that makes the world a better place.

AE – I feel like this has been the story of our lives. How would you say we have incorporated this beekeeping philosophy into our lives?

RC – Well beekeeping is only one way to help manifest the wisdom of the honey bee into our everyday lives. It also inspires me to bring the rest of my life into alignment with the wisdom of the honey bee.

AE – Is living in a yurt part of that story?

RC – The incredible damage that the production, transport and use of the coal, oil and gas fossil fuels does to our planet and our lives really hit home for me when the BP Oil spill occurred in 2010. As you know, after seeing all the media coverage of the environmental and human devastation that spill inflicted we decided we didn't want to be a part of the fossil fuel pipeline any more. We were living in an apartment in town with oil hot water and heating systems. We had just recently bought

Ross at home with his bees.

a piece of woodland where we wanted to build a cordwood masonry home and we decided why wait, let's get a yurt and move onto our land now, saving us money on rent and removing us from the end of the fossil fuel pipeline.

Fossil fuels are so easy and convenient to use, they are very seductive and are a hard habit to break. We found this out when we learned that the biggest energy consumption sector in the entire food chain is the refrigerator. We tried to live without using it while in the apartment, but we failed miserably in this effort. When it is there, you use it. We had to place ourselves in a situation where we simply didn't have the option to be able to use a fridge before we figured out how to live comfortably without one. Part of this learning curve was to switch to a primarily vegetarian diet, heavy in local and organic foods. Not only is such a diet generally healthier and have a smaller environmental footprint, but it is much safer when you don't have good refrigeration.

Placing ourselves into a situation where we didn't have any electricity, no indoor plumbing or septic, and no fossil fuels at our command forced us to develop alternative systems that could replace the conveniences and benefits they normally provide. When you live with fossil fuels on a daily basis and rely on them for survival, you're in a crisis when they are suddenly not there. It is very different when you voluntarily choose to live without fossil fuels and take the time to plan and develop the alternative systems to replace the jobs that fossil fuels would normally do for you. We quickly realized that this was the perfect way to develop the systems we would need to run the house we were planning to build as part of our ongoing experiment in trying to live while consuming the least amount of fossil fuels possible in our home. So far we have got it down to the equivalent of 15-20 gallons a

This mean green beekeeping machine was converted to run on waste vegetable oil by students at our local vocational/ technical school.

PICK-UP AVAILABLE

Shastina Millwork

CUSTOM COMMERCIAL

CALL FOR QUANTITY DISCOUNTS

WOODENWARE

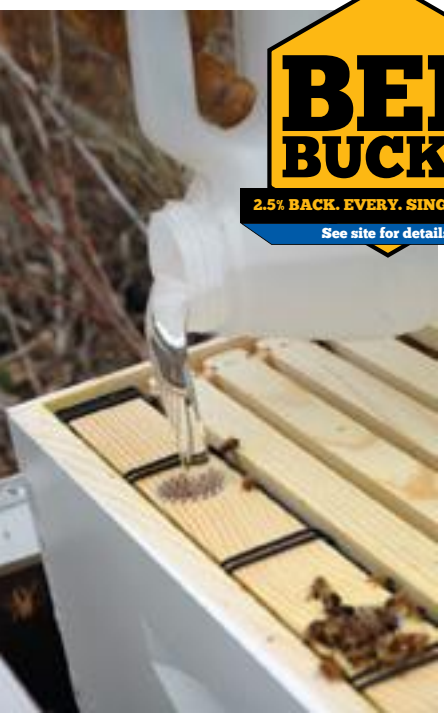
Durable & Affordable

OUR COVERS STAY FLAT AND LAST LONGER

POLLEN PATTIES

ULTRA BEE

BEE-PRO®



BEE BUCKS

2.5% BACK. EVERY. SINGLE. TIME.

See site for details.

SYRUP ON SITE

We now have bulk Pro-Sweet on site - call today for quantity discounts!

- Contains both binomial and monomial sugars
- Stimulates bees & helps them put on weight
- Won't ferment like sugar water
- Ready to feed to your hives

Also available in 2½ gallon and 5 gallon sizes!

CUSTOM COMMERCIAL MANUFACTURING - ANY SIZE, ANY QUANTITY

dave@shastinamillwork.com 877-789-7526 shastinamillwork.com

year – mostly to run the chainsaw and snow blower.

AE – I love the way it didn't stop with the yurt. Can you explain all the features of the house we are building that align with the wisdom of the honeybee?

RC – The home we have started building will be partially underground. Two walls will be bermed and we will have a green living roof with plants and bees on it to allow us to take advantage of the natural insulating properties of earth. A green roof also allows us to reduce water run-off, and eliminate the heat-island effect created by man-made building materials. Our property is in the woods, and since we have a ready supply of fuel on site, we have installed a masonry heater, cook stove, and oven since masonry heaters are the most efficient way to heat with wood. We are incorporating a composting toilet into our house design along with a modest photo-electric solar installation.

AE – How do you travel without fossil fuels? And how have we managed to use even fewer fossil fuels for transportation recently?

RC – One of the biggest uses of fossil fuels for many people is transportation. Since 2005 I have been driving diesel vehicles that have been modified to run on waste vegetable oil that I collect from local restaurants. (see *Bee Culture* September 2008) We installed a photoelectric solar system on our land in 2018 and so in 2019 we bought a used electric vehicle so now we can power our transportation, at least partially, with the fossil-fuel-free electricity we produce at home.

It always came across as hypocritical to me to suggest that others stop burning fossil fuels when I was using them all the time. However, once I made changes that brought my life into better alignment with my values, I was empowered to reach out into the broader community and begin to push for changes there. Thus, I have since become more involved in my state and local politics and currently serve on my Town's Energy Committee and my County's Regional Planning Commission.

For me beekeeping is not only part of my effort to create right livelihood for myself, but also a spiritual pursuit that constantly informs my decisions and provides inspiration. The typical

One thing you notice about living in a yurt is that it is acoustically transparent. If you live in the woods, the sounds of the animals, the wind in the trees and the pitter patter of rain make up your soundtrack.

colony requires 150-200 pounds of honey to get through an entire year, and even though it is estimated that the average worker bee can only produce 1½th of a teaspoon of honey over its entire lifetime, it doesn't fall for the illusion that what it does is insignificant. In the same way the cumulative impacts of all our decisions from whether we vote, to the sources of the energy we use and the foods we eat may seem insignificant, but they matter. As fellow Vermont beekeeper Kirk Webster has pointed out, our old way of life is dying and a new way is struggling to be born. Are we going to spend our precious time participating in the death or the birth? They are both happening at the same time so we have to choose.

AE – Tell us about your latest writing project.

RC– I have just co-authored a book on the history of beekeeping in Vermont. It is not a complete history but covers all the major events, many of the beekeepers, and most importantly the unique skills of Northern queen production and overwintering that Vermonters have excelled at. Skills that I think beekeepers throughout the northern reaches of the U.S. and Canada can benefit from.

AE – What do you do for enjoyment?

RC – For enjoyment I tend to watch movies, go for walks in the woods, share meals with friends, listen to music and play games or work on puzzles, but mostly I am enjoying everything that I do in life. Working with the bees and the natural world in a way that is meaningful to me; Meeting interesting and innovative beekeepers from all over the world; Trying to figure out how to live more sanely in a world that seems more and more chaotic and insane with every passing year. Life is an incredible adventure. BC

Alice Eckles is the author of the novel *The Literature Preferred by Wild Boar*. She is also the arts and crafts and idea person at Dancing Bee Gardens, in Middlebury, Vermont.

Dadant

Online dadant.com
Toll-Free 888.922.1293

It's Summers Time –

Spring, Gardening and More Loss

One of the first sure signs that Spring is coming is that very first seed catalog that we receive – almost on the day after Christmas, certainly by mid-January. And it's almost overwhelming – literally hundreds of different tomatoes, peppers, onions. There is so much of everything that it is really hard to decide what you want.

Each year we hope to do a better job than we did last year and the year before. I hope Kim and I are not the only ones that start out with grand vision of the garden spot and wow, let's make it even bigger this year. Why? We didn't take good care of it last year. Why do you want it bigger? Because we're so hopeful that this year we'll do a really good job. We'll keep all the weeds pulled, we'll feed when we're supposed to, we'll do all the right things.

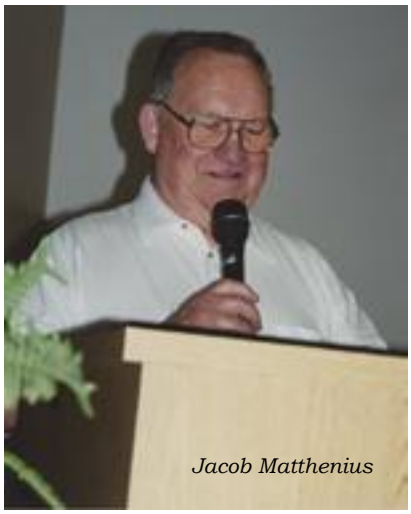
Time for true confession. It's kind of the same story with our bees. We didn't do a very good job last year. Why? Because we're so busy writing about bees and teaching other people how to be good beekeepers that we don't have enough time to take good care of our own.

One thing Kim is really good at is taking good care of the plants during the Winter months. We have something blooming in our house all Winter long. It's delightful. Right now we have hyacinth bulbs sprouting and just about ready to bloom. It's so nice to be surrounded by plants when it's cold and snowing outside. We even broke tradition this year and used our beautiful Norfolk pine as our Christmas tree. He definitely has the touch.

Our furnace room is actually more of a greenhouse. We even get letters from the electric company concerned that we use a lot more electricity than our neighbors. Kim counted over 200 plants in that basement room. Every month or so we swap things between the basement and the rest of the house. It's wonderful.

For the second month in a row the beekeeping industry has suffered a loss. This time we've lost two good friends in our beekeeping world.

Jacob (Jake) Matthenius passed away at 91, on February 7. He was from Pennsylvania. Jake was the second chairman of the Eastern Apicultural Society (EAS). I only met Jake a couple of times, so I didn't know him well. My best memory of him is coming to Ohio for our 50th Anniversary Celebration for EAS. We were able to have all five (at that time) Chairmen and many of the presidents from past EAS Conferences. The 50th was held at Kent State University and we were honored to have Jake among the special guests.



Jacob Matthenius

EAS suffered another very personal loss. On February 6 Willie Robert (Bob) Cole passed away at the age of 92. Bob was the third Chairman of the Board for EAS. I met Bob at my very first EAS in Lancaster, PA in 1994. Over the years of my work with EAS I got to know Bob pretty well. He was a good friend to Kim and I and also to *Bee Culture*.

Bob Cole

Bob loved EAS. He loved the Master Beekeeper program, he loved bees and beekeepers, and he just enjoyed teaching people how to be better beekeepers. He travelled the world extensively, sometimes with our dear friend, Ann Harman. They volunteered and went to some places I'd never even heard of just to teach beekeeping. EAS won't be the same without Bob.

People say 'as we get older' we start to lose those that we love. It seems to be happening a lot lately and it's hard. But we are blessed to have had these folks in our lives.

I'm hoping you didn't notice, but we were a little sloppy with the February issue. I can give you all the reasons – travel, holidays, rushing to get done, short-handed, still adjusting to our new boss. We try our best to give you the very 'best' *Bee Culture* that we can. Mostly I think we succeed, but sometimes we make a mistake or two here and there.

I hope to see some of you at the big Tri-County meeting in Wooster, Ohio on March 7. There will be over a thousand people there with speakers and vendors. It's one of the best days in beekeeping and the first one of Spring here in Ohio. It's what gets us all fired up and ready to keep bees.

MARCH – REGIONAL HONEY PRICE REPORT

Below is data from surveys we've taken for the past seven years. The picture it shows is pretty informative, and, predictable. That's a good thing because it shows that some fly-by-night, trial-by-error things come and go, but the good ones are consistent. We made one error this year that's unfortunate. We listed one area twice, and missed sales on the internet.

A few things bear noticing however. Generally, the farm market scene remained fairly steady considering the number of sellers, but the amount sold pretty much doubled for all types of markets. You might consider these outlets more this year. Bakeries, too, seem to have increased in a healthy way with more reporters selling to, and selling more to bakeries. What's up in the honey baking scene we wonder. Worth checking out don't you think.

Also interesting was that the percent selling at work didn't change at all really, but the amount being sold there is way less than half compared to last year. Any ideas why?

We guessing that the percent of our reporters selling, and the amount of honey sold at the local fairs this past year has to be a sampling error. Way, way more selling, and way, way more sold than last year. If you sell, let us know why, and if you don't you should seriously consider checking this out this Summer.

Where Do They Sell Their Honey?

% of Reporters Selling at these locations							% of Their Honey Sales at these locations							Locations Honey Sold at
2014	2015	2016	2017	2018	2019	2020	2014	2015	2016	2017	2018	2019	2020	
72	83	61	67	87	81	71	31	39	46	38	31	36	35	Home (inside or roadside stand)
14	24	14	20	13	18	26	43	32	42	34	37	44	24	Local community - sponsored farm market (i.e. Sat. & Sun. sales)
26	22	24	20	31	26	17	29	20	44	30	29	29	15	Local Farm Market business that's seasonal (Fall only, for instance)
25	28	27	19	26	23	24	26	30	37	38	42	30	21	Local Farm Market business that's year-round
6	6	3	7	5	8	4	10	15	25	19	15	30	38	Flea Market
83	22	22	35	31	35	24	22	19	27	22	18	17	19	Health Food/Organic store
11	13	3	9	18	18	14	10	14	25	13	9	13	11	Gift Store
13	11	2	14	16	23	12	12	19	80	22	34	21	13	Bakeries/Food Establishments
10	9	10	16	16	14	17	16	34	38	18	9	20	24	Local High-End Retail Outlets (gourmet stores)
32	35	15	33	35	37	34	25	20	37	24	23	30	23	Local, Small 'Mom & Pop' Retail Outlets (grocery & gas)
7	11	7	14	18	15	14	28	45	44	43	24	38	25	Local Small Packer or Producer/Packer
3	4	2	3	3	0	61	78	83	45	55	35	0	50	Huge Packer, they pick up
8	11	9	7	10	14	1	37	45	45	48	43	49	53	Wholesale only to larger stores, you deliver to warehouse
13	7	2	14	11	15	14	5	9	30	12	5	6	4	Breweries/Beer or Mead makers
8	6	3	7	6	-	11	8	4	10	10	17	-	4	Internet, direct retail, mail order
33	19	27	36	47	36	36	13	12	34	24	25	17	5	Work, direct retail
10	7	2	16	6	6	42	13	7	27	5	17	7	17	Local/State Fair, with club

*Total percentage of sales does not come out to 100% because of multiple outlets.

REPORTING REGIONS								SUMMARY			History	
	1	2	3	4	5	6	7	Range	Avg.	$/lb	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS												
55 Gal. Drum, Light	2.13	2.32	2.30	2.10	2.29	1.70	2.70	1.50-3.00	2.22	2.22	2.24	2.28
55 Gal. Drum, Ambr	2.28	2.22	2.24	2.11	2.16	1.60	2.47	1.30-3.00	2.17	2.17	2.09	2.19
60# Light (retail)	222.00	190.00	215.00	155.95	147.50	177.87	220.00	120.00-300.00	195.57	3.26	211.90	201.36
60# Amber (retail)	214.59	190.55	212.50	161.94	199.80	174.58	221.85	113.74-285.00	200.24	3.34	209.94	201.96
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	97.28	76.70	93.20	68.00	61.20	107.34	107.34	57.60-194.40	88.67	7.39	96.89	90.32
1# 24/case	148.12	108.78	138.23	117.39	104.00	157.29	136.20	60.00-300.00	134.58	5.61	139.60	133.17
2# 12/case	128.57	101.10	118.35	86.90	111.84	140.61	129.00	79.20-246.00	118.61	4.94	125.19	114.76
12.oz. Plas. 24/cs	101.82	104.66	104.67	89.79	57.48	100.93	123.60	31.20-172.80	99.85	5.55	100.86	98.78
5# 6/case	143.35	113.80	160.20	112.75	113.16	144.57	144.57	71.50-240.00	133.40	4.45	131.36	128.84
Quarts 12/case	175.60	156.44	139.87	149.14	143.69	192.00	174.00	108.00-300.00	158.12	4.39	148.56	157.36
Pints 12/case	92.70	98.24	80.50	84.77	111.00	94.00	84.00	60.00-140.00	91.49	5.08	103.72	94.66
RETAIL SHELF PRICES												
1/2#	5.84	5.03	4.75	4.29	4.50	5.59	5.59	3.00-9.00	5.18	10.36	5.27	5.21
12 oz. Plastic	7.12	6.34	5.69	5.01	5.27	7.50	5.93	3.68-12.00	6.17	8.23	6.17	6.07
1# Glass/Plastic	9.16	8.02	8.40	6.44	7.27	6.00	8.31	4.79-17.00	8.14	8.14	8.08	7.91
2# Glass/Plastic	15.00	11.94	15.34	10.18	12.80	10.00	15.17	8.39-25.00	13.89	6.95	13.36	13.76
Pint	13.04	10.43	9.30	9.73	11.30	10.60	10.20	6.00-22.00	10.75	7.17	10.03	10.89
Quart	24.63	17.85	16.41	16.78	19.54	18.60	20.46	11.50-40.00	19.18	6.39	16.72	17.99
5# Glass/Plastic	31.45	27.31	40.75	25.28	24.69	32.50	32.13	17.99-50.00	30.27	6.05	29.27	29.91
1# Cream	11.46	7.96	10.00	6.50	8.24	10.87	12.50	6.00-18.00	9.74	9.74	9.90	10.52
1# Cut Comb	13.70	11.31	12.19	12.50	15.00	13.52	15.00	6.00-22.00	13.03	13.03	11.72	11.93
Ross Round	12.01	7.25	11.04	10.00	7.75	11.00	13.75	5.50-17.00	10.84	14.45	11.33	9.17

NEXT MONTH

Welcome to NEXT MONTH, where our Honey Reporters share a line or two about what they will be doing NEXT month with their bees. Advice is given for each region so you can see what others are doing where you are, and, of course in all the rest of the regions. Check these out. These reporters are successful in business.

Region One

- Spring is Coming, Feed, Feed,
- Check Honey Stores
- Add Pollen Patties
- Feed Sugar Patties
- Sample for Mites, Treat if Necessary, Sample Again
- Rearrange Frames of Honey for Colony Access
- Install Top Feeder, Fill it
- Boxes
- Check for Dead Outs
- Order Packages
- Continue Praying
- Mine All Died/ Don't Know Why

Region Two

- Be sure colonies are Queen Right
- Sample for Mites, Treat, Sample again before putting Supers on
- Add Supers
- Check for Over Crowding
- Swarm Control
- Keep Eye on Feed
- Watch for Early Swarming
- Check for Brood
- Get Ready for Splits
- Replace Damaged Equipment
- Spring Splits

Region Three

- Swarming, Check for Queen Cells
- Make Splits
- Sample and Treat for Mites
- Mite Check/Queen Check
- Inspect Colonies weekly for Swarm Cells
- Add Hive Bodies
- Super, Super, Super
- Feed and Split
- Equalize Colonies

Region Four

- Control Swarming
- Mite Control
- Split Strong Colonies
- Feed Sugar and Patties
- Combine colonies if needed
- Swarm Prevention-Checkerboard Frames
- Add Supers
- Requeen where necessary
- Sample for Mites, Treat if needed
- Rotate Brood Boxes

Region Five

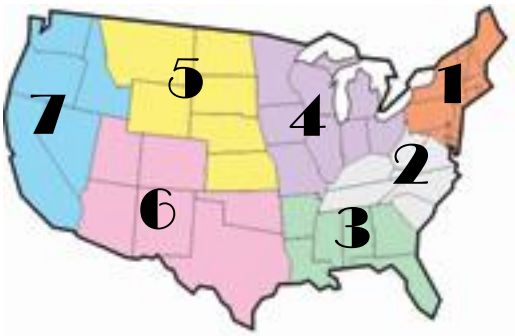
- Check of Food Supply
- Feed Food Supplements
- Sample for Mites
- Make Splits
- Clean Bottom Boards
- Feed if necessary
- If Weather permits Unwrap Colonies

Region Six

- Feed Sugar Syrup
- Replace Winter Patties if needed
- Sample for Mites and Treat
- Split and Requeen
- Combine or Split
- Inspect on Warm Days
- Reverse Hive Bodies

Region Seven

- Sample and Treat for Mites
- Restock Deadouts
- Feed Syrup
- Mite check
- Inspect for Swarm Cells
- Equalize and reverse Brood Boxes
- Feed and Split, Split and Feed



More Honey Reporters Wanted

We are always 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 **Amanda@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.

BEE TALK

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

Question 1

More Bees are considered better than less honey bees in a colony. But, as Spring arrives populous, healthy honey bee colonies want to reproduce by Swarming. Do we want to stop it? Do we want to encourage it? What should a beekeeper do?

As in any beekeeping practices, a beekeeper will have several options to choose from based on colony conditions and what he wants to be the end results.

A. Option 1. I would not let the bees swarm otherwise, it will be loss of bee population. It will also a set back to the bees left in the box. The virgin queen left behind in the box will take few days to mate and then she will start egg laying. This process may take up to 10 days for a queen to mate and start laying eggs. The off spring of newly mated queen will be 21 days later. The result of this process is a low colony population that will not make as much honey. If the queen fails to mate due to inclement weather conditions (e.g. rain, cold, etc.), the beekeeper will have to requeen with another queen. This even will delay the process of recovery and building up population to make honey and lead a normal colony this summer.

Option 2. I will make splits from the strong colony to avoid any swarming. The beekeeper will have to decide what a size of a split to make based on colony strength, season in his region, and what he wants to have at the end of the season. If a beekeeper is into increasing the number of hives, he will then make one or two splits out of the colony using one to four frames of brood and one to three frames of honey and introduce mated queens or queen cells to those splits. The mother colony will be in a good shape to make honey based on the population left and the season progress in the area. If a beekeeper does not want to increase the number of hives, he has the option to sell those newly made splits as nucs and make some money.

Option 3. A beekeeper will make splits and let them requeen them selves. This system is known as "walk away splits". I personally don't recommend this option as it takes two weeks for a queen to develop, mate and start egg laying. By the time the beekeeper will have a regular colony headed by a mated queens it will be five weeks. This is a waste of time and use of bees during the season. It will be even questionable option in Northern climates where the season is too short.

Overall, After making splits and addressing the swarming issue. I highly recommend to requeen the swarming colony to reduce the swarming tendency in my colonies. ***Medhat Nasr, Alberta***

A. My favorite number in beekeeping is AVERAGE. AVERAGE population, average temperatures, average precipitation, average seasonal length – I could go on. Why? Because every living thing has a long evolutionary history of AVERAGE and knows how to handle those situations. We also teach rules to newbees in beekeeping, but live in a multi-variable world of complex equilibria. AVERAGE simplifies complex, important decisions. I'd also point at some of my favorite bees, Carniolans, who are hardy mostly because they are totally tuned into seasonal signals, and they choose to Winter on the smallest feasible cluster size. I think swarming is natural, and in many cases inevitable, but it is a total disaster around here if a huge-o colony decides to do it before Spring has established itself. The brood breaks my colonies have seen from swarming seem to have also helped with *Varroa* control. My city neighbors don't love those swarms much, though.

If I know that I have a boomer colony, I will split it as soon as I feel it is safe: I take a page from Steve Repasky's book and watch for the production of purple-eyed drones in the Spring. It is worth learning all you can about splitting colonies, anyway, so go read "Increase Essentials."

Anything that winters here (DC) will split or swarm (or both) so I engage in plans to split everything based on it's size/strength and the long range forecast. We also organize a swarm squad here because, gasp, beekeeper plans are rarely perfect. ***Toni Burnham, DC***

A. Much depends on the goals of the beekeeper. Rather than try to stop swarming in an effort to maximize honey production, or encourage swarming and risk not only losing honey production and having to feed colonies to get through Winter, but potentially losing the entire colony should they fail to successfully requeen themselves, I prefer the middle road. I try to discourage, but not stop, swarming by reversing the hive in the Spring and then adding honey supers in a timely manner to be sure the colony does not get over-crowded and congested. My goal is to keep as large a population of bees in the hive early in the season so that they at least can store away plenty of honey for Winter. Then if they swarm later in the Summer, at least I don't have to deal with the extra work and expense of feeding in order to prepare the colony for Winter. ***Ross Conrad, VT***

Frames - Plastic

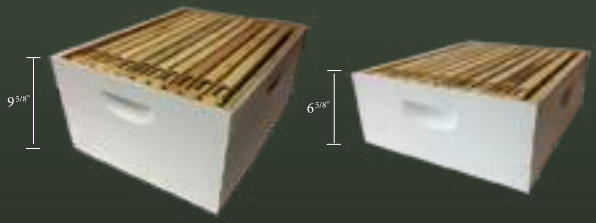
- Super Strong and Durable
- Safe - FDA food grade plastic
- Easy to use - No Assembly Required

Frames - Wood

- Stronger than Industry Standard
- New 1/2" thick end bars - 3/4" top bars
- Assembled, Glued, and Stapled

Snap-in Foundations

- Impervious to wax moths, rodents, and hive beetles
- Preferred by Professional Beekeepers
- Precision molded, perfect cells
- Easy to use - Snaps into wood frames



Commercial Grade Boxes

- Honey Supers & Hive Bodies
- Added Strength 1 – 5/8" Top Joint
- Pacific Northwest Ponderosa Pine
- Assembled, Primed, & Painted

Pierco®

Genuine Beekeeping Equipment

EST. 1977

Buy Pierco - Buy Quality
Factory Direct Store
Low Prices - Buy Now & Save!

FREE SHIPPING * See website for details

Check us out at: www.Pierco.com

FOR ALL YOUR BEEKEEPING NEEDS

HOBBYISTS / SIDELINERS / COMMERCIAL BEEKEEPERS

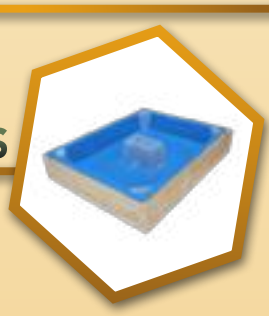
SUPERDFM PROBIOTIC

We Offer DOUBLE & TRIPLE WAX

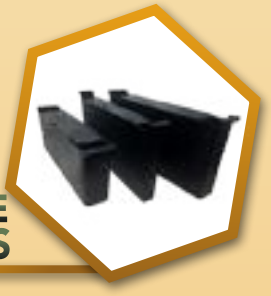
VARROA MITES

BEEKEEPING KITS

TOP FEEDERS



PROTECTIVE WEAR



IN-HIVE FEEDERS

Call or Visit us at:

Factory/Store Address: 680 Main St. | Riverside, CA | 92501

Get Connected | (800) 233-2662 Made in the USA

A. I spent a lot of energy in my first years of beekeeping trying to control swarming without splitting. It proved almost impossible. A good split gives us two populous colonies, ready to take advantage of the Spring flow, and at least one new queen. It's a win-win for us and our bees. Not splitting causes loss of the old queen and half of the hives' population, and 75% of the time, the swarm dies. Split early and win. ***Tina Sebestyen, CO***

A. In general, we want to avoid swarming, because we lose the queen with its genetics for which we may have paid highly, and the work force resulting in fewer nurse bees and fewer foragers (less honey stores). Multiple swarms result in the loss of most of our young worker bees. In addition, the new queens will only have half of the "mother queen's" genetics along with that of the 15 or more drones she mated with. If the drones are sick or have poor genetics, the colony's new progeny will be affected.

Obviously beekeepers who live in town want to avoid swarming to avoid potential neighborhood tension. Many books explain how swarming can be avoided or at least minimized. Strong colonies can defend their colonies and overcome potential illnesses and problems as well as produce a good honey crop. Making nucleus colonies is one good way of reducing the risk of swarms and provides the beekeeper with more colonies for backup if problems arise. ***Barb Bloetscher, OH***

A. Do we want to stop it? Honey beehives that are populous in Spring progress to swarming as a form of natural reproduction. A beekeeper could effectively try to stop the swarming behavior (i.e. split colony, cage queen/queen excluder, requeen, etc.), but it may not always work. The recommendation of swarm stopping is in place in most cases for the following reasons:

- Geographic location of the colony (i.e. swarms in southern region could happen all year given mild/ideal weather)
- Season of when swarming may occur or time of year (i.e. remember adage: swarm in July, aint worth a fly – colonies need time to build population of food and brood stores for Winter survival)
- Apiary location in relation to human population (i.e. swarms in cities not ideal given potential for human concern)
- Learning tool for beekeepers (i.e. new beekeepers can learn so much by understanding the signs and mechanisms of swarming that learning to stop it is in essence making them a better beekeeper because you are learning how the colony "thinks and reacts."
- Legality (i.e. towns/cities and states may have ordinances in place that require beekeepers to manage colonies to prevent or mitigate swarming so it also may be legally required that you manage swarming in your area)
- Potential for disease spread (i.e. colonies that swarm could spread disease, parasites, pests to new areas)

Do we want to encourage it? Remember swarming is natural reproduction. If you have an old queen (i.e. older than two seasons of laying) or she is not up to par (i.e. spotty brood pattern, physically damaged body, etc.), it may be worth saving her genetics (if she has been a proven layer, colony overwintered, or good honey producer or whatever traits you are interested in) then, letting the colony get a fresh start with a new queen of the same genes, if the swarm goes by the book and actually re-queens from the same hive, leaves you some population that is able to continue in growth the same season. Some beekeepers also love the challenge of catching/fishing for swarms. Note that if you place swarm lure/trap boxes in an area these need to meet state/local laws since some states require that no exposed beekeeping equipment can be left outdoors (i.e. comb or box used for swarm catching). I encourage beekeepers to try to stay one step ahead of the bees if possible so they can try to control the outcome of what colony-level decisions are made.

What should a beekeeper do? It depends based on the answers to part one above. It also depends on how you manage your apiary. There is no wrong answer here unless you are violating laws, then you must step back and re-evaluate to get a legal plan in place. Remember, honey bees want to reproduce, so your best laid plans may change leaving you with no choice as a beekeeper so equip your beekeeper tool kit by learning how to recognize and react to the signs of swarming. Knowledge will always keep you in the drivers seat even if it feels like you are backseat driving most of the time! ***Kim Skyrm, MA***

Question 2

Looking at the first Question, what if a colony is too weak or shows no preparation to swarm. Is that a good sign? Or is it a cause for concern and a closer look at the colony?

A. Of course the weak colony in Spring is a concern. Then, I would have to investigate to find out why? Few symptoms to look at – presence of diseases such as Nosema, *Varroa*, AFB, EFB, Chalk brood, etc.; brood pattern; presence of queens and queen age; feed; colony history from last year by checking notes taken about the colony last year. This step will enforce the importance of recording colony management through the season.

Once a beekeeper has a good idea about causes of weak colony, then he has to make a decision on how to help this colony to recover. In many cases if the colony is weak, it is economically better to get rid of this colony. If there is enough population, then requeening and adding capped brood about to emerge and feed will help. I would not advise combining weak colonies together unless you know the colony has no disease history. Combining weak colonies that have diseases will spread more diseases around the bee operation. ***Medhat Nast, Alberta***

If a colony is weak, you could consider moving some brood from that boomer colony (if you have one, and do a mite test first). My feeling is that colonies which limp out of winter are likely to keep limping. You can try to reinforce them by adding package bees (without the queen – yes, you can buy that) or by requeening as soon as queens are available. I'd do my best to be sure that the colony was right-sized for the population so that SHB and wax moth don't take a shot at wrecking the place. I might consider doing an oxalic vape, too, in case *Varroa*

New For The Beekeeper –

Some might say it takes a little passion and a lot of drive to run a successful business. Two qualities Ryan Howard, with his wife Daniella, have channeled to create success with **Sunrise Feed and Supply**.

Now entering its fourth year, the bee supply and service company has found its niche and is benefitting farmers and beekeepers and hobbyists in the CA Central Valley area.

Howard did not grow up with an ag background or a love for beekeeping or the bee business. Conversation with travelers in the business while visiting his wife as she worked at the local restaurant is where the couple's business story begins.

"I was looking for something I could start on my own," Howard said. "Talking to some of the guys I decided to start selling corn syrup."

A simple purchase of a tank to hold the syrup and securing space was all that was needed in the early start-up. Education by way of everything bees, from feeding, to hive creation, to pollination Howard learned from the tradesmen themselves.

The migrant beekeepers shared the benefits of having a local feed and supply to meet their needs while pollinating area orchards, beginning with the corn syrup.

"It's growing every year," Howard said of the hobbyist portion of the business. "They're into making honey; they're really into the bees. Some just want to save their bees."

His busy months are January to March, with business slowly starting up in October as brokers begin bringing bees and boxes to the area.

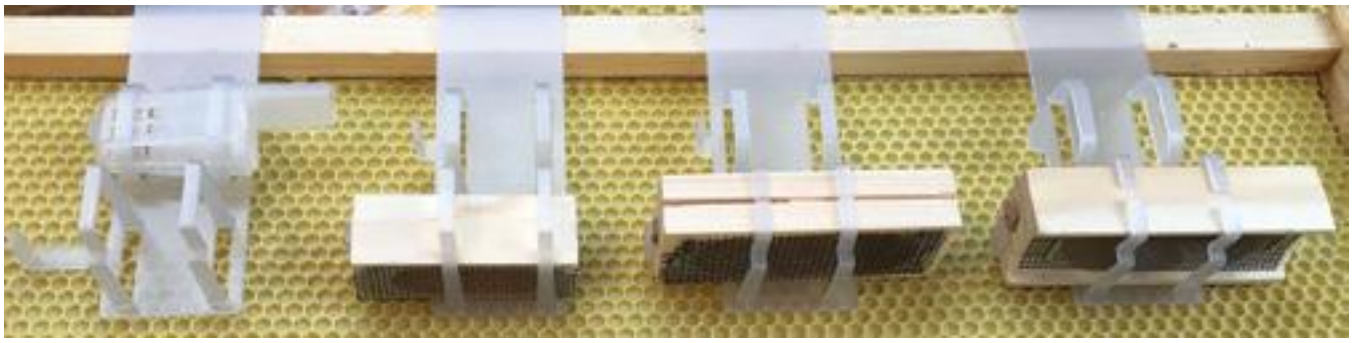
Once the bees are delivered the brokers travel back and forth until blossom begins in early February.

"Once that's happening, we've got a few short weeks," he said. "This year we had a lot of rain, so there wasn't a lot of flight hours but they got it all pollinated pretty much."

Howard enjoys helping and supplying the hobbyist with their needs. The small business and its unique clientele are served by Howard and Daniella, who recently quit her "day job" to help with the company. Her primary responsibility is running the storefront, as well as the office so Ryan can work out in the field.

"I like customer service," Howard said. "I like helping someone that wants to learn about bees, wants bees for the backyard. I can help them from A to Z."

For more information on Sunrise Feed Company, call 209.627.8114.



Queen Cage Holder – sold by Honey Lake Bee Company.

Fast, easy, accurate placement of a queen cage. Holds all four styles of queen cages in the perfect position. For more information and videos on how to use, visit **www.QueenCageHolder.com**.

BEETALK ... Cont. From Page 23

have carried over. I would not add package bees without vaping them, either. ***Toni Burnham, DC***

A. Definitely a cause for a closer look not just at the colony, but also at the beekeeper management which may be the cause of the weak hive as opposed to a poor queen. On the other hand, small weak colonies do not build up mite populations as quickly as big strong colonies. I find that the smaller colonies that struggle all Summer and often don't produce much, if any surplus honey for harvest, are the ones that almost always survive the Winter well and are very strong and raring to go the following Spring. I believe that this is the primary reason so many beekeepers are able to successfully overwinter nucleus colonies that are made up in mid- to late-Summer. It is not so much that the queen is somehow superior, it is simply that the small size of the nuc (and the late creation of it) simply don't allow *Varroa* mites to build up to deleterious levels that negatively impact Winter survival. ***Ross Conrad, VT***

A. If the colony is weak, it is a cause for concern, and the problem should be rectified immediately. A col-ony not showing signs of preparation for swarming doesn't necessarily mean it is weak or that there is a problem. A good, strong colony that has a young queen (from the previous Fall) will not necessarily want to swarm if it is given plenty of room. Re-queening of splitting in fall is a great way to avoid having to do Spring splits and results in populous colonies, perfectly prepared for the Spring flow. *Tina Sebestyen, CO*

A. Few of us want to worry about swarms in early spring but we do want strong colonies. If the colony looks weak, check the brood pattern of the queen and consider requeening if the pattern is weak. Also check the *Varroa* mite level and treat if necessary. If the laying pattern is poor or the queen is over a year old, it may be wiser to requeen than treat a mite infested colony that potentially is sick with viruses and/or Nosema sp. as well. ***Barb Bloetscher, OH***

A. This depends on the answers to a few additional questions and assumes you have been and are evaluating your colony on a routine basis to observe changes over time:

- What time of year are you making this assessment? If the colony is being evaluated in early Spring, this may be pre-mature assessment since they have not had time to build up, etc.
- Is it consistent every time you assess the colony? What is the queen quality?

I recently purchased a shirt for a friend that said "I am silently judging your queen's brood pattern". Be this t-shirt. If it isn't there, swarming or not, it won't matter – bigger issues may be happening here. A proven queen may have some ebbs and flows depending on weather and season forage availability, etc. but overall you should feel great about her ability to produce brood and overall good about the colony when you close the outer cover each time – what is your first reaction when you get inside, does it change as you go through the frames? Remember, a consistent queen is just that, consistent. If you have doubts, there is probably a reason and trust your instincts. Queen quality matters so every time you go through your hives you should be evaluating how old is the queen, is she a proven layer, tight brood pattern, consistent, physically no visible damage to her body?

- You should also evaluate your colony health not just on their ability to present signs or actually swarm, but overall health as well. How is the build up? Are they producing whatever resources you want at the time/flow you like? Are you seeing questionable brood? Where is the brood and food stores being placed in the colony? Does the queen have room to lay?
- The more time you spend with your bees and the more experience you have will make you not only a better beekeeper, but also able to accurately determine then judge the criteria that you are looking for in your colonies and the apiary as a whole. ***Kim Skrym, MA***

Number 1 Tip of the Month – Pollen Substitute Feeder

By Greg Carey

You can make a pollen substitute feeder from almost anything, and you see that when looking for a good design. The PVC tube feeders look very nice, are easy to cut out, but can be a bit expensive. All the ones I've seen seem to have a fixed position, making them susceptible to water intrusion. This is the design I came up with using almost total repurposed materials. Its main cost is the time it takes to cut out and glue together.

I start with a 5"X11" base with a 5" high back and ¾" high stop in the front. The cross hatches, seen here, aren't really needed and were eliminated from later versions. I make them from pallet wood.

The wooden base is wrapped with coroplast stapled in place with ½" staples. It's suspended on nylon cord connected to a fishing swivel and light wire at the top for wrapping around a limb. The fishing swivel is what makes this feeder unique.

Other than the coroplast there are three features which keep the pollen substitute dry under all weather conditions. The first is the slight down slant of the open end of the feeder. This helps to shed rainwater. Next is the extended top on the opening which has two purposes. It acts as an awning, and it gives the feeder an offset so that it also acts as a wind vane. Now, you know the third is that swivel mentioned earlier. The swivel keeps

the closed back of the feeder pointing toward the wind and driving rain. I've observed my bees feeding during a light rain.

Here it is in action. Hanging from a limb at about chest height, it's easily loaded with a large spoon. If you already have PVC feeders, it would be a simple thing to add a swivel and weather cock feature to keep the opening pointed away from the rain. Keep your powder dry. *Greg Carey, MD*

I make my own deeps and supers from 1x12 and 1x8 common lumber from big box home improvement stores (think Lowe's and Menards).

Don't cut them down. Make the boxes out of whole boards. Cut to size after assembly.

This leaves a small extra piece that can be combined for sugar cake spacers and even stacked to make whole boxes.

We waste nothing – even the sawdust goes in the garden. *Mike Haney*

Bee Culture wants you to share your good ideas with our readers. Be precise and include a photo or sketch if possible, but that may not be necessary. If we use your idea you get a free one-year subscription. The best each month gets $100.

FOUND IN TRANSLATION

The bug side of pollination.

Jay **Evans**, USDA Beltsville Bee Lab

I am not known for having a green thumb and except for one year of ambitious subsistence gardening (doomed by goats), our limit for many years has been a small herb and tomato plot. I am motivated to attract bees though, and am surrounded by people who know how to do that. The USDA- ARS Bee Research Laboratory has a providential pollinator garden thanks largely to the efforts of Dr. Francisco Posada (garden photos taken by Peggy Greb, USDA-ARS) and it is an excellent refuge for both bees and researchers. To better understand all the greenery, I plowed through several papers by colleagues who are testing new ways to keep pollinators safe and well fed. These colleagues are best known for studying the bug side of the pollination equation, but they have teamed up with plant experts for a little, ughh, cross-pollination. So it is with a recent paper by graduate student Pierre Lau and colleagues at Texas A and M University. In "Seasonal variation of pollen collected by honey bees (*Apis mellifera*) in developed areas across four regions in the United States" (*PLoS ONE* 14(6): e0217294. **https://doi.org/10.1371/journal.pone.0217294**), the team analyzed hive-collected pollen grains in California, Michigan, Texas, and Florida. Their focus was the realm of gardeners and city planners, areas with only 20-35% undeveloped land. Using pollen traps, they identified the first 200 pollen grains per sample to species or, in some cases, the next level up. Suburban California proved to be most diverse, followed by Florida, then Michigan and Texas. Overall, bees collected more diverse forage in the Spring, and an even mix of pollen from woody plants and trees versus herbs. Colonies were more faithful than expected to particular species on a weekly timescale, suggesting fidelity by individual bees or recruiters, or perhaps subtle preferences at the colony level related to immediate needs. If you are planning a garden, or shopping among the numerous pollinator seed mixes for your area, the authors of this open-access article provide helpful information for four divergent habitats.

Going straight to the city, Dr. David Lowenstein and colleagues mapped out over 1000 pollinator visits to flowers in dozens of Chicago parks and gardens ("Evaluating the dependence of urban pollinators on ornamental, non-native, and 'weedy' floral resources", *Urban Ecosystems*, 2019, 22:293–302 **https://doi.org/10.1007/s11252-018-0817-z**). After confirming the attractiveness of well-known weeds and ornamentals, especially perennial plants, they highlight the profound lack of interest by pollinators for three plant groups (petunias, impatiens, and marigolds) loved by gardeners for attractiveness and hardiness. Similarly, noted bee biologist Dr. Dave Goulsen paired up with botanist Ms. Rosi Rollins (**http://www.rosybee.com/research**) to quantify the attractiveness of 111 putative bee magnets ("Quantifying the attractiveness of garden flowers for pollinators", *Journal of Insect Conservation*, 2019; 23:803–817, **https://doi.org/10.1007/s10841-019-00177-3**). They confirmed that many plants on 'pollinator mix' hit lists were indeed attractive to honey bees, bumble bees and a diverse set of additional pollinators, but also recognized plants such as calamint, a plant that was the top choice among many bees but not among gardeners or listmakers. Perennial geraniums were super attractive to bees as well, but these are distinct from their shinier annual relatives, which tend not to seduce bees. Several other plant groups showed one species with high attractiveness and close relatives which were not valued by the bees. In addition, the authors point out that plants found on other bee-friendly lists in fact received few or no visits. The study was carried out in the United Kingdom but the open-access paper should be relevant for bee gardens in the US as well. In fact, >75% of their vetted plants are not UK natives, similarly to ornamental plants elsewhere.

At the farmscape level, Adam Dolezal and colleagues at the University of Illinois and Iowa State University carried out a two-year study showing how bees deal with the ups and downs of intensive

agriculture ("Native habitat mitigates feast–famine conditions faced by honey bees in an agricultural landscape" *Proceedings of the National Academy of Sciences*; Vol. 116 pp. 25147-25155, **DOI: 10.1073/pnas.1912801116**). Colonies were established adjacent to 20 soybean farms in total, across two years. Ten of these farms were surrounded by croplands (with 84% of the bee-flight space comprised of corn or soy, not unusual in Iowa) while ten were surrounded by other land uses, with around 40% of the acreage in corn and soy. Colonies were established some weeks after soy planting to minimize the effects of chemically coated seeds. Colonies in the ag-intensive plots did best, reaching around 25 frames of adult bees and about 25 kilograms of hive weight by mid-August, versus 15 frames and 15 kilograms in the low-cropping plots. However, by late August, colonies at both sites collapsed significantly, reaching identically low weights by the end of the season. In all plots, bees collected nectar, but rarely pollen, from soy plants and relied on pollen from clover and other neighboring legumes. When these surrounding flowers went into steep decline, colonies began to shrink. In one year, the researchers kept colonies in an ag setting (their own land-grant University farm) until August and then sent them to pasture in a diverse prairie setting. The bees whooped it up there, increasing their hive weights and health substantially compared to the colonies left in place on the farm. The authors argue that these moves, if timed perfectly, can give beekeepers (and soy growers) the benefits of soy pollination through much of the Summer and a late-season boost after that. The 'STRIPS' project in Iowa (same affiliation as the Feast-Famine folks, **https://www.nrem.iastate.edu/research/STRIPS/content/faq-how-can-i-get-prairie-strips-my-farm**) favors adding these Prairie strips directly to the farmscape in the hopes that bees can take advantage of an extended and more diverse bloom without being moved.

While changes to backyards, parks, and farmscapes are important, there are strong efforts to increase forage opportunities at even larger scales. Policy and planning groups like the Pollinator Partnership (**https://www.pollinator.org/**) and the Bee and Butterfly Habitat Fund (BBHF; **https://beeandbutterflyfund.org/about-us**) are focused on developing planting guides for diverse habitats and increasing acres of bee forage on public and private lands, respectively. In particular, the BBHF has had great success in improving pollinator resources on large-scale farms and pastures. In the science realm, the Dr. Clint Otto and colleagues at the USGS have carried out numerous studies showing the value of rangelands, and seeding with flowering plants, for bees in the Dakotas (I reviewed one such effort in 2017 in **https://www.beeculture.com/found-in-translation-5/**). Dr. Vincent Ricigliano and USDA colleagues also showed the benefits to honey bees of improved rangeland habitats ("Honey bee colony performance and health are enhanced by apiary proximity to US Conservation Reserve Program (CRP) lands", ***Scientific Reports***, 2019, Article 4894, **https://www.nature.com/articles/s41598-019-41281-3**), and these benefits no doubt apply to other important pollinator species as well.

Like many environmental efforts, improving bee forage can be tackled at various scales, from a well-timed container garden of flowering plants, or a water source for bees, to policy that impacts thousands of acres of potential bee space. Many more like-minded groups are working to increase safe bee forage and these efforts are taking root, improving the chances for honey bees as well as other pollinators. BC

A Closer LOOK

SMALL HIVE BEETLE

Clarence **Collison**

The Small Hive Beetle is a parasite and scavenger of honey bee colonies.

The small hive beetle (SHB), *Aethina tumida* Murray (Coleoptera: Nitidulidae), is native to subSaharan Africa (Lundie 1940), and was first detected in the United States in 1998 (Elzen et al. 1999; Arbogast et al. 2009). Adults invade honey bee colonies, where they lay eggs in crevices and on the combs. Both adults and larvae feed on pollen and honey (Lundie 1940; Meikle and Patt 2011, Meikle et al. 2012) and attack brood (Ellis and Delaplane 2008). In large numbers, small hive beetles can cause hive collapse (Neumann and Elzen 2004; Ellis and Delaplane 2008). *A. tumida* transmit diseases, including honey bee deformed wing virus (Eyer et al. 2009a), sacbrood virus (Eyer et al. 2009b) and American foulbrood, *Paenibacillus larvae* (Schäfer et al. 2009).

"Adult beetles were found in the laboratory to feed on honey bee eggs, completely consuming all eggs, even in the presence of honey and pollen. Odors from hive products plus adult bees were found to be significantly attractive to flying adult beetles, as evidenced in baited trap studies. Hive products alone or bees alone were not attractive to adult beetles (Elzen et al. 1999)."

"The response of male and female small hive beetles to air-borne volatiles from adult worker bees, pollen, unripe honey, beeswax, wax by-products ("slumgum") and bee brood, was investigated in olfactometric and flight-tunnel choice bioassays. In both bioassay systems, males and females responded strongly to the volatiles from worker bees, freshly collected pollen and slumgum, but not to those from commercially available pollen, beeswax and bee brood. The response to pollen volatiles was dose dependent, while response to volatiles from worker bees increased with both the number and age of the bees. Females were more responsive than males to the different volatile sources, with greater response in tests with unripe honey. In flight-tunnel choice tests, Super Q-trapped volatiles from worker bees elicited a response comparable to the response to living workers, while trapped volatiles from other sources were not attractive (Suazo et al. 2003)."

"Small hive beetles may reproduce on fruits (Ellis et al. 2002a) or in bumblebee nests (Ambrose et al. 2000). While SHB adults have comparatively little impact on the colony, the larvae can cause severe damage to combs (Lundie 1940), often resulting in the full structural collapse of the nest. SHB reproduction in honey bee colonies is associated with typical signs such as rotten smell, fermented honey and comb damage (Lundie 1940). Spiewok and Neumann (2006) reported for the first time on the reproduction of small hive beetles in honey bee colonies without any signs of damage."

"Survivorship of small hive beetle larvae was measured after they were raised on one of six diets. The effects of container shape (wide and shallow vs. narrow and deep), soil depth (0, 0.5, 1.0, 2.0, 4.0, and 8.0 cm) and temperature (28°, 32°, or 35° C) on pupation success was measured. Diet influenced larval survivorship, but did not have a strong effect on larval weight. The larvae fed only bee brood survived the shortest period of time. The larvae that were denied pupation substrate, fed only honey and pollen, and no other food or water after 20 days, had a medium survivorship of 47.6 days, with a maximum of 61 days, while those fed only brood had a medium survivorship of 18.2 days. Pupation substrate was essential for successful pupation, and the depth of the substrate, not its top surface area, was the crucial factor. Pupation success in narrow and deep containers was 95.6% on average, but only 12.5% in wide and shallow containers, using the same soil volume. In narrow and deep containers, most or all larvae kept in four to eight cm of soil pupated at all temperatures; few larvae kept at two cm soil depth pupated. One out of 240 kept at 1.0 cm pupated, and no larvae kept at soil depths of 0 or 0.5 cm pupated (Meikle and Diaz 2012)."

"The small hive beetle is an opportunistic parasite that feeds on bee larvae, honey, and pollen. While SHBs can also feed on fruit and other plant products, like their plant-feeding relatives, SHBs prefer to feed on hive resources and only reproduce inside bee colonies. As parasites, SHBs are inevitably exposed to bee-associated microbes, either directly from the bees or from the hive environment. These microbes have unknown impacts on beetles, nor is it known how extensively beetles transfer microbes among their bee hosts. To identify sets of beetle microbes and the transmission of microbes from

bees to beetles, a metagenomic analysis was performed. Huang et al. (2019) identified sets of herbivore-associated bacteria, as well as typical bee symbiotic bacteria for pollen digestion, in SHB larvae and adults. Deformed wing virus was highly abundant in beetles, which colonize SHBs as suggested by a controlled feeding trial. Their data suggest SHBs are vectors for pathogen transmission among bees and between colonies. The dispersal of host pathogens by social parasites via floral resources and the hive environment increases the threats of these parasites to honey bees."

"The small hive beetle is a parasite and scavenger of honey bee colonies. Eyer et al. (2009a) conducted laboratory experiments to investigate the potential of small hive beetles as a vector of honey bee viruses. Deformed Wing Virus (DWV) was detected in adult small hive beetles that: 1) were fed with dead workers with deformed wings, 2) were fed with DWV-positive brood, and 3) were associated with DWV-contaminated wax. SHB became significantly more often infected through feeding on virus infected workers, brood and the virus contaminated wax compared to pollen and the controls, where no infections were found. DWV was also detected in adult SHB after trophallaxis with infected workers. Further, among SHBs identified as DWV-positive, 40% of the beetles carried negative stranded RNA of DWV, indicating virus replication. Their results suggest that SHB can be infected with honey bee viruses via food-borne transmission and have the potential of being a biological vector of honey bee viruses."

Diet influenced larval survivorship, but did not have a strong effect on larval weight.

"Honey bee colony infestation by the small hive beetle (SHB) is associated with fermentation of hive materials. Pollen, beetles, and robbing bees (10 of each) were collected from hives infested with SHB in both Florida and Kenya. Plating of homogenized bodies of beetles and bees and comb swabs resulted in smooth cream-colored yeast colonies that formed pseudomycelial cells as they aged. Fatty acid profiles of yeast isolates from Florida and Kenya most closely matched the profiles of *Candida krusei* and *C. sake*, respectively. However, the DNA sequence of the 28S and 5.8S-ITS2 of both the Florida and Kenya isolates were 99-100% homologous to *Kodamaea ohmeri*. The ITS1 region differed between the two geographic strains. The two strains produced similar volatile profiles which were attractive to SHB and contained compounds also found in honey bee alarm pheromone (Benda et al. 2008)."

"Coupled gas chromatographic-electroantennographic detection (GC-EAD) analyses of Super Q (volatile collection trap) collected worker honey bee volatiles revealed several components that elicited antennal responses by the small hive beetle. However, GC-MS analysis showed that eight of these EAD-active components dominated the volatile profile released into a wind tunnel by living adult worker honey bees and rubber septa impregnated with a Super Q extract of the volatiles of the bees in a 15-minute bioassay. These components were identified as isopentyl acetate, 2 heptanone, octanal, hexyl acetate, nonanal, 2-nonanone, methyl benzoate and decanal (compounds associated with alarm pheromones and sting apparatus). In dual choice wind tunnel bioassays, the Super Q extract and a blend of the eight components elicited dose-dependent upwind responses from beetles relative to a solvent control. At 375-bee day equivalents, the Super Q extract and the 8-component blend elicited 76 and 74% upwind response, respectively, which compared with 84% response from approximately 150-200 living worker honey bees. In contrast, the Super Q extract and the 8-component blend lured only approximately 12 and 3% of beetles, respectively, into a trap compared to 48% by the odor from living adult worker bees (Torto et al. 2005)."

The longevity of incarcerated beetles greatly exceeds their metabolic reserves.

"Colony defense by honey bees is associated with stinging and mass attack, fueled by the release of alarm pheromones. Torto et al. (2007) was able to show that the parasitic relationship between the European honey bee and the small hive beetle is negatively impacted by the bee's release of alarm pheromones, which are potent attractants for the beetle. They also discovered that the beetles from both Africa and the United States vector a strain of *Kodamaea ohmeri* yeast, which produces these same honey bee alarm pheromones when grown on pollen in hives. The beetle is not a pest of African honey bees because African bees have evolved effective methods to mitigate beetle infestation. However, European honey bees, faced with disease and pest management stresses different from those experienced by African bees, are unable to effectively inhibit beetle infestation. Therefore the environment of the European honey bee colony provides optimal conditions to promote the unique bee – beetle – yeast – pollen multitrophic interaction that facilitates effective infestation of hives at the expense of the European honey bee."

"Small hive beetles are parasites and scavengers of honey bee colonies and actively disperse for host finding. Spiewok et al. (2008) investigated the re-infestation levels of SHB-free colonies within 10 infested apiaries in South Africa, Australia and the USA. Re-infestation of 95% of the colonies indicates a high SHB exchange between colonies. Colony position and queen status had no influence on colony infestation levels. Spread into apiaries was determined at 12 SHB-free apiaries. While apiaries in Maryland remained un-infested, those in Australia showed high infestation numbers. Apiary density, SHB population levels and ongoing SHB mass reproduction seem to govern SHB infestation of newly installed apiaries. Those located in forested habitats showed higher infestation levels possibly due to the presence of wild/feral colonies."

"An assay was developed to investigate the potential survival and reproduction of the small hive beetle when provided artificial food resources in managed honey bee colonies. Supplemental feeding was done to maintain the

health of the hive, initiate comb building, expand colony numbers and promote pollen foraging. To complement the protein requirement of honey bees, commercial pollen substitutes have been developed and are available for producers. Small hive beetles also exploit the pollen substitutes when present in the hive. Adult beetles were provided with seven different commercial pollen substitutes and allowed to freely feed and oviposit over a period of 30 days. Beetles that survived the longest on the treatments did not necessarily produce the most larvae. The supplement Bee-Pro® supported the greatest survival, yet produced very low larval numbers. Global Patties® produced the most larvae; however, adult survival was low. This result may have been due to the larvae using all of the food resources in a short amount of time, leaving little to support adult survival. Four of the seven treatments supported 70% or greater beetle survival for the entire assay period. This study suggests that the protein supplement needs to be readily consumed by the honey bee colony if it is to be effective for pest control. Careful selection of the amount and type of honey bee supplemental diets is important in balancing nutritional needs of bees and reducing potential problems with small hive beetles (Stuhl 2017)."

"Ellis et al. (2002b) ran experiments to determine whether honey bees feed their small hive beetle nest parasites. Honey bees incarcerate the beetles in cells constructed of plant resins (propolis) and continually guard them. The longevity of incarcerated beetles greatly exceeds their metabolic reserves. They show that survival

We write over 88% of the Beekeepers in the program Nationwide.

BEEKEEPING INSURANCE SERVICES

APICULTURE INSURANCE PROGRAM

A Specialized Program for Beekeepers

Available Nationwide

Offering All Forms of Insurance Including:

- ✳ USDA Apiculture
- ✳ Property
- ✳ General Liability
- ✳ Automobile
- ✳ Life Insurance
- ✳ Home & Farm Insurance

We are Proud Members & Sponsors of:

- ✳ American Beekeeping Federation
- ✳ American Honey Producers Association
- ✳ California State Beekeepers Association
- ✳ Florida State Beekeepers Association
- ✳ Minnesota Honey Producers Association
- ✳ Montana State Beekeepers Association
- ✳ North Dakota Beekeepers Association
- ✳ Texas Beekeepers Association

Kevin Rader: Buzzus@beekeepingins.com

www.beekeepingins.com

888-537-7088

of small hive beetles derives from behavioral mimicry by which the beetles induce the bees to feed them trophallactically." BC

References

Ambrose, J.T., M.S. Stanghellini and D.I. Hopkins 2000. *A scientific note on the threat of small hive beetles (*Aethina tumida *Murray) to bumble bees* (Bombus *sp.*) *colonies in the United States*. Apidologie 31: 455-456.

Arbogast, R.T., B. Torto, S. Willms and P.E.A. Teal 2009. *Trophic habits of* Aethina tumida *(Coleoptera: Nitidulidae): Their adaptive significance and relevance to dispersal*. Environ. Entomol. 38: 561-568.

Benda, N.D., D. Boucias, B. Torto and P. Teal 2008. *Detection and characterization of* Kodamaea ohmeri *associated with small hive beetle* Aethina tumida *infesting honey bee hives*. J. Apic. Res. 47: 194-201.

Ellis, J.D. and K.S. Delaplane 2008. *Small hive beetle* (Aethina tumida) oviposition behaviour in sealed brood cells with notes on the removal of the cell contents by European honey bees (*Apis mellifera*). J. Apic. Res. 47: 210-215.

Ellis, J.D., P. Neumann, H.R. Hepburn and P.J. Elzen 2002a. *Longevity and reproductive success of* Aethina tumida *(Coleoptera: Nitidulidae) fed different natural diets*. J. Econ. Entomol. 95: 902-907.

Ellis, J.D., C.W.W. Pirk, H.R. Hepburn, G. Kastberger and P.J. Elzen 2002b. Small hive beetles survive in *honeybee prisons by behavioural mimicry*. Naturwissenschaften 89: 326-328.

Elzen, P.J., J.R. Baxter, D. Westervelt, C. Randall, K.S. Delaplane, L. Cutts and W.T. Wilson 1999. *Field control and biology studies of a new pest species,* Aethina tumida *Murray (Coleoptera: Nitidulidae), attacking European honey bees in the Western Hemisphere*. Apidologie 30: 361-366.

Eyer, M., Y.P. Chen, M.O. Sch□fer, J. Pettis and P. Neumann 2009a. *Small hive beetle,* Aethina tumida, *as a potential biological vector of honeybee viruses*. Apidologie 40: 419-428.

Eyer, M., Y.P. Chen, M.O. Sch□fer, J.S. Pettis and P. Neumann 2009b. *Honey bee sacbrood virus infects adult small hive beetles*, Aethina tumida (*Coleoptera: Nitidulidae*). J. Apic. Res. 48: 296-297.

Huang, Q., D. Lopez and J.D. Evans 2019. *Shared and unique microbes between small hive beetles* (Aethina tumida) *and their honey bee hosts*. Microbiologyopen 8: e899. **https://doi.org/10.1002/mbo3.899**

Lundie, A.E. 1940. *The small hive beetle:* Aethina tumida. Sci. Bull. 220. Union South Africa Dept. Agric. And For. (Entomological Series 3).

Meikle, W.G. and R. Diaz 2012. *Factors affecting pupation success of the small hive beetle*, Aethina tumida. J. Insect Sci. 12: 118.

Meikle, W.G. and J.M. Patt 2011. *Temperature, diet and other factors on development, survivorship and oviposition of the small hive beetle*, Aethina tumida *Murray (Coleoptera: Nitidulidae).* J. Econ. Entomol. 104: 753-763.

Meikle, W.G., J.M. Patt and D. Sammataro 2012. *Intraspecific competition effects on* Aethina tumida (*Coleoptera: Nitidulidae*). J. Econ. Entomol. 105: 26-33.

Neumann, P. and P.J. Elzen 2004. *The biology of the small hive beetle* (Aethina tumida, *Coleoptera: Nitidulidae): gaps in our knowledge of an invasive species*. Apidologie 35: 229-247.

Sch□fer, M.O., W. Ritter, J. Pettis and P. Neumann 2009. *Small hive beetles*, Aethina tumida, *are vectors of* Paenibacillus larvae. Apidologie 41: 14-20.

Spiewok, S. and P. Neumann 2006. *Cryptic low-level reproduction of small hive beetles in honey bee colonies*. J. Apic. Res. & Bee Wrld. 45: 47-48.

Spiewok, S., M. Duncan, R. Spooner-Hart, J.S. Pettis and P. Neumann 2008. *Small hive beetle,* Aethina tumida, *populations II. Dispersal of small hive beetles*. Apidologie 39: 683-693.

Stuhl, C.J. 2017. *Survival and reproduction of small hive beetle (Coleoptera: Nitidulidae) on commercial pollen substitutes*. Florida Entomol. 100: 693-697.

Suazo, A., B. Torto, P.E.A. Teal and J.H. Tumlinson 2003. *Response of the small hive beetle (*Aethina tumida*) to honey bee (*Apis mellifera*) and beehive-produced volatiles*. Apidologie 34: 525-533.

Torto, B., A. Suazo, H. Alborn, J.H. Tumlinson and P.E.A. Teal 2005. *Response of the small hive beetle* (Aethina tumida) *to a blend of chemicals identified from honeybee* (Apis mellifera) *volatiles*. Apidologie 36: 523-532.

Torto, B., D.G. Boucias, R.T, Arbogast, J.H. Tumlinson and P.E.A. Teal 2007. *Multitrophic interaction facilitates parasite host relationship between an invasive beetle and the honey bee*. Proc. Nat. Acad. Sci. USA 104: 8374-8378.

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

HORIZONTAL BEEKEEPING – PART II

Tina **Sebestyen**

In regular Langstroth beekeeping, the Winter check involves tipping the hive forward to gauge its weight, not possible in horizontal beekeeping. We have the next better thing, we can actually look at the bars or frames and see how much honey or bee bread is left. One of the cool things about horizontal beekeeping is the ability to open the hive and rearrange things even when it is really cold out. In a top bar hive, the bars themselves create a solid roof over the bees, making it possible to work without disturbing the cluster. In a long Langstroth hive, something else needs to be used to create an inner cover over the bees. A piece of burlap, placed over the frames in late Summer, and then propolized by the bees, creates an antibacterial roof.

The bees will have begun the Winter at the brood chamber, right near the entrance, and they will follow the honey to some extent. In late Winter or early Spring, the queen will begin laying eggs. Thereafter, she stays with the brood. The cluster will remain over the brood chamber, and the bees travel to food, bringing it back to the brood chamber. Since we don't know exactly where the cluster is, we start at the back of the hive, removing the bars or frames. Set them aside so there is room to work. Continue to work toward the door, until some bees are seen. We are looking for the edge of the cluster. Once we find it, stop moving frames or bars, so that we don't disturb the cluster. Bars or frames full with honey and bee bread are placed against the back of the brood chamber, while empty ones are moved to the back of the hive. This is also the perfect time to add bee candy if they are running low on natural stores.

Feeding bees can be a bit more challenging in horizontal beekeeping, since there isn't room above the bars or frames to add a shim and Winter patty. However, bee candy can just as easily be made into the shape of the comb in a top bar hive, and hung just as though it were honey comb. For the long Langstroth hive, bee candy can

In the foreground, a traditional vertical Langstroth horizontal hive. Left, a Langstroth horizontal hive, and above, a deep top bar hive.

A 1½ to 2 inch piece of plastic foundation provides a much more positive attachment for comb than the traditional short wooden spline.

be poured into a Langstroth frame and allowed to set. In this way, the candy is placed right where the bees need it, and where they are looking for it. For a top bar bee candy board, staple a piece of hardware cloth to the top bar to form a support for the candy, sort of like adding re-bar to concrete. Use an empty bar with comb to outline the proper size, and make a form out of cardboard to keep the sugar in the right shape while it sets. For the long Lang, simply pour the sugar/water mixture into an empty frame on a cookie sheet, and wait for it to set. This takes a couple of days in my sunny window. Cooked bee candy sets right away, but I prefer not to risk creating furfurals (HMFs) in my bee food[1], so I make my bee candy with just sugar and water, no heat. A dough hook in the mixer helps make the job easier. A very simple emergency bee feeding can be done with 2:1 sugar water in a bike bottle.[2] The sugar water is forced into the empty cells of honey comb using the bike bottle. Not all of it goes in, so work over a five-gallon bucket to catch what runs off. Since we will not disturb the cluster, this can be done in Winter or Spring, even when it is very cold (though be aware that sugar water will freeze, and should only be used when the bees can access it soon. It is emergency feed). Another simple way to feed top bar hives uses mesh onion bags filled with bee candy chunks and stapled to the top bar.

The bottom of the top bar hive. Notice 4" brace, strengthening the hive, the cut-out to create a screened bottom, the piano hinge that allows the entire half of the bottom to open, and the ventilation holes along the side of the hive.

Fixing Problems in Top Bar or Long Langstroth Hives

Winter is the perfect time to discover if there is an air flow problem in your horizontal hive. If mold or mildew is discovered on honey comb as the Winter check is being done, you have discovered where the problem lies. Many top bar and long hive plans do not include ventilation holes along the sides of the hive, and they are definitely needed. Mold will usually be found one third to half way back from the entrance. Another result of inadequate ventilation is the curving of honey comb. Bees curve the edges of comb to try to direct air flow from the entrance, often curving the comb so much that it attaches to the next bar back.

The solution is simple. Using a ¾" bit, drill a hole four to five inches down from the top, right where the mold or curving of comb is found, on both sides of the hive. Drill at least two more holes along the length of the hive, on each side. Don't be hesitant to open up ventilation in winter. Bees can handle cold quite well, much better than they can handle excess moisture, though it won't usually kill them in a horizontal hive like it will in a vertical hive (traditional Langstroth). The bees happily propolize these ventilation holes in late Summer when wasps begin proliferating, and I re-open them after it gets cool enough to make propolis difficult for the bees to work. The ¾" size means that the beekeeper can easily close them as well, with a cork from a wine bottle. Stapling #8 hardware cloth over the holes results in instant closure with propolis, and makes it harder for humans to re-open. These extra holes along the length of the hive allow easier access to honey comb for returning foragers, too, along with other benefits we'll discuss in a future issue.

More Fixes for Top Bar Hives

One thing that can be discovered for sure in the Winter check is whether the bees are alive, or not. If they have made it to March, and they have enough feed, there is every chance they'll make it through Spring. If the bees in your top bar hive have continuously survived for more than three years, your hive is fine for your area. Keep doing what you are doing. If, however, you find that the colony has died, now is the perfect chance to retrofit.

Retrofitting a living, well-functioning top bar hive with bars that have the more positive spline is usually easy. If the bars are more than ½ inch thick, cut the empty comb off and save in a box. And using a table saw, cut the splines off. Then, with the bars face down on the table saw, and the blade set to half the thickness of the wood, cut a saw kerf in the exact center. This will require some fantastic math, taking the thickness of the saw blade into account, so that exactly the same amount of space is left on each side of the cut. Cut the plastic foundation into 1½' strips, using the table saw or a large pair of tin snips. Try one in the saw kerf. If needed, make the kerf slightly wider. Once the foundation will fit tightly, press it into the cut, and using a nail gun, if available, run nails through the wood and plastic, making sure the nail doesn't come out the back side. If no nail gun is available, use a small drill bit and pre-drill holes just the right size for finish nails. This will avoid splitting the plastic foundation. If you want to re-use the comb you cut off, that is fine, as long as it is less than three years old. Two-year-old

comb is nice to work with. Using a serrated knife, split the comb far enough to insert the foundation spline. Use bird netting, the kind that keeps apricots safe from birds (not chicken wire) and a stapler to create a hammock to hold the comb in place until the bees fix the attachment at the top. Even easier, just make all new top bars with the proper spline, and gradually integrate them as old comb is culled for age.

Next, if the entrance is comprised of multiple holes on the side of the hive, open an entrance in the end, so that an oxalic acid vaporizer will fit. It might be possible to use a hand saw to cut a 1½" strip off the bottom of the end to create the new entrance. This way, the cut out could be used as an entrance reducer or closer. You might as well create new entrances on each end while you are at it. This will preserve the possibility of keeping a nuc in one end, with the parent colony in the other end, and OA vaporization can be done for both.

This is also the perfect time to create screened bottoms, which I believe are especially effective in horizontal hives. The mites have so many fewer bees to grab onto as they fall through them to the floor than in vertical beekeeping. Use a saber saw to cut an oblong piece out of the floor under the brood chamber. Leave at least four inches of the floor intact for stability, and cut another oblong piece out from under the honey stores. Keep the cut-outs to install during the winter. Opening the floor under the honey makes it much easier for the bees to dehydrate the nectar, making honey production faster. Staple #8 hardware cloth down to cover the openings from the inside. If we attached the hardware cloth to the outside bottom, the bees must walk down into the space, and back up to floor level, and they will fill this violation of bee space with comb, making it impossible to drop the floor piece in. I run a screw at an angle through the piece, and into the remaining bottom. Then, when it is removed in Spring, leave the screws partly in place in the removable piece, and it will be quite easy to put it in when winter arrives.

Yet another possibility with a living colony is to move them into a long Langstroth hive. The long Lang has the benefits of horizontal beekeeping along with the benefits of traditional Langstroth beekeeping (interchangeable parts, feeders you can buy, frames with or without foundation). If your bees are in a shallow top bar hive, this will be a wonderful, easy remedy, providing a good space for brood, with a deep pollen band and deep honey band above. Your top bars probably measure 18 inches while a long Langstroth takes regular frames that measure 19 inches. Simply cut thin boards that will reach from side to side in a Langstroth hive, and screw them to the bars of the top bar hive that contain bees and brood. The bees will expand the combs to fit the new hive. Rotate them out as needed (not longer than five years), and replace with frames. Finish filling the long Lang with frames and give the bees a frame feeder to help them build the pristine new comb they'll need.

For the Winter check in a top bar hive, stop removing bars when the first few bees are seen. This is the edge of the cluster, and we don't want to disturb the cluster. Move honey to just behind the cluster, and empty frames to the back of the hive.

Now, we've made it through winter and are ready for spring. In April, we'll discuss placement of new horizontal hives, installing a package or nuc, and for experienced beekeepers, the possibility of using a top bar or long lang in a two queen system.

https://www.honeybeesuite.com/no-cook-candy-board-recipe-for-feeding-winter-bees/

Dr. Wyatt Mangum, *Top Bar Hive Beekeeping, Wisdom and Pleasure Combined*, 2012 BC

Tina has been keeping bees since 2007 in top bar, Langstroth, and more recently, the long Langstroth hive. She learned beekeeping from wonderful mentors, "old guys", as well as through mentoring as founder of the Four Corners Beekeepers Assoc. She is vice president of the CO State Beekeepers Assoc. and is currently working to produce the Master Beekeeper Program for the state of Colorado. She helps with large scale queen production for commercial operations, raises locally adapted queens for SW Colorado, helps produce nucs, does structural removals of bee colonies, and writes and speaks about bees everywhere she gets the chance. She can be reached at ***bee.seeking@gmail.com***

ALMOND ORCHARDS

John **Miller**

Tactical Changes Underway

We are told change is a constant. Change, constant change is certainly true in beekeeping and almond orchards.

In a review of Miller Honey Farms records from 2003, I see the price for western clover honey was $1.50/lb., and the average almond pollination fee was $45.00.

Dramatic changes have occurred to the North Dakota landscape since 2003 resulting in much smaller honey crops. An expansion of almond acreage drove demand for pollination services during the same time.

Beekeepers struggle with the new normal.

Almond growers struggle with a challenging regulatory environment and skewed public perception; growers as poor stewards of resources.

Beekeepers move their outfits to California to meet the pollination requirements of the almond growers. We have to. The income from pollination work is now more vital to our operations than honey production. This is the new normal.

Look at almond pollination work, and the almond grower – differently.

Below, are several tactical changes [well underway] in almond orchards. The changes become strategic for beekeeper success. The almond orchard is the Launchpad for sustainable American beekeeping.

A significant change is occurring on the floor of the almond orchard. Growers are embracing the idea of cover crops in their orchards in early Spring. It seems counter-intuitive to plant a cover crop of wild radish and mustard blooming at the same time as the almond tree. It is not.

Seeded correctly, 90 days or so prior to almond bloom, the cover crop sets it's deep taproot during a dormant time in the orchard. This is the same time of year Winter rains fall on almond acreage. These cover crop root systems open the soil. Rainfall stays in the orchard, not running off. This benefit to soil health is unquestioned. The open soil is rainfall-recharged. Growers need not pump groundwater for irrigation; rainfall recharged soil is restorative.

While the cover crop is in bloom, the nitrogen transfer from plant to soil improves soil health. The public can see a forage project in full flower, and not appreciate the relationship between the cover crop, the soil health, and the benefits to pollinators. All the bees in those orchards benefit. Migrating butterflies, native and ground-nesting bees also benefit. Forage projects serve the needs of many species. It is a fact beekeepers and orchardists see and can share with the public.

A growing body of work suggests radish and mustard taproots impart anti-nematode properties into the soil – improving tree health. A productive orchard is like a productive beehive – it requires constant husbandry from both orchardist and beekeeper.

Forage projects anchor bees in the orchard to the orchard. On good weather days the available almond blossom pollen has been harvested by the bees by mid-afternoon. Bees very much prefer almond pollen because it is very nutritious. Once the available pollen is harvested, the bees can drop to the floor of the orchard to continue foraging; not flying beyond the orchard – getting into trouble foraging on other plants at risk for a pesticide application.

The above ideas are not new. What is new is the perception. California is the most populous state in the nation. Most Californians have scant knowledge of where food comes from. Beekeepers and Almond Growers work to meet an [ever] expanding set of regulations and expenses.

Compliance and Sustainability in many industries now involves senior-level resources. At many companies, the Compliance and Sustainability vice-president reports directly to the CEO. Beekeepers and Almond Growers have an important Sustainability story to tell. The Almond industry is the keystone of sustainable beekeeping. The almond bloom is the first annual naturally occurring nutrition for bees. Beehives recover from Winter's challenges in almond orchards. Beekeepers know the stimulation from almond pollination work sets hives on the path to Spring and Summer prosperity.

Ideas behind sustaining the hive and the orchard are not new. What is new is the scrutiny almond growers face as good agricultural stewards. Growers and beekeepers are good environmental stewards – and can work together to showcase our work. Forage projects meet the sustainability test on several levels. BC

PAm Makes it Possible
Investing in Applied and Basic Research

In 2006, Project Apis m. (PAm) was born out of a grassroots effort by beekeepers and almond growers in the wake of Colony Collapse Disorder. PAm was built to help address issues that beekeepers and growers were facing to support bee health and crop pollination security. Today, PAm is the largest honey bee nonprofit in the USA.

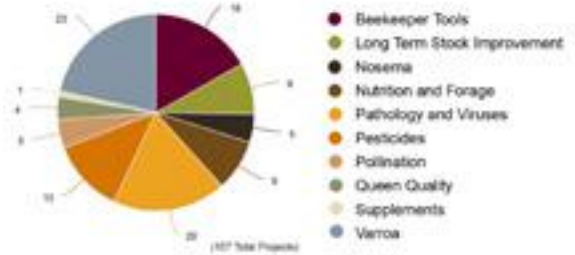
Built to be a unique vehicle, PAm funds honey bee research and honey bee health solutions. Donated funds come from a variety of sources including beekeepers, agribusinesses, corporate sponsors and concerned individuals. Research proposals can be submitted anytime, and specific requests for proposals are also announced periodically. Research priorities are set by the PAm Board of Directors, who are beekeepers with a broad range of additional skills and industry connections. A volunteer team of highly respected scientists review proposals and make recommendations based on methods and design, importance to beekeepers, potential impact, etc. The Board of Directors makes the final decisions about which projects to fund. PAm's objectives are simple – to support the beekeeping industry, by enhancing honey bee health and crop production.

Forage projects around almonds complement the research PAm funds. Blooming cover crops provide immediate benefits and mitigate other bee health threats.

PAm invests in both applied and basic research that are important for honey bee health concerns. Applied research is designed to directly address or solve specific problems - for example, beekeepers are concerned with queen quality and want to know why queens are failing and what can be done. In response, PAm funded multiple projects to study if pesticide exposure, Varroa, or temperature extremes during shipping were contributing to these queen quality problems. Temperature extremes were confirmed to compromise queens, and the applied outcome was Dr. Jeff Pettis designing packaging prototypes to reduce queen damage, and working with shipping companies to educate employees about better bee handling.

Another example of PAm funded applied research is the Hilo bee project, developing a line of bees that is Varroa resistant and commercially viable. This project has a clear objective with an application in mind: providing beekeepers with a bee that does not require chemical treatment for Varroa and performs well in a commercial operation. Applied projects aim to deliver results that can inform beekeeper management choices.

PAm Funded Research Projects 2006-2019



Basic research is often a longer- term investment. Although it may not seem to have value to beekeepers, it is an essential part of building our understanding and knowledge as we look for bee health solutions. A recent example of impactful basic research is Dr. VanEnglesdorp and Dr. Ramsey's project "On What Do Varroa Mites Feed?" This PAm funded project overturned a long-standing assumption that Varroa feed on the blood of bees, and proved that Varroa feed on bees' fat bodies-- which are much more important for bees' immunity and detox functions. While this research does not yet have a direct beekeeper application, armed with this very important piece of scientific knowledge Dr. Ramsey and others are now conducting additional basic research with objectives to use this information for a high priority applied outcome: Varroa control.

Another example of how an investment in basic research can make a difference in the long-term is Dr. Reed Johnson's pesticide work, funded by PAm in 2011 and 2013. This basic research looked at the effects of pesticides and tank mixes frequently used in almond production, on brood and queens. This research did not have an immediately clear application; however, it started a body of work that eventually led to better pesticide application practices which are now included in the Almond Board of California's Best Management Practices for Honey Bees. This initial investment continues to give us important practical returns.

These are just a few examples to illustrate how we balance support for practical work that offers immediate solutions and also long-term building blocks of knowledge. PAm has funded over 100 projects, explore our searchable research database at ProjectApism.org/honey-bee-research.

New Bee Lab At UC Davis

Kathy **Keatley Garvey**

On a day too cold for honey bees to fly and nearly too cold for bundled dignitaries to speak, officials celebrated the opening of the newly constructed USDA-ARS bee research facility on Bee Biology Road, UC Davis campus.

Queen bee breeder Jackie Park-Burris, a past president of the California State Beekeepers' Association and a leader in the industry, snipped the ribbon Jan. 7 in 45° temperature, joining a group of other stakeholders to open the U.S. Department of Agriculture's Agricultural Research Service (USDA-ARS) bee research facility.

The facility, located next to the UC Davis Department of Entomology and Nematology's Harry H. Laidlaw Jr. Honey Bee Research Facility, slides Davis into the national spotlight as "Pollination Central" and "The Bee Capital of the World." The Davis facility is the newest of five USDA bee research labs in the United States and as the only one in California.

"This is the only USDA bee research team in CA – where the action is," said emcee Paul Pratt, research leader of the Invasive Species and Pollinator Health Research Lab. USDA maintains honey bee research facilities in Tucson, Ariz.; Beltsville, MD, Baton Rouge, LA, and Stoneville, MS.

"The opening of the USDA-ARS bee lab marks a new opportunity for USDA and UC Davis entomologists to collaborate and investigate serious problems that affect stakeholders," said Steve Nadler, professor and chair of the UC Davis Department of Entomology and Nematology. "We are very fortunate that the lab was built at UC Davis."

Plans for the USDA-ARS facility began five years ago at a stakeholders' conference in the Laidlaw facility. Attendees at the November 2015 meeting targeted honey bee health, primarily varroa mites, pesticides and nutrition.

Jackie Park-Burris, of Jackie Park-Burris Queens, Palo Cedro, CA – her family has worked with UC Davis researchers for more than 80 years – cut the ribbon with four other stakeholders: almond pollination consultant Robert Curtis of Carmichael, former director and associate director (now retired) of Agricultural Affairs, Almond Board of CA; Kelvin Adee of Bruce, SD, president of the American Honey Producers' Association; Brad Pankratz of Can-Am Apiaries, Orland, CA; and Darren Cox of Cox Honey Farms, Logan, UT, a past president of the American Honey Producers' Association.

Pratt introduced newly hired research entomologists, **Arathi Seshadri** and **Julia Fine**, forming the Invasive Species and Pollinator Health Research Unit at Davis. They are dedicated toward developing technology that improves colony survivorship through long-term studies of multiple stress factors, he said. "They will develop and transfer integrated biologically based approaches for the management of invasive species and the improvement of pollinator health."

Seshadri and Fine aim to improve honey bee survival and beekeeping sustainability in California and nationwide, Pratt said. They will collaborate with federal, university, non-governmental and industry partners.

Seshadri, a pollination biologist with expertise in honey bee behavior and plant reproductive strategies, will be working with beekeepers and farmer stakeholders to develop projects aimed at finding solutions to the ongoing pollination challenges. Also trained as an evolutionary biologist, she has applied principles of plant-pollinator mutualism, specifically the impact of phytochemicals in pollen and nectar on honey bee health and colony performance. Her contributions to pollinator conservation include enhancing the sustainability of all pollinators, including native bees on farms and urban areas. She also has expertise in agroecosystem-based approaches and citizen science programs to promote pollinator diversity and abundance.

Fine, an entomologist with expertise in insect toxicology, honey bee physiology, reproduction and development, focuses her research on identifying how stressors impact honey bee behavior, health and fecundity. She uses established and novel laboratory techniques. Her previous projects involved investigating how agrochemical and viral stressors interact to affect the development and survival of honey bee brood and how nutritional stress affects honey bee queen fecundity. In engaging with beekeepers and growers, Fine will research how realistic biotic and abiotic stressors affect honey bee reproduction, longevity and pollination services, and she aims to identify techniques and strategies to overcome these effects.

Want to learn more about this brand new USDA Bee Lab! Tune into *Bee Culture's* sponsored podcast where Julia Fine spells out more for the direction of this Brand new Lab. Check out **www.BeekeepingTodayPodcast.com** for more!

Jackie Park Burris Jackie Park-Burris Queens, Palo Cedro – her family has worked with UC Davis researchers for more than 80 years – cut the ribbon with four other stakeholders. From left are almond pollination consultant Robert Curtis of Carmichael, former director and associate director (now retired) of Agricultural Affairs, Almond Board of California; Brad Pankratz of Can-Am Apiaries, Orland, Calif.; Darren Cox of Cox Honey Farms, Logan, Utah, a past president of the American Honey Producers' Association; Jackie Park-Burris, of Jackie park Burris Queens, "alo Cedro, CA; and Kelvin Adee of Bruce, S.D., president of the American Honey Producers' Association. (Photo by Kathy Keatley Garvey)

"We don't need to tell the people here how important honey bees are to agriculture, to the natural environment and the importance of minimizing costs to honey bee industry," Matteri told the crowd. He noted that researchers, through collaboration and cooperation, have made great strides in nutrition, physiology, pathology, environmental factors.

"We've learned a lot," Matteri said, "and we're looking forward to many good things to come."

'Bee Capital of the World' – Associate Dean Oberbauer, pointing out the many "individuals focused on apiculture on the UC Davis campus," described Davis as "the bee capital of the world."

"The location of this new honey bee lab right next to the Harry H. Laidlaw Jr. Honey bee Research Facility – offers faculty, students and USDA a unique opportunity for expanding partnerships, internships and collaborative research for faculty and students," she said.

The associate dean lauded the UC Davis research, teaching and public service in apiculture and the what's to come. "We are extremely fortunate and pleased to have this new USDA honey bee lab so close to our researchers and we look forward to this continued partnership in the years to come," Oberbauer concluded.

USDA's Pacific West Area Director Hackett told the crowd that "for me, this is a homecoming." After receiving his doctorate at UC Berkeley, he worked in research with UC Davis Professor Robbin Thorp (1933-2019), when "American foulbrood was a hot topic."

Hackett thanked stakeholders for "your help in bringing this lab here…Your funding on behalf of industry is what made this bee lab come about and we really thank you for that." He singled out the American Beekeeping Federation, American Honey Producers' Association, CA State Beekeepers' Association and Almond Board of CA.

"With this Davis lab," Hackett said, "we are situated in Pollination Central, in the heart of the almond and tree fruit industry."

"*Varroa* mites" topped the list of concerns at the November 2015 stakeholder conference, Hackett pointed out, adding that "It will be studied in context with other stressers such as pesticides."

"We're really looking forward to solving ALL the bee problems," Hackett quipped, to applause. Research will include "how do you combine treatments to improve honey bee health especially from protecting bees from varroa in this agriculturally intensive, high pollination unit location."

Hackett said it's a tremendous opportunity for USDA scientists to partner with UC Davis Entomology and Nematology faculty. The bee faculty include researchers Brian Johnson, behavior ecology; Neal Williams, pollination ecology; and Extension apiculturist Elina Lastro Niño. Faculty member Rachel Vannette, a community ecologist, also works with bees.

Entomologist researchers Julia Fine (left) and Arathi Seshadri listen to the speakers at the grand opening of the USDA-ARS bee research facility in Davis. (Photo by Kathy Keatley Garvey)

"By working together we can synergize all our efforts to help the bee industry and to ensure pollination in country's major specialty crops," Hackett said.

History of the Bee Program – Extension apiculturist Elna Niño chronicled the history of the bee biology program at UC Davis. The first bee instructor was George Haymaker Vansell (1892-1954) a USDA employee in the Davis Experiment Station. A former student at UC Davis, he taught from 1920 to 1931. His research led to a better understanding of the role of bees in crop pollination.

Among the other faculty mentioned: Harry Hyde Laidlaw Jr. (1907-2003), known as "the father of honey bee genetics," who joined the department in 1947; Professor (now emeritus) Norman Gary, faculty member from 1962 until his retirement 1994; Distinguished Professor Robbin Thorp (1933-2019), faculty member 1964 to 1994; Distinguished Emeritus Professor Robert E. Page, Jr., who served on the faculty from 1989 to 2004; and Eric Mussen, Extension apiculturist (now emeritus) from 1976 through 2014. (**See history of bee biology program**)

Gary led the efforts to obtain funds to construct the bee biology facility (renamed the Harry H. Laidlaw Jr. Honey Bee Research Facility), starting with a National Science Foundation facilities grant. He designed the facility, located his primary office there for almost 25 years, and persuaded the Chancellor office to name the access road as Bee Biology Road.

More current members of the faculty: Neal Williams joined the department in 2009; Brian Johnson, 2012; and Elina Niño. 2014.

'We Are Grateful' – In her talk, Park-Burris said that the "California State Beekeepers' Association is overwhelmed that we have a USDA lab to collaborate with our UC Davis lab. We hope there's a lot of collaboration going on. We really look forward to that. As a stakeholder, my family has been raising queens just north of here (Palo Cedro) for over 80 years. Dr. Laidlaw had worked with my uncle and my father. He's been at my house. And he's been through my bees. Julia (Fine) has even already been up to see the queen farm."

"The queen bee breeding industry could definitely use you guys," Park-Burris continued. "CA has all the issues because everybody comes here. It's very important that we have this lab here and how grateful we are that you have all gone to work to make this happen."

"We look forward to solving some of our problems – *Varroa*, *Varroa*, *Varroa* – and forage and pesticide interaction," Park-Burris said, "and all that happens in California during the largest pollinator event in the world. So you're in a good place and we're grateful."

Extension apiculturist emeritus Eric Mussen later commented: "I think the collaboration among the new USDA bee lab personnel, cooperating researchers, and beekeepers should provide an opportunity to probe deeply into potential causes of colony loss. The ability to follow the health of individual bees and colonies, throughout the year, should provide important clues about precursors of decline, well in advance of the ultimate collapse." BC

Are You Listening?

NOTES FROM THE BOARD

Apis M. **Mellifera**

We Are An Integrated Living Super Organism

The Board of Directors is relieved to see that honey bees are now routinely being recognized by humans as a super organism. It's about time. For too long we have been categorized correctly as insects, but our biology reveals much more than simply organisms with a thick exoskeleton, six legs, two pair of wings, and intricate mouthparts. We prefer the more complex moniker noted by one wag, "flying swiss army knives." On top of this, we are also a social organism in contrast to the great majority of insect species that are not.

We are indebited to Jürgen Tautz for his book, *The Buzz About Bees: Biology of a Super Organism*, 2008 Springer-Verlag Berlin Heidleberg, for bringing into focus our complex biology. According to Dr. Tautz, "The concept of equating an entire bee colony to a single animal resulted in the term 'bien,' implying the 'organic interpretation of an individual.'"

In conclusion, our *colony* is finally being seen for what it is, an invisible whole, and single, integrated living super organism. This cuts across not only species but much further along our taxonomic tree, according to Dr. Tautz, who takes the "shrewed and basic observation of the old apiarist's concept of a bee colony to the extreme, and proposes that a honey bee colony is equivalent not only to a vertebrate, but in fact a mammal."

Unlike possibly many humans, we don't find this characterization by Dr. Tautz as "farfetched." He concludes ". . . not if rather than concentrating on the phylogeny of the honey bee, one would focus on the context of those functional evolutionary characters that have rendered the most-recently evolved form of all vetebrates--the mammals – dominant."

Distinct characters and novel features, he claims, separate mammals from other vertebrates, and can be directly compared with honey bees. These include: Mammals have a low reproduction rate unlike honey bees. Female mammals produce "milk" for their offspring in special glands as do female honey bees that produce "royal jelly." The mammalian uterus provides a controlled, protective environment independent of the external world, while the honey bee raises its young, giving similar protection in the brood comb or "social uterus."

Mammals also have a controlled body temperature of about 36°C (98.6°F) while we honey bees keep our brood comb temperature only about one degree C less according to Dr. Tauz. Finally, he concludes that "mammals have large brains with the highest cognitive abilities of vertebrates, while honey bees possess a highly developed capacity for learning with a cognitive ability that eclipses many vertebrates."

Dr. Tautz's book, therefore, is a provocative resume describing we honey bees as "honorary mammals." Having developed some of the same novel strategies he says "there is more to this than a mere superficial similarity." It is achieved through a complex social and behavioral organization, enabling us to go behyond simply controlling our environment. It makes honey bees potentially immortal, as we find ways to alter our genetics so as not to enter what he characterizes as an "evolutionary dead end."

On the Honey Bee Microbiome

Beyond Dr. Tautz's volume, scientists have found a perhaps even more remarkable symbiology in our honey ⇨

SAVE EXPENSE
PICK-UP WITH
A FRIEND!!!!

HARDEMAN APIARIES

906 South Railroad Ext.
P.O. Box 214, Mt. Vernon, GA 30445
Phone 912.583.2710 • Fax 912.583.4920

2020 SPRING PRICES

ITALIAN QUEENS & PACKAGES

QUEENS	PKGS.	1-9	10-24	25-99	100-UP
1-9 . . . $21.00	#3	88.50	86.50	84.50	82.50
10-24 . . . $19.50	#4	104.00	102.00	100.00	98.00
25-UP . . . $19.25	NO NUCS THIS SEASON				

RUSSIAN HYBRID QUEENS AND PACKAGES

QUEENS	PKGS.	1-9	10-24	25-99	100-UP
1-9 . . . $23.50	#3	91.50	89.50	87.50	85.50
10-24 . . . $21.75	#4	107.00	105.00	103.00	101.00
25-UP . . . $21.50	NO NUCS THIS SEASON				

CLIP . . . $2.50 MARK . . . $2.50

WE WILL START TAKING ORDERS IN DECEMBER

Pick-ups are welcome. Yearly inspected by The Department of Agriculture. Package and Queen prices do not include postage. All shipments must be paid in full before we ship. No payment may cause delays in your shipping. All postal claims are to be made by customer. Hardeman Apiaries are not responsible. We accept all major credit cards.

We will not ship packages to zone five and up, no exceptions. Postal service will not insure packages past zone four. Zone five and up package customers should try your local bee clubs to see if they may be picking up packages. Queens can be shipped to most United States customers. These can't be insured by the Post Office or UPS.

---

bee colony. Dr. Nancy Moran at the University of Texas at Austin has a passion for insects and their indwelling microbes, finding insights into plant-dwelling insects, including psyllids, aphids and other sap-sucking insects. It's no surprise, therefore, to learn she has found a rich biological population of symbionts in we honey bees, as is becoming clearer in humans. (Life Partners by Elizabeth Pennisi, Science Magazine, Vol. 366, Issue 6467, 15 November 2019).

According to Wikipedia, the following is true about what some are beginning to call an organ of its own: "Humans are colonized by many microorganisms; the traditional estimate is that the average human body is inhabited by ten times as many non-human cells as human cells, but more recent estimates have lowered that ratio to 3:1 or even to approximately the same number. Some microorganisms that colonize humans co-exist without harming them; others have a mutual relationship. Conversely, some non-pathogenic microorganisms can harm human hosts via the metabolites they produce. Certain microorganisms perform tasks that are known to be useful to the human host but the role of most of them is not well understood. **https://en.wikipedia.org/wiki/Human_microbiome**

Humans have us beat here in pure numbers of microbes it seems, which make up their "microbiome." Ours contains only a paltry eight apparently, but is complex enough apparently to be a stand in for study of the one found in humans according to Dr. Moran.

Experiments in Dr. Moran's lab have developed "microbiome-free" workers. Those poor creatures gain less weight, are more suscepible to pathogens and die sooner than we normal workers, and their hives inevitably decline. Most recently, it has been found that our sisters with intact microbiomes become more susceptible to pathogens, when exposed to glyphosate, the herbicide marketed as Roundup®. Dr. Moran concludes, that "like most complex partnerships, the unions between insects and microbes will take a life-time to unravel."

Thank goodness for Apimondia 46 in Montreal, Canada. It featured a full symposium on the honey bee microbiome. The introduction by Kirk Anderson of the USDA Honey Bee Laboratory in Tucson, Arizona concluded: "The stability of the worker microbiota suggests a healthy ecosystem, but like all well-structured communities, the microbiota is beset with cryptic cheaters and opportunists." A symposium on the "Gut Microbiome," incorporated seven detailed presentations on the importance of the topic, research techniques involved, and relationship among both biotic and abiotic factors within the worker honey bee.

With the word is getting out about the importance of the microbiome in we honey bees, a new kind of treatment is thus hitting the streets similar to products now becoming available to humans. This is resulting in a plethora of so-called "probiotics" to help us keep the eight organisms inside us healthy. We urge beekeepers to beware of this kind of marketing, however. Far too often we have become the target of a promotional idea, when not enough scientific study has ensured the effectiveness and safety of the resulting product. We emplore beekeepers, therefore, to inquire deeply into the effectiveness of such treatments, so that we don't become victims of human cheaters and opportunists in the bargain. BC

BUILD A WAX STRAINER

Ed **Simon**

It happened again. I received another batch of wax that had a lot of honey mixed in with it. Much of the honey had been pulled to the bottom of the pail by gravity, but it was still mixed in with the wax. Only the top three or four inches of wax were relatively free of honey. I wanted to save as much of this the honey as possible for the customer. Then LIGHTNING STRUCK. EUREKA! Well, maybe not quite that dramatic. But at least I knew how to use gravity and time to make an easy-to-use wax strainer. Nesting five-gallon pails and some screen would provide an inexpensive low-tech wax strainer solution. Previously I saw a crude example of this style of strainer built without the screen by James White, a beekeeper in our beekeeping club. I knew I could improve on the efficiency of this device with minimal work.

Note: Different colored pails are used to show the pail nesting of the completed strainer.

Parts

1) Two identically sized five-gallon pails (so they will nest correctly). Each manufacturer seems to make a slightly different diameter pail.
2) Strainer mesh - 1 Square foot of ⅛" or ¼" hardware cloth or perforated aluminum sheeting.

Construction

Two five-gallon pails are used to form a strainer and honey pail combination that allows you to recover more honey from your wax cappings. First the strainer is constructed and then it is nested in a second honey pail.

Step 1: Cut the bottom out.

Remove the bottom of one of the five-gallon pails (part 1). The easiest way to do this is to drill a starter hole near the center in the bottom of the pail and then use a scroll saw and follow the bottom edge of the pail to cut the hole.

Note: Make sure you leave a minimum of 1" as a ledge for the strainer mesh to sit on.

Step 2: Smooth out the edges of the cut you made in the previous step.

Use a utility knife to remove the rough edges of the previously made cut in the bottom of the pail.

Step 3: Cut the strainer mesh to the correct size.

Mark the strainer mesh (part 2) to fit the bottom of the pail. Use the outside of the bottom of the pail for a template. Then draw a second smaller circle about ¼ inch inside the first circle. Use tin snips to cut on the inner circle. Dress the edges of the strainer mesh to eliminate dangerous sharp edges.

Step 4: Fit the strainer mesh to the inside bottom of the pail.

If needed, trim the strainer mesh to allow it to sit solidly on the bottom of the pail.

Step 5: Decision time.

The strainer mesh can either just lay on the bottom of the pail or it can be stapled. If you staple it, make sure the staple ends are bent over and will not catch on anything. Bad words can be the result if you are not careful.

Note: I do not staple the strainer mesh to the pail I make. It is easier to clean both the pails and the strainer mesh when they are separated.

Step 6: Sticking pails.

Clean dry pails from the same manufacturer should nest quite easily. But they can still easily stick together and be hard to separate. This is usually caused by one or more of the following reasons:

1. There is honey or wax where the pails slide together. Cleanliness helps.
2. A suction builds up between the pails. This should not be a problem with the huge hole in the bottom of the strainer (inner) pail.

If you have a problem with pails binding together you can use a third modified pail to help solve the problem. Additionally, this third pail raises the strainer pail and provides additional storage for the strained liquid.

Cut a third pail with your scroll saw about 1" below the reinforcing handle ring. This bottomless and almost side less pail will then fit nicely between the strainer pail and the honey pail. The additional height also helps by providing extra volume for honey or when you have a spout or tap on the honey pail that interferes with the nesting of the strainer pail.

If you are like me and have many different sized pails where the bottom (honey) pail has a smaller diameter than the strainer pail, you can reduce the sticking pail problem by using a large diameter wire. Bend three to six pieces of the wire into a "U" and drape them over the edge of the honey pail. This raises the strainer pail by reducing the diameter of the honey pail. It may not eliminate the sticking problem, but it will make separating the pails easier.

Note: I use 5" pieces of #12 or #14 electrical wire for the purpose.

Step 7: Add a drain valve (tap) to the honey pail. (optional).

It is usually less messy to empty a pail through a drain than pouring it out.

Note: See the accompanying or a previous article "Build a Drainable Honey Pail" in this publication.

Usage

To use the wax strainer, place it in a five-gallon pail (honey pail). The ridges at the top of the strainer pail will stop it from sitting directly on the bottom of the honey pail. This is about 3" for most five-gallon pail

designs. It leaves room for the honey or any other liquid being strained to collect under the wax. Fill the strainer pail with beeswax wax and wait. Eventually gravity does its job and pulls the honey slowly into the second (honey) pail.

Note: To clean the screener mesh use a heat gun that is available at most hardware or home improvement stores. Use it over newspaper as the melted wax is very difficult to remove from any surface.

Additional Thoughts:

You can also use this strainer to help clean the wax before processing it. All you need to do is to mix your wax with water then pour it into the strainer and wait. The water will eventually drain off and the wax should be relatively clean.

Conclusion

Easy to make, easy to use and easy to clean, this helpful strainer will allow you to recover more honey from your capping wax and at the same time ease the cleaning of the wax for subsequent processing.

If too much wax is still allowed into the honey, then replace the strainer mesh with one that has a finer opening.

Note: For very fine screening, cut a piece of cheese cloth or window screen to cover the bottom screen mesh. BC

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

North American Beekeepers' Communication Database

Cesare **Del Vaglio, et al**

University of MT – Master Beekeeping Certificate Final Paper

Project Note

The authors of this report would like to express their thanks to the North American Beekeepers who took the time to complete this survey and contribute their valuable information. Special thanks to Dr. Jerry Bromenshenk for his guidance and support.

Project Rationale and Description

Historically beekeeper organizations were limited to a State/District/Provincial organization. Recently there has been an increase in beekeeper organizations including groups, clubs, and guilds in North America. Presently there is no single directory of these organizations that include up-to-date contact information. A survey was developed and circulated using Google Forms to create a database that will be used to disseminate valuable information about hive health and management, mentoring programs, educational opportunities and promptly and accurately distribute alerts.

Scope of Project

Interest in beekeeping has increased dramatically in recent years. Tew stated (as cited in Graham 2015, p. 531), "The characteristics of a potential apiary location range from scenic to practical." Today, areas previously not considered as potential apiary sites are now home for a growing niche for local honey.

Bees are now buzzing worldwide on rooftops, balconies, backyards and in public gardens. Bees have found homes in Paris, Berlin, London, Toronto, Vancouver, Tokyo, Sydney, Chicago, Boston and New York (Mullins, 2018). Honey bee hives were even installed on the roof of Cobo Arena, located in Detroit, Michigan's downtown core, just one mile away – across the Detroit River to Windsor, Ontario, Canada (Witsil, 2018). In 2017, to help raise awareness of honey bees, hives were installed at the United States Vice President's residence (Kinery, 2017). Recently the growth of the api-tourism sector also attests to the interest in beekeeping internationally (Wos, 2014). Yet, commercial beekeeping continues to be a vital business that requires the management of millions of colonies for pollination in support of agriculture.

Regardless of the beekeeper's goal, one steadfast fact exists - the need for up-to-date, immediate, and accurate information regarding the health and management of hives. Managed honey bee populations worldwide are faced with challenges from parasites, diseases, forage availability, exposure to pesticides, and survival within monoculture agricultural settings (Graham, 2015).

The goal of this project is to create a database that has the potential to connect the numerous and different types of beekeepers from the West, Southwest, Midwest, Northeast and Southeast regions of the United States, and across Canada: from British Columbia to Newfoundland. The data base will encourage the collaboration among beekeepers to continue their education and awareness regarding issues of colony health and implementation of sustainable beekeeping practices (Graham, 2015). Those responding to the survey will among many things, offer valuable insights as to the purpose of their beekeeping organization, whether it is commercially focused, motivated to support hobbyist and treatment free natural beekeeping, or provide information that promotes best management practices. Efforts were made to contact beekeeper organizations, clubs or guilds across North America to elicit their feedback regarding specific pre-determined questions. To do so, the research team targeted the following United States and Canadian Provinces: Alabama, Arkansas, Colorado, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, Washington, West Virginia and Wisconsin; the Canadian Provinces included: Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Nova Scotia, Ontario, Prince Edward Island, Quebec and Saskatchewan. To reach as many beekeepers as possible, a total number of 989 emails were sent out.

As the survey began, the research to identify groups to receive surveys resulted in the realization that many beekeepers were individuals not associated with any particular organization. The decision was made to create a second survey, similar in scope to the original, in order to capture their information and potentially connect them to the database and other beekeepers (Appendix B). A total number of 17 individual emails were sent out.

Terms

The following section defines the common terms used within this paper.

Africanized Bees – *bee population in the Americas resulting from the introduction of the African bee race*

Apiarist or beekeeper – *generally describes a person who raises bees*

Apiary or Beeyard – *a place where bees are kept; a collection of hives or colonies of bees kept for their honey, or for growing bees and queens*

Google Forms *and* **Google Sheets** – *a survey administration app and an integrated spread sheet app, respectively, in the web-based software office suite offered by Google within its Google Drive service* **Swarm** *- the natural method honey bee colonies use for reproduction*

Materials and Methods

Within a five-week time frame beginning on January 20, 2019, and ending at midnight on March 2, 2019, a 17-question survey (Appendix A) was sent electronically to local beekeeper associations, clubs, and guilds using Google Forms. These dates provided the necessary time frame to ensure survey email reminders were also sent to every organization. Within a four-week time frame, beginning on January 27th and also ending on March 2, 2019, an eight-question survey (Appendix B) was sent electronically to individual beekeepers, also using Google Forms.

Survey

This study asked beekeepers across North America to identify the nature of their group, which provides one insight into the motivations that encouraged them to keep bees. To reach as many beekeepers as possible 989 emails were sent out and 126 responded. This represents a 13% response rate. There were 17 individual beekeeper surveys sent out and six (35%) responded. "The response rate can be defined as the percentage of the same that actually participates in the study" (Bryman & Bell, 2016, p.239). To boost the number of survey responses the authors of this research took an additional step and sent out reminders.

The prompting message stated - ***This is a reminder*** *that we had previously sent you an important honey bee survey....please take a few minutes to fill out and reply.... many thanks. The U. Montana Master Beekeeping course project students. If you have already completed the survey, many thanks.* Following up on people can usually produce an increase in the response to the questionnaire, hence the sample size (Bryman & Bell, 2016).

Findings

This exploratory survey was conducted to study beekeeping organizations in North America and describes information that has not yet been abundantly examined. It can also help determine the best research design, for instance, future data-collection method to be used (Bryman & Bell, 2016). The survey questions were formulated to provide feedback, and one question specifically, was to determine if there were more individuals joining beekeeper organizations in North America.

The first area of interest was the goal or nature of each organization. Specific key data has been presented in the following seven charts. There was no mechanism in the survey program to disaggregate information in "other."

Question 17 asked whether there was any evidence of Africanized Bees in their region. Seven said yes, 10 said they did not know, and 109 said no. Based on the location of the beekeeper organization responding to the survey this would indicate that Africanized Bees have been located in Colorado, Kansas, Louisiana, Massachusetts, Michigan, Ohio, and Pennsylvania. Additionally, data received from the individual surveys sent out (17), had six respondents, only one respondent from Texas, stated they were aware of Africanized Bees in their state.

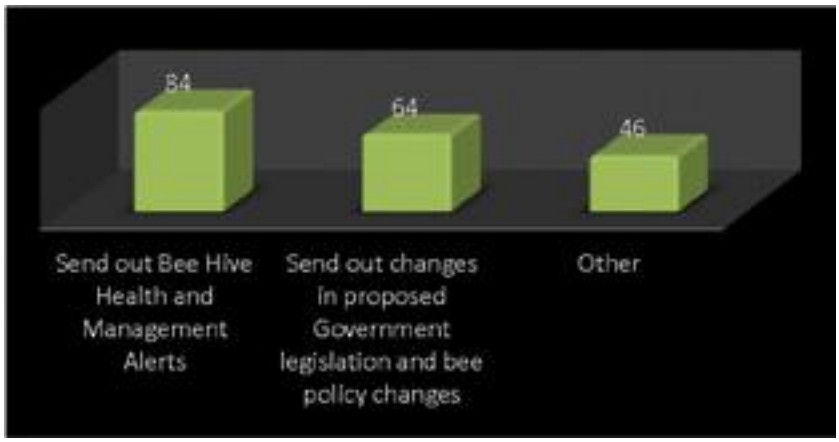


Figure 1: Roles Fulfilled *– Question seven addressed the roles fulfilled by the organizations. The most frequently sited response was to send out beehive health and management alerts 84 (67%).*

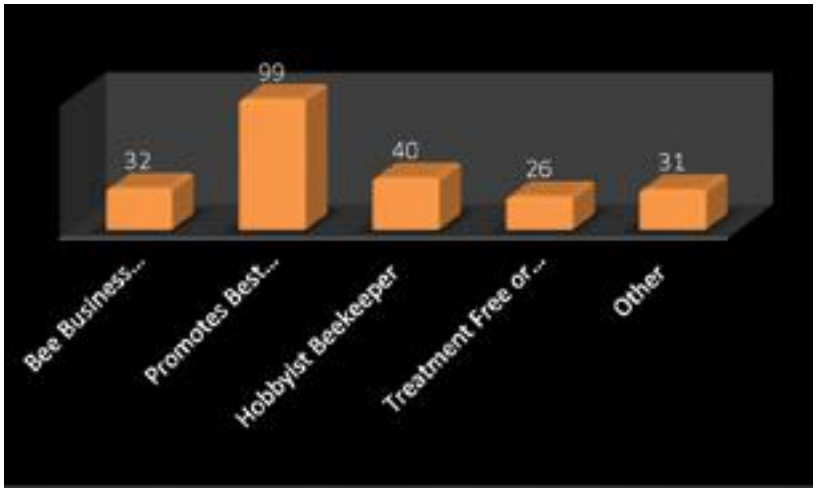


Figure 2: Nature of the Group *– Question eight addressed the nature of the organization. What was noteworthy is the number of responses, 31 (25%), that indicated "other." Promotes best Management Practices recorded the largest number of resonses, which was 99 (79%) of the sample.*

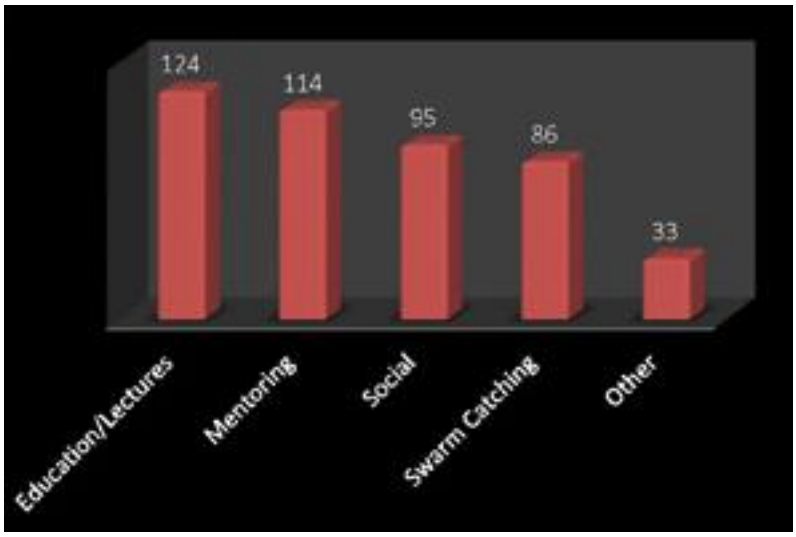


Figure 3: Organization's Purpose *– Question 10 addressed the purpose of the organization. The most noteworthy response was Education/Lectures, 124 (98%). It also appears that Swarm Catching, 86 (68%), indicates an effort to capture free bees which could, without proper safeguards, result in the spread of infectious diseases.*

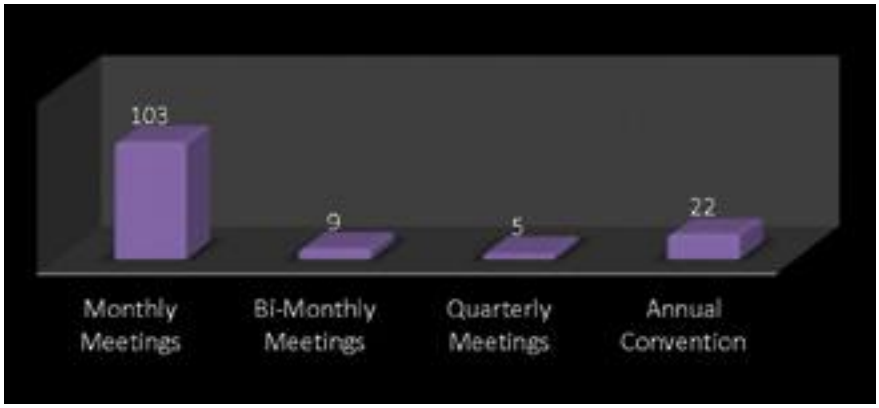


Figure 4: Frequency of Communication within Organization *– Question 11 addressed how often organizations met. Please note some groups checked off more than one meeting frequency (e.g., Monthly, Annual Convention). By far, most groups met monthly, 103 (82%). Many also indicated they met at other frequencies throughout the year. What is noteworthy is that three groups in the sample indicated they never met. To communicate, one group uses Facebook. They also recorded they are a small group of 25, but were growing. The second group had two forms of communication: emails and website. They too are a small group of 25 and noted their membership is constant. The third group uses emails and Facebook, and stated they have over 200 members and are growing.*

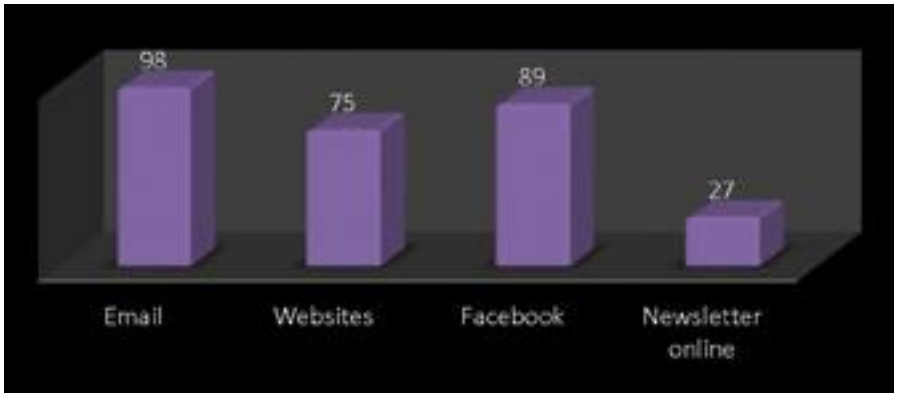


Figure 5: Method of Communication within the Organization *– Question 11 also addressed the methods the organization used to communicate with its membership. The data indicates that many organizations take full advantage of online communication opportunities. The most common was emails, 98 (78%). Please note organizations could choose more than one option.*

Individual surveys also yielded some data. Of the 17 surveys sent out six responded. Five of the six described themselves as a Hobbyist Beekeeper, and one did not provide an answer. With regards to the question, as a beekeeper, what roles do you perform, only three indicated they did perform a role and it was swarm catching. Four of the six indicated they did not communicate with other beekeeping organizations, but two indicated they looked at existing newsletters (1) and websites (1). Five stated they were looking for courses and learning opportunities. Four respondents said they were looking for a mentor, one stated they would like to be a mentor; the fourth did not respond. Lastly, when asked the question if they were aware of any established beekeeper associations, clubs or guilds in their area, all six (100%) said yes.

Discussion

This eight-member research team successfully located 989 active email accounts in North America.

Overall 126 responded which indicates a 13% response rate. Although the response rate met the threshold of 100 respondents, the researchers were disappointed with such a low rate of return. Based on further communications the team members had with individuals who participated in the project a few assumptions were made.

A detailed letter of explanation of the project accompanied each survey. The letter identified the University of Montana Master Beekeeper's class as the originators of the survey. Even with this introduction some recipients questioned the legitimacy of the project. It may be assumed that using a personal email account rather than an email associated with an educational institution caused skepticism regarding the legitimacy of the project. Our survey was sent out from a personal email, which raised validly questions from two respondents.

Some survey respondents indicated they didn't want to complete the survey without input from their local leadership team, or the membership at large. Since the majority of those surveyed met on a monthly basis, it may be assumed that the survey didn't allow enough

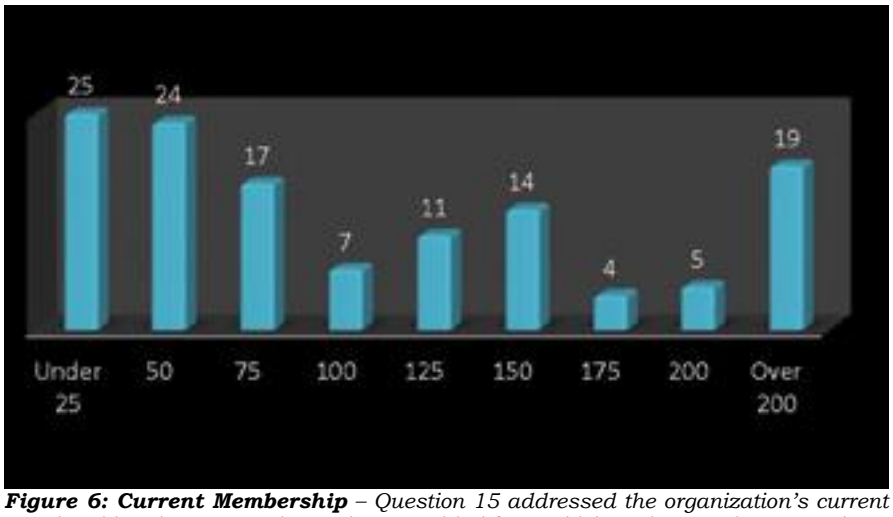


Figure 6: Current Membership *– Question 15 addressed the organization's current membership. There were nine options provided from which to choose. The respondents were asked to pick the quantity which best defined their organization. The largest number of respondents, 25 (20%), indicated they were part of a group with 25 members or less. There appears to be quite a range of membership across North America.*

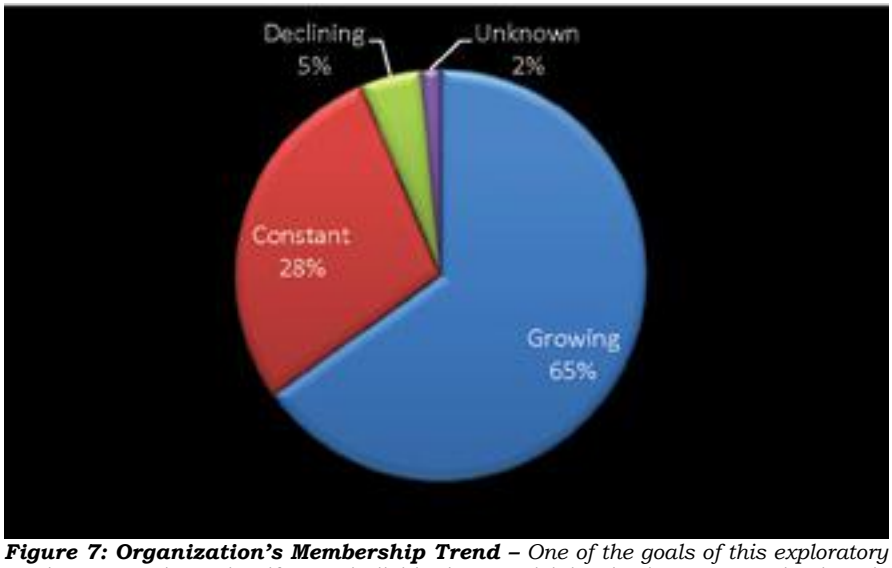


Figure 7: Organization's Membership Trend – *One of the goals of this exploratory study was to determine if more individuals were joining beekeeper organizations in North America (Booth et al., 2016). Question 16 addressed the organizations' projected membership trend. Of the 126 respondents, 82 (65%), stated it was growing, and 36 (28%) stated it was constant. Perhaps the decision to join a group is an indicator that the beekeeper population is growing. These findings support one of the research team's assumptions; there is a growing interest in some form of beekeeping involvement.*

time to capture the various meeting schedules to allow local input.

Finally, some respondents chose not to respond preferring to keep facts about the organization private. One important reason cited for joining an organization was for social purposes, with 95 (75%) indicating this intention. This might indicate that fellowship and support is a motive. It may be assumed that some may have preferred to remain anonymous as a reason not to respond. When provided an opportunity to explain further, no additional information was provided.

Recommendations

Future students enrolled in the University of Montana Master Beekeeping course should continue with this project. The project participants could contact the 10 States and United States territories not included in the original scope of this study. Those 10 States are: Arizona, California, Hawaii, Idaho, Nevada, New Mexico, Oregon, Texas, Utah and Wyoming. The Territories are: American Samoa, Guam, Northern Mariana Islands, Puerto Rico and the Virgin Islands.

Instead of using a student's personal email account, it is recommended to use a University of Montana email address which would lend more credibility to the communication process and the study.

Survey question 17 regarding evidence of Africanized Bees was based on observation of colony behavior, rather than genetic testing. A future enhancement to question 17 might include the following:

What evidence do you have to support this response?: 1. Beekeeper observation; 2. Confirmed Africanized Bees in your area; 3. Positive genetic testing of suspected Africanized Bee behavior.

References

Booth, W.C., Colomb, G.G., Williams, J.M., Bizup, J., & Fitzgerald, W.T. (2016). *The Craft of Research. 4th Edition.* The University of Chicago Press: Chicago.

Bryman, A., & Bell, E. (2016). *Social Research Methods. 4th Edition.* Oxford University Press: Oxford, England, UK.

Graham, J. M. (Ed). (2015). *The Hive and the Honey Bee.* A Dadant Publication: Hamilton, Illinois.

Kinery, E. (2017, June 7). Second lady Karen Pence creates some buzz by installing hive at residence. *USA TODAY.* Retrieved from **https://www.freep.com/story/news/politics/onpolitics/2017/06/07/second-lady-karen-pence- creates-some-buzz-installing-hive-residence/102601306/**

Montana Department of Agriculture. (2019, February 11), Retrieved from **https://agr.mt.gov/Bees**

Mullins, M. (2018, January 8). The Buzz in Paris: Rooftop Beehives, Honey and Urban Beekeeping. *Bonjour Paris.* Retrieved from **https://bonjourparis.com/food-and-drink/paris-beekeeping-and- honey/**

Tew, J. E. (as cited in Graham J.M. (Ed). 2015). *The Hive and the Honey Bee.* A Dadant Publication: Hamilton, Illinois. 531-554.

Witsil, F. (2018, March 14). One hive at a time, back yard beekeepers try saving Detroit, the world. *Detroit Free Press.* Retrieved from **https://www.freep.com/story/money/business/2018/03/14/backyard-beekeepers-detroit-bee-hive/416065002**

Wos, B. (2014). Api-tourism in Europe, *Journal of Environmental and Tourism Analyses,* Vol. 2.1, 66-74.

Appendices
Appendix A: North American Beekeepers' Communication Database Survey
Appendix B : Individual Survey

APPENDIX A

North American Beekeepers' Communication Database Survey

1. Date: please enter the date
2. Time: please enter the time
3. Organization Name
4. Organization State or Province
5. Organization Contact Person's Name
6. Organization Contact Person's Email
7. Roles you perform: In your role as the designated state club or Provincial Beekeeper Association, do you perform any of the following roles? (Check all that apply)
   - Send out Bee Hive Health and Management Alerts?
   - Send out changes in proposed Government legislation and bee policy changes?
   - Neither
   - Other

8. What is the nature of your group? What type of beekeeping does your group promote? (Check all that apply)
   - Bee Business (Commercial)
   - Promotes Best Management Practices
   - Treatment Free or Natural Beekeeping
   - Hobbyist Beekeepers
   - Other

9. Organization's email address:
10. Organization's Purposes: (Check all that apply
    - Education/Lectures
    - Mentoring
    - Swarm Catching
    - Social
    - Other

11. Organization Communications with Members. (Check all that apply)
    - Monthly Meetings
    - Bi-Monthly Meetings
    - Quarterly Meetings
    - Emails
    - Annual Convention
    - Website (URL)
    - Facebook (URL)
    - Newsletter (URL)

12. Organization URL: enter none if appropriate:
13. Organization Facebook URL: enter none if appropriate:
14. Organization Newsletter URL: enter none if appropriate:
15. Total Membership: Please round to the nearest number shown –
    50 75 100 125 150 175 200 over 200

16. Organization Membership Direction:
    - Growing
    - Constant
    - Declining
    - Not Applicable

17. Is There Evidence of Africanized Bees in your Region?
    - Yes
    - No
    - I don't know

APPENDIX B

Individual Survey

1. In what City, State, or Province do you keep honey bees?
2. Are you aware of any established beekeeper association, clubs or guilds in your area?
3. As a beekeeper, do you perform any of the following roles? (Check all that apply)
4. If you share information or services, how do you communicate?
5. Which of the following (beekeeping practices) are you involved in?
6. Mentor related questions:
   - Do you have a mentor?
   - Are you looking for a mentor?
   - Would you like to be a mentor?

7. Are you looking for courses, learning opportunities?
8. Is there any evidence of Africanized bees in your area? BC

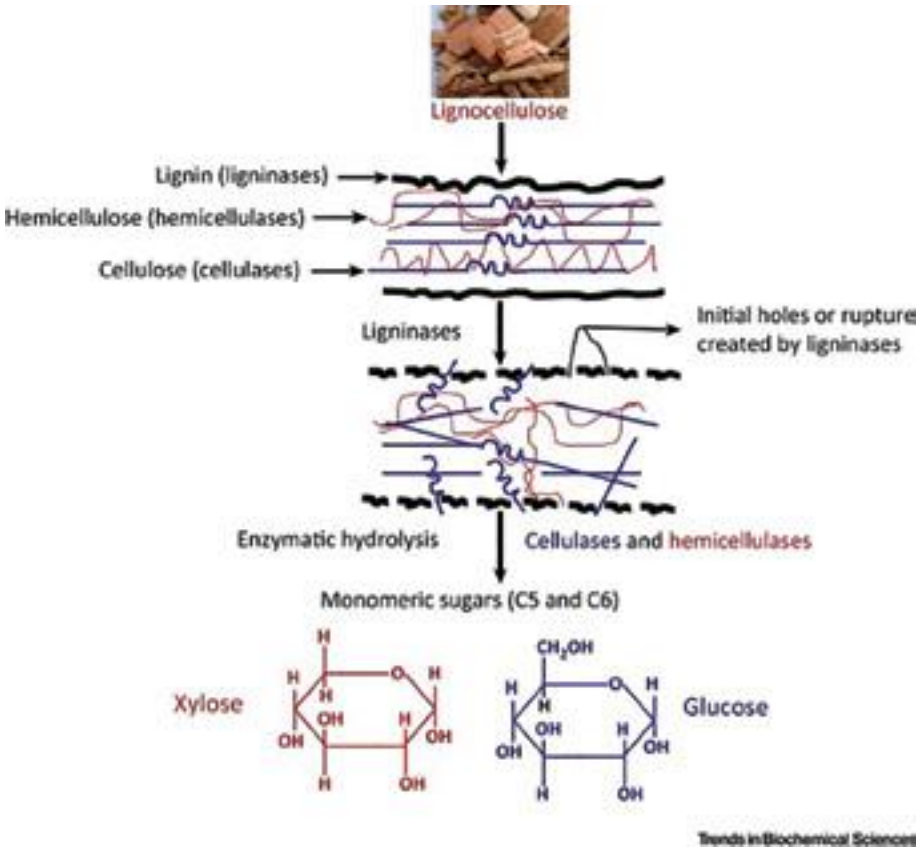
Who Put The Sugar In The Manure Pile?

Mike **McNally**

How often have you heard beekeepers talk about why their bees are all over compost piles, manure piles or sawdust piles. The answer is always the same, who knows? This typically occurs when there are minimal plants in bloom. The answer is quite simple the bees are after sugar. I know!!! How did the sugar get there? To answer that question we need to go back to high school Biology class. Remember photosynthesis? Green plants with chlorophyll take in carbon dioxide and water, add a little sunshine and out comes oxygen and complex carbon compounds. Sugars are some of the complex carbon compounds.

All of nature's chemical processes require energy. Most of that energy comes from sugars tied up in organic compounds. Microorganisms such as bacteria and fungi breaks down large organic molecules into smaller ones and in the process take their sugars to drive their own chemical processes. Remember only plants can make their own sugars, all other organisms need to get it from plants one way or another.

Fungi, in particular mushrooms are the world's big time disassemblers. Without fungi we would have nothing but dead plants and trees cluttering our landscape. Fungi breaks down mostly cellulose and lignin from plants and trees but they are also able to breakdown long chain carbon and hydrocarbon molecules. In short they are able to break down pesticides and petrochemicals. Yup, you read it right. Some mushrooms are able to detoxify pesticides and break down petrochemicals in oil spills. For those of you that would like to read more on this subject I would recommend the book Mycelium Running by Paul Stamets.



Now back to the manure pile. When any organic waste sits, be it manure, wood, straw or whatever it quickly becomes populated with microorganisms and the breakdown process begins. Mushrooms put out spores (seed) and when they land on a suitable organic piles they start to grow strands of hyphae which in turn grows into mycelium, the primary body of the mushroom organism. It is this portion that is out of sight and underground. There may be hundreds of miles of mycelial strands in a compost pile. At this point the mushrooms produce enzymes that breaks down the organic matter into sugars, peptides, polypeptides, alcohols and other organic compounds. Each mushroom species produce their own cocktail of enzymes which is unique and favors that particular mushroom. During times of rapid metabolism mushrooms excrete moisture droplets called guttations that contain organic compounds listed above.

One very important acid that is contained in the guttations is p-coumaric acid. It is responsible for turning on the honey bee's immune system via the cytochrome P-450 pathway and very recently it was found to suppress ovarian enlargement and development in worker bees and ls usually found in

bee bread. Thus the development of queen bees depends on being fed royal jelly with no p-coumaric acid in it. Who knew??? P-coumaric acid is ubiquitous in nature and found on many flowers as well. 1, 2.

Anyway, honey bees feed on these guttations and get fungal sugars and important phytonutrients like p-coumaric acid and others. Always when I give talks on the relationship of honey bees and fungi and why we find them feeding on compost and manure piles there is always a curmudgeon in the back that yells out, "what does the honey taste like?" Being a curmudgeon myself I yell back, "it tastes like crap". Not really but we are both pleased with our quips. BC

1. *A dietary phytochemical alters caste-associated gene expression in honey bees*, Wenfu Mao, Mary Schuler, May R. Berenbaum
2. *Honey constituents up-regulate detoxification and immunity genes in the western honey bee* Apis mellifera, Mao W, Schuler MA, Berenbaum MR

A Smart Person Knows What To Say. A Wise Person Knows Whether To Say It Or not.

Spring Is Coming

Connie **Krochmal**

From about mid-Summer into late Fall, many bee plant species are flowering in California. The following is a brief look at some of those.

Seaside heliotrope (*Heliotropium curassavicum)* is found in California as well as many other states. A creeping annual, this prefers moist sites along stream banks, sandy seashores, and marshes. It features smooth, hairless, weak stems, and pale green leaves, which can vary in shape.

This plant blooms from June through November. Bees eagerly work heliotrope flowers, which are rich in nectar. These can yield surplus honey.

Japanese pagoda tree (*Sophora japonica or Styphnolobium japonicum)* is a very reliable, attractive, Summer blooming, leguminous tree. Reaching forty to eighty feet in height, the plant bears small, scented, pea-like blooms that form large, showy, terminal panicles. When in full bloom, this tree is absolutely gorgeous. It is covered with creamy white blossoms, ½ inch long.

These appear from late July into September. One cultivar has violet blooms. The blossoms are followed by bean-like pods.

Japanese pagoda tree is a source of nectar and pollen. Bees quickly seek out these flowers. Each blossom yields 2 mg. of nectar daily. When enough of the trees are available, this can bring surplus honey of over fifty pounds per colony. The honey has a pronounced flavor.

Chinese hibiscus (*Hibiscus rosa-sinensis)* is a lovely, somewhat tender (hardy to zone 10) small tree. This can be grown in cooler areas as a herbaceous perennial. At least a hundred cultivars are available.

Double flowered varieties are unsuitable for bees. The solitary blooms are up to eight inches across, and emerge from Summer through the Winter on new wood. Blossoms contain six to nine petals.

The flower color varies widely. Possible shades include red, yellow, pink, salmon, orange, white, and various color combinations.

Chinese hibiscus and its relatives are good bee plants. They are sources of nectar and pollen. Bees are very fond of the blossoms.

The abundant nectar is easily accessible to bees. In tropical regions, the plants are major sources of a water-white honey that tends to granulate readily.

Coral vine (*Antigonon leptopus)* is an evergreen vine that is worth featuring here. Widely grown in California, it is usually in bloom from mid-Summer through the Fall.

Bees love the blossoms, which provide pollen and much nectar throughout the day. When enough of the plants are present, these can bring a good honey crop. Rarely granulating, this tangy, strong tasting but pleasant honey is thin bodied with a distinctive aroma. The honey varies from water white to light or dark amber.

Abelias (*Abelia spp.)* are popular evergreen shrubs in California. Some types begin flowering in mid to late Spring. But, the main flowering period is from Summer until a killing frost.

These are carefree, easy to grow, reliable, very free flowering plants. Winter hardiness varies according to the species. The delicately scented blossoms appear in small clusters all along the stems. They can be funnel, bell, or trumpet-shaped.

The lovely blossoms come in various colors, but whites and white with pinkish tinges are pretty common. Abelia blossoms are great sources of nectar and pollen, and are well liked by bees.

In California, both **peppermint** (*Mentha piperita)* and **spearmint** (*Mentha spicata)* have naturalized. In addition, these hardy perennials are widely cultivated. They can bloom for months with flowering extending from July through November.

Spearmint is an excellent honey plant. The amber colored honey can have a somewhat strong flavor.

Peppermint is also considered a great honey plant. The amber to deep amber honey has a strong mint-like

Seaside heliotrope.

Abelia

Loquat

flavor, which mellows with time. Both of these mints can bring large honey crops.

Buttonbush (*Cephalanthus occidentalis)* is a common native in California. Depending on the location, this can be a small tree or large shrub. In California, this free flowering plant can reach forty to fifty feet in height. The blooms emerge from June through September in the state.

The plant is named for the button-like appearance of the flower heads, which range from round or globe-like to spherical. The sweetly scented flowers are generally creamy white, but occasionally can be pale pink or reddish. For the most part, they're terminal. However, these sometimes arise in the upper leaf axils.

The flower heads are several inches wide. The most distinctive feature of the flowers is the long styles, which protrude far beyond the end of the corolla. Bees are sure to visit buttonbush blossoms from about 11 am to dusk.

The flowers produce an abundance of nectar and pollen with the latter being yellow. When the bees are working this plant, the apiary often has a rich aroma during nighttime hours.

Buttonbush is a major bee plant in most regions. This brings a pleasant, mild tasting, heavy bodied, light colored honey. It is good quality.

Although the **loquat** (*Eriobotrya japonica)* was covered in a previous article on Winter blooming plants in the Southwest, it is worth mentioning here as well.

According to my Sunset western gardening book, the flowers can appear during the Fall in this area. These bring pollen and nectar with up to 50 pounds of spicy flavored honey per colony possible.

Goldenrod

The **western goldenrod** (*Solidago occidentalis)* can be found in California. It is also native to Washington, Oregon, Idaho, Wyoming, Montana, Nebraska, New Mexico, Arizona, Utah, Colorado, and Nevada. This is very common in the West in the foothills, lowlands, and wet places – especially along marshes, rivers, and streams.

This native perennial blooms from late August through October. All goldenrods are major nectar and pollen plants. They can bring forty pounds of honey per colony along with a rich abundance of pollen.

Generally, the nectar flow is best when the days are warm and the nights are cool, and there's little to no rain. The full bodied, heavy, thick honey is spicy flavored with the color varying from light to dark or yellow. Forming coarse grains, the honey usually crystallizes within a couple months and develops coarse grains. This varietal honey, which is an excellent choice for creamed honey, is very popular among bakers.

A number of other bee plants in California begin blooming in Spring and continue into late Summer or Fall. These include wild alfalfa from February into September, alfalfa from April through October, horehound from May through September, white sage from April through August, blackberries from May through August, cucumber, Winter squash and pumpkin from May through August, and red clover from July through October.

In addition, some of the common garden flowers can continue blooming until frost. These include cosmos, zinnias, hollyhocks, and dahlias.

Eucalypts *(Eucalyptus spp.)*

While the species above have appeared in previous articles, the various types of eucalypts are new. The trees are often called gum or string bark. These exotics are by far the most commonly planted tree species one encounters in California and Arizona.

To a lesser extent, they're also grown in Texas, Florida, Oregon, and warmer areas of the South. Around seventy species have been introduced to California mainly for timber. Some five hundred to six hundred kinds occur worldwide.

Related to melaleuca and the bottle brush, these are members of the Myrtaceae family. They're native to Australia and the Malayan region.

Eucalypts are some of the tallest, fastest growing woody plants in the world. While most are trees, a few species are shrubs. The resinous evergreens are aromatic with the scent differing slightly by species.

The beautiful woody plants feature lovely peeling bark and attractive foliage and flowers. Quite showy, the blossoms are red to cream. These plants feature two types of leaves.

The juvenile foliage is rounded and forms pairs. Covered with a whitish bloom, the mature leaves are alternate and can be blue, gray, or deep green. These are so rich in oil that they are quite flammable, which doesn't help matters in fire-prone areas, such as California.

The leafy branches and fruits are used in dried flower arrangements. The bloom time varies by species. In California, one can find some type of eucalypt in bloom during most seasons. Some species can bear flowers several times a year.

Eucalypts are of great benefit to beekeepers. M.C. Richter, author of "Honey Plants of California," lists

twenty or so species that are reported to be good bee plants in the state. Very rich in nectar, these can bring large honey crops. The quality, color, and aroma of the honey does differ according to the species. In some cases, the good quality honey is water white. In others, it is of lesser quality and amber colored.

Sugar gum (*Eucalyptus cladocalyx or Eucalyptus corynocalyx)*

I've chosen to feature the sugar gum due to its long blooming period. According to Richter, flowering can occur from August through November.

The tree has an aroma similar to that of cantaloupe. Native to South Australia and Victoria, this plant has naturalized in California, Arizona, and Hawaii as well as some other areas of the world.

In cultivation, it is generally 50 to 100 feet tall, depending on growing conditions. A dwarf cultivar called Nana only reaches 30 feet in height.

This species is often planted as a windbreak. Hardy to zones eight through 10, sugar gum features a straight, short, stout trunk and a dense wide crown. The smooth, peeling, mottled bark is pale gray to tan.

The inner bark is creamy white. The oval seed capsules are 3/8 inch wide.

This species retains the branches on the upper half of the trunk. With a reddish tinge, the deep green, oval leaves are glossy. These are three to five inches in length. The foliage is poisonous to horses, cattle, and sheep.

The very floriferous plant bears scented, creamy white to creamy yellow blossoms. These form three inch wide, axillary clusters. Flowering normally occurs annually, but in some cases it can be in alternate years.

Sugar gum begins flowering at a very young age – around five years when grown from seed. The tree brings a very heavy nectar flow, resulting in up to 200 pounds or so of honey per colony. Slightly humid warm spells bring the best nectar flows.

With a mild flavor, sugar gum honey varies widely in color from pale straw to light colored, profound to extra light amber, light amber, or bright amber. When heated, it turns frothy. When this is a pure monafloral honey, it doesn't granulate.

Sugar gum produces lots of pollen, although bees show little interest in it when other pollen is available.

Growing Sugar Gum and other Eucalypts

I'm reluctant to aggressively promote the cultivation of eucalypts in general for several reasons. First, there is the fact that some types have already naturalized in some areas. In addition, their flammability is another issue to consider.

On the other hand, the eucalypts possess many admirable qualities that are well worth mentioning. They are such important landscape plants in California that my Sunset western gardening book features five pages listing the recommended species and types.

Preferring hot, dry situations, they're beautiful, easy to grow species that require minimal routine care. Normally no fertilizer is needed with the exception of iron should the plant become chlorotic.

In a drought-prone state like California, the fact that established plants need no watering is of considerable importance. They're almost pest and disease free with the exception being the eucalyptus longhorned beetle, which was first found in California in 1988. Eucalyptus trees are very strong, tough, durable plants that can withstand challenging conditions, including high temperatures.

Adapting to a wide range of soil types, including poor, infertile ones and various pH levels, eucalypts have been planted as avenue, skyline, and street trees as well as shade trees, windbreaks, and timber. Full sun is needed. Hardiness depends upon the species.

The young plants are particularly vulnerable to freezes. Most benefit from staking when young. Pruning serves to strengthen the young trunk. A minimum of twenty inches of annual rainfall is needed, but more is preferred. BC

Connie Krochal is a beekeeper and plant expert living in Kentucky.

Pay Attention!

There is no excuse.

This month's eclectic topics: "A management procedure you should not do," "Winter wax moths," and some "Bee reflections"

James E. **Tew**

James E. Tew, 35 years ago.

Don't do this – ever

I speak from experience. Late last Fall, I ended up with some honey still in the comb that was of questionable quality. Not horrible honey, but just not the best. Each season, I save some honey, in deep frames, to put on both new colonies and needy colonies that could use some overwintering help. Even in a marginal year, bees would consume some of my supplemented stores, but normally, forager bees would quickly begin to bring in their own new sources of nectar to be processed into honey. Honey would beget honey[1]. They didn't always consume all the aging honey that I gave them; hence my unintentional honey recycling procedure. Now, my honey emergency stores are several seasons old.

I have found that honey shortages are not the most immediate problem when helping my colonies. My go-to hive demon is usually a *Varroa* issue. I discussed this hive-pest challenge in an article a few issues ago. So, I accumulated some deeps of honey – about five to seven deeps – that I would not want to eat. While it is edible, I would not really want you or me to eat it. As do you, I have ready access to much nicer honey for my consumption. *"Just feed it back to the bees"* is the universal advice. Clearly, the bees want my free honey, but they are duty-bound to gather even more honey to add to their larder. I begin to acquire (lower) quality honey that has been through two or three of these cycles.

Late last Fall, I had about six deeps of such honey. I wanted the combs freed up for a more desirable crop and for dark comb replacement. I decided to extract this propolis-laced, burr-comb trapped honey. Possibly it would have use for specialty honey products such as animal feed or for use in deer attractant lures.

I knew it be hard to extract – especially cold – so I brought the deeps into my heated shop. Halloween came. (I have grandkids). *I will do this later.* Thanksgiving came shortly thereafter. *I will simply do this later.* Then Christmas and the new year event. *Later, later, later.*

Initially, my shop had the pleasant odor of honey, wax, and propolis. Though I can't hear well, I have a sensitive sense of smell. Over the ensuing weeks, I noticed the odor of the supers was changing. Still a recognizable hive odor but different. I had a look into the top of the tightly sealed deeps. Full-blown wax months. Yes, yes, I should have realized that would happen. You experienced beekeepers, too, should have realized that would happen. I blame it *on Senior Citizenship forgetfulness.*

I was frustrated. I will show these familiar pests who's in charge. I will just set the very heavy deeps back outside where it is frigid. That stopped them cold (literally). Things changed. All during Christmas, the weather was bizarrely warm. Yet again, the moths began to thrive.

One early unseasonably warm morning, I noticed a couple of Winter foragers (robbers?) sniffing the equipment that was only partially closed. By 2:00pm, I estimate that there 300-400 robbers on the job. *(Both*

What is that smell?

You know that unique smell in your honey house and in your used equipment storage shed? It seems to the odor of old smoke combined with old wax and propolis. I suspect your bee truck cab has a similar ambience. It is unique to beekeeping.

In the extracting room, there is the pleasant odor of honey and wax. Add wax moths and that odor changes to a similar but different odor. Why? I have no clue and I have no science to offer. Maybe it aids wax moths to find potential mates. Maybe it sends resource location messages to searching adult moths. Maybe the wax moth is able to find new wax sites due to common hive odors. Please note that I am guessing. If there is an odor present, it has a reason.

[1]So, ask me. Why would you not just extract it every year. (1) I want some honey for this very supplemental purpose. Bee-processed honey in the comb is the best emergency winter feed. (2) I'm more of a bee biologist than a honey producer. Now at my life's stage, I invest my meager money in cameras, software, and other such equipment rather than continually developing a home extracting facility. I am aware that most of you are reversed. You use your phone camera and you want all the honey your bees can produce. (3) In my advancing age, I have become protective of my life's energy. Handling and processing honey are a young person's job. If my comments here bother or disappoint you, let me know. I can present much more detail.

A New Beekeeper's Best Friend!

4 Information Packed Issues Featuring:

- Beeyard Choices
- Building Frames
- Dealing With Laying Workers
- Mentors
- Drones
- Controlling *Varroa*
- Summer Swarms
- Beekeeping In The Far South

Plus Much, Much More!

Bee Culture's
BEEKeeping
Your First Three Years

The Industry's Leading Experts Guide You Through Your First Three Years As A Beekeeper!

Visit Us At www.BeeKeeping3.com To Start Your Subscription Now!

Greater wax moths and honey bee foragers/robbers during early December 2019.

*bees and wax moths are really, really good at finding both new and old food sites.).*Yes, yes, I should have realized winter foraging bees could find this honey source during a warm spell. Hey, you beekeepers with experience, you should have realized that possibility by this point, too.

My entire family and the dog could all have been outside – even grilling dinner – but my family had no interest. Dangerous bees were everywhere. You should know that none of my family has any bee interest. I am alone in my bee affliction. The seasonal coldness returned, and all was back to normal. Dead wax moths and no robbing foragers – Except . . .

While digging out two empty old brood frames to get a better view of the wax moths, I inadvertently left two frames inside the shop. Later I noticed this oversight and thought little of it, but mice seemed to assume that I had left these frames there for them. Now, I am dealing with a minor mouse infestation.

Do you agree with this idea? I have a friend who has an aged Betterway Chest Wax Melter. I'm not sure that new melting devices like this one is available. If it is, let me know and I will update in future articles.

So, I plan to take this mess to my friend who has one of these units. Rather than trying to uncap and process this small crop, he and I agreed to simply melt the frame contents out. This will be much easier to do rather than extracting, except the honey will be even lower quality. What a tangled web I wove.

This is a 1986 converted slide photo of a Betterway Wax Melting that was in my lab. It was a very useful device. Under strict supervision, the device could even be misused as a honey liquefier. As I recall, it measures about 30" high x 45" long. It could take maybe 30-40 frames at the time. The edge of catch pan is underneath the melter at the right. The resulting overheated honey was not fit for human consumption. Rendered wax floated on top of the hot honey. Plastic foundation and foundation inserts were destroyed. Rendered frames could be refurbished and were reasonably disease and pathogen-free. The overheated honey still had specialty uses while the resultant wax was re-rendered in smaller batches. This was not a device for processing wax that was still almost white wax. As with solar melters, this machine was too rough on such delicate wax. After my retirement, this unit was sold. I do not know its present fate.

Now my mind is on wax moths

While I had plenty of the Greater Wax Moth (*Galleria mellonella* L) in my temporarily stored supers, I also had a great crop of the Lesser wax moth, *(Achroia grisella).* In my own bees, I don't see this wax pest too often. Maybe I have not been watching closely enough.

Lesser Wax Moth. No escape from the cold. There were hundreds of larvae and adults present and that many more on the way[2].

http://www.dorsetmothgroup.info/portal/p/Picture/s/Lesser+Wax+Moth[2]

I can promise you that there were NO adult wax moths of either species flying around my shop before I brought in these deeps. Yep, eggs had to come in with the equipment. I would suspect that most colonies have some stage of either species moth lurking all the time.

While exploring my moth Winter moth outbreak, I came across an article[3] in which the authors stated that their *"results indicate that bees seem to lose the arms race since Greater Wax Moths successfully invade the beehive, reproduce in bee combs, and honey bees are not able to expel them, or even police their laid eggs. Honeybees release alarm pheromones, which the greater wax moth can sense but seem to ignore."*

I wish I could ask the authors if bees were releasing alarm pheromones due to the presence of wax moths or due to other causes. I would guess they meant that defender bees were responding to the presence of moths, but I should not be guessing.

It would appear that, in addition to many other diseases and pests, in some form, wax moths are normally cohabitating with bees within a colony. If so, a healthy colony constantly must deal with moth outbreaks. Therefore, a healthy colony is always fighting a war on multiple fronts. While most colonies seem to always have wax moth infestation potential, other possible confrontations could be ongoing with the foulbroods, hive beetles, pesticides, food shortages, viruses, fungi, water shortages, robber bees, bears, and beekeepers. It's a wonder that any colony thrives for very long.

A promised new wax moth control news will probably be old news by the time you get this *Bee Culture* edition. This information was from a news release January 2020.

> *EPA is proposing to register a pesticide product containing* **Bacillus thuringiensis**, *subsp.* **aizawai** *strain ABTS 1857 (Bta ABTS 1857) to prevent and control wax moths in beehives. This product offers beekeepers a new tool against destructive wax moth larvae.*
>
> *The active ingredient in this pesticide product (Bta ABTS 1857) is part of a large group of bacteria,* **Bacillus thuringiensis**, *that occur naturally in soil. Bta ABTS 1857 controls wax moth infestations by producing a crystallized protein that is toxic to wax moth larvae.*[4]

Then that brings me to swarming. To thrive and grow as a species, honey bees must overcome all these wars and also swarm enough to replace the many dead colonies. But there's more. They must produce even more swarms to prevent just "breaking even" as a species. Just more reasons for you beekeepers to do no harm. Your colonies are burdened enough already. Good grief, Jim. Move on!

[3]The National Center for Biotechnology Information: Losing the Arms Race: Greater Wax Moths Sense but Ignore Bee Alarm Pheromones. **https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6468870/#__ffn_sectitle**

[4]**https://www.epa.gov/pesticides/first-beehive-uses-currently-registered-active-ingredient-bacillus-thuringiensis-subsp**

Beekeeping Reflections

There is no typical beekeeper

The Death of a Small Colony

All beekeepers are, at once, the same but different. Beekeepers' interest varies wildly. Simply stated, beekeepers keep bees for different reasons. Those reasons change as lifelong beekeepers age. Bees and their keepers are living, viable, and changeable beings. Though most bee books make it appear so, culturing bees is not something that can be neatly delineated. There is no guaranteed "to-do" list for successful bee management schemes. Only suggestions.

Everything about bees and their keepers is constantly changing. Such changes can be great or small. No matter the years of experience, bees and their keepers have both good times and bad. Guaranteed – both good and bad times will come to all beekeepers. Beekeepers have a wide range of adaptive alternatives, but our bees are essentially locked into both biological and instinctual behavior rhythms.

Beekeepers interacting with bees is a form of mutualism. Both species should get something from the cooperative arrangement. I suppose it could be a cooperative relationship to which the bees never agreed, but unknowingly need the help from you – the keeper. This is a complicated relationship. We should not be surprised to encounter frequent glitches.

There is no typical beekeeper. In whatever way possible, I hope all who are reading this find a rewarding path within this complex relationship.

As always, a sincere thanks for reading all my ramblings. BC

Dr. James E. Tew, Emeritus Faculty, Entomology, The Ohio State University and One Tew Bee, LLC; ***tewbee2@gmail.com; http://www.onetew.com; https://youtu.be/s0Zzn1oEhlI***

A Closer Look

Basic Honey Bee Biology

X219

$29.95

www.beeculture.com

274 pages, color

Clarence H. Collison

Freedom Of Misinformation

Pesticides Facts

Early in American history it was decided that the best response to false, misleading and untruthful information was not to censor, but the Bill of Rights and the First Amendment that guarantees the right to more speech to correct and expose the lack of credibility of those who spread incorrect information for personal gain.

The December 3, 2019 Catch the Buzz installment *Neonic Crisis Counter Point* by Jon Entine titled *Challenging media narrative about the 'birds and the bees' – neither faces serious threats from neonicotinoids or other crop chemicals,* was quite astounding. Not because it shed new light and helped to inform readers about the reality of our current situation, but because it included a few verifiable facts mixed in with a large number of inaccuracies, misinformation and a one-sided argument that ignored or disregarded the voluminous facts that do not fit into the narrative Entine espouses.

Find a fault and use it to discredit all other information

Entine seizes on the truth that some environmental groups and numerous media outlets have erroneously claimed that honey bees are going extinct. Such statements either misunderstand the situation or overly hype it up in order to grab peoples' attention. Entine correctly points out that the number of honey bees worldwide has increased over the last decade while ignoring the fact that at the same time, winter and yearly losses among beekeepers are also are record high levels. The reason honey bee colony numbers have increased is because beekeepers are absorbing these losses and have gotten used to replacing their high annual losses by buying bees or creating splits and nucleus colonies.

Play fast and loose with the facts

As a former producer and director for both NBC and ABC news, the number of facts that Mr. Entine gets completely wrong is impressive. As the Executive Director of the Genetic Literacy Project whose motto is "Science not ideology," Entine's lack of scientific references of peer reviewed studies to back up his assertions and claims, even when he refers to such studies, speaks to the weakness of his arguments. For example, he claims that studies on the dangers of Imidacloprid are misguided because most corn and soybean seeds are treated with clothianidin and thiamethoxam which are tens of times less toxic to birds. Not only do we know that clothianidin is the most toxic of all the neonicotiniods (Pisa 2015), but he ignores the fact that birds also eat insects that have ingested the toxins and this allows the poisons to bio-accumulate in the birds some of whom are not primarily seed eaters. The bioaccumulation process occurs when a chemical or metal becomes increasingly concentrated as it moves up through a food chain.

The "Counterpoint" states that "Within a few years after the introduction of neonicotinoid seed treatments, they were celebrated almost as a miracle insecticide as they reduced the overall toxicity of pesticide use and had few if any ***documentable*** impacts on non-target species." (emphasis added) True but the reduced toxicity only applies to mammals such as humans. Neonics are extremely toxic to insects and the only reason few documentable impacts on non-target species existed is because this class of pesticide was so new, the necessary research had not yet been done to see how extensive non-target impacts might be.

Alternative Facts

Endine's narrative states categorically that unlike other pesticides, neonicotinoids do not "kill beneficial insects, threaten wildlife and pose health problems to humans". Such statements are simply without merit and not supported by the evidence. The reality is that "Major knowledge gaps remain, but current use of neonicotinoids is likely to be impacting on a broad range of non□target taxa including pollinators and soil and aquatic invertebrates and hence threatens a range of ecosystem services. (Goulson 2013) In other areas, we just don't know one way or another if neonics are really safe.

Here are some direct quotes from the science:

"We found honey bees in both control and neonicotinoid-treated groups progressed almost identically through the summer and fall seasons and observed no acute morbidity or mortality in either group until the end of winter. Bees from six of the twelve neonicotinoid-treated colonies had abandoned their hives, and were eventually dead with symptoms resembling CCD. However, we observed a complete opposite phenomenon in the control colonies in which instead of abandonment, they were re-populated quickly with new emerging bees." (Chensheng 2014)

"Our study on honey bees under laboratory conditions confirmed the

Given the wide-scale use of neonics, more studies are needed to fully understand their effects on human health.

lethality of clothianidin to honeybees at high doses. We could as well show that individual honeybees fed with sub-lethal doses (30 pg to 3000 pg per bee) revealed inhibitory effects on conditioning responses . . ." (Bartling 2019)

"Two studies, conducted on different crops and on two continents, now substantiate that neonicotinoids diminish bee health . . . Tsvetkov *et al.* find that bees near corn crops are exposed to neonicotinoids for three to four months via nontarget pollen, resulting in decreased survival and immune responses, especially when coexposed to a commonly used agrochemical fungicide. Woodcock *et al.*, in a multicounty experiment on rapeseed in Europe, find that neonicotinoid exposure from several nontarget sources reduces overwintering success and colony reproduction in both honey bees and wild bees. These field results confirm that neonicotinoids negatively affect pollinator health under realistic agricultural conditions." (Woodcock 2017)

"Species foraging on oilseed rape benefit from the cover of this crop, but were on average three times more negatively affected by exposure to neonicotinoids than non-crop foragers. Our results suggest that sub-lethal effects of neonicotinoids could scale up to cause losses of bee biodiversity." (Woodcock 2016)

"Neonicotinoids can persist and accumulate in soils. They are water soluble and prone to leaching into waterways. Being systemic, they are found in nectar and pollen of treated crops. Reported levels in soils, waterways, field margin plants and floral resources overlap substantially with concentrations that are sufficient to control pests in crops, and commonly exceed the LC_{50} (the concentration which kills 50% of individuals) for beneficial organisms. Concentrations in nectar and pollen in crops are sufficient to impact substantially on colony reproduction in bumblebees. (Goulson 2013)

"Results demonstrate that imidacloprid has direct effects on white-tailed deer when administered at field–relevant doses." (Berheim 2019) The white-tailed deer fawns in this study suffered malformations and higher death rates when imidacloprid, was added into their drinking water. Researchers also showed that when higher levels of imidicloprid accumulated in the spleen of the deer, both body weight and survival of fawns decreased.

Pesticides would rank near the bottom of the list of problems bees have to worry about if these toxic chemicals didn't exasperate the issues of varroa, diseases, nutrition, and forage availability by making them all worse."

In 2016 a systematic review of all available peer-reviewed research was conducted on the human health effects of neonicotinoids. Reviewers concluded that "the studies conducted to date were limited in number with suggestive but methodologically weak findings related to chronic exposure. Given the wide-scale use of neonics, more studies are needed to fully understand their effects on human health." (Cimino 2017)

Another review states: "Due to the broad application of neonicotinoids, a widespread human exposure to these pesticides can be suggested. Present evidence from epidemiological studies, in vivo and in vitro studies indicates that neonicotinoids cause potential damage to humans and mammals. However, methods for determining damage from neonicotinoids in human biological samples are still in the research stage and deserve further investigation. At the same time, large-scale prospective studies are needed to see whether neonicotinoids will have deleterious effects on humans, especially among vulnerable populations such as occupational groups, children, and pregnant women. (Han 2017)

Australia's Example

Entine echoes other pesticide industry apologists by bringing up the fact that no reports of CCD have been confirmed in Australia, despite that country using neonicotinoid pesticides for years. I checked on this claim about two years ago and found that Australian beekeeper experiences do not at all prove that neonics are not a problem for bees down under. Annual losses had spiked for those beekeepers with apiaries near commercial farming operations, particularly that grow canola. However, it is possible that things may have changed in the past two years so I contacted Des Cannon, former president of the Australia Beekeeper Federation, and former editor of the Australasia Beekeeper again to get an update on the situation in Australia. He

contacted knowledgeable beekeepers in almost every Australian state and here is what he said:

"Interestingly, across the group, they had all reduced their losses over, say, 10 years ago, by placing more emphasis on their queens and on maintaining strong hives, often by using nucleus hives for support. Canola was universally seen as a problem, and often avoided. Whether this was due to neonic seed coatings or indiscriminate use of other insecticides was unclear, but all felt fungicides were a bigger issue than previously recognized, especially when used in tank mixes and/or with adjuvants . . .

"Last thing I would add is that across Australia generally, the bulk of honey production is from native flora. We are far less reliant on agricultural areas than countries overseas, as a lot of that native flora is in public lands such as State forests, National Parks, or Travelling Stock Reserves (which are, in effect, remnant floral habitat and are often grazed by livestock but never cropped). This is why the loss of natural resources in this year's fires is of such concern. One fire alone has caused a NSW beekeeper to lose 28 apiary sites which had at least nine or 10 honey-producing tree species on them. So in summary, I would say beekeepers still see neonics and insecticides generally as problems, but avoid the problems by not working in the vicinity of Canola or other crop country."

While Australia's experience does not exonerate or indict neonics as an issue for honey bees, it is clear that something associated with Canola plantings, has indeed become a problem in agriculturally intensive areas of the land down under. Unlike in the USA, Aussie beekeepers have so far been able to find alternative foraging areas filled with wild native plants and free of pesticide treated crops to help keep their bees in a healthy state. And like many in the U.S., they are cannibalizing healthy nucleus colonies in order to prop up full-size hives. Why are beekeepers not asking why the extra work and cost of keeping nucleus colonies as support for existing hives is needed these days when it was not necessary just 20-30 years ago?

Why are beekeepers not asking why the extra work and cost of keeping nucleus colonies as support for existing hives is needed these days when it wasn't necessary just 20-30 years ago.

Repeat a lie often enough and many people will believe

Entine's article also perpetuates the falsehood that is often repeated even by well-meaning members of the beekeeping community, that "pesticides ranked near the bottom of the list" of challenges that honey bees face. As I have pointed out before, pesticides actually rank near the top of the list when one considers that *besides* the direct effect these poisons have on the bees, they are able to aggravate all the other issues bees are dealing with. By weakening the bee's immune system, they make bees more vulnerable to diseases and to *Varroa* mites, since it is the pathogens that are ubiquitous in colonies weakened by *Varroa* mites that actually kill the bees, not the mites themselves. Not only are hives weakened by pesticide exposure more likely to die from mite exposure, some pesticides have been shown to increase the time bee brood develops from egg to adult, allowing mites more time to raise their young to maturity. Herbicide use tends to decrease the amount of blossoming plants available to foragers effecting colony nutrition. So we see that pesticides (insecticides, fungicides, herbicides, etc.) make the problems of pathogens, varroa mites and forage availability all worse.

Older chemicals worse, or better?

Another misleading half-truth that the Entine article perpetuates is the idea that neonicotinoids have replaced the older more toxic chemicals that used to be used. While it is true that the older organophosphates and pyrethrins appear to be more toxic to people than neonicotinoids, the neonics are much more toxic to insects than the older pesticides. Because of the danger to themselves, farmers tended to only use the older poisons when they had to. The relative safety of the neonicotinoids and ease of use by treating seeds and not having to spray, has resulted in farmers using them annually as a matter of course, whether they have a pest problem or not. This is partly responsible for the dramatic increase in pesticide use we have seen in agriculture over the last couple decades. Additionally, the older chemicals were not systemic, so pollinator exposure could be reduced by spraying when crops were not blossoming, or spraying at night or during cold weather when bees were not flying. Should any pollinator visit treated plants following the application of neonics, the systemic and long-lasting nature of this family of pesticides guarantees that the pollinator will be exposed to the pesticide since it readily migrates to the pollen and nectar as well as the rest of the plant. The reality is that not just the pollinators, but we all would benefit from a return to the older "more dangerous" chemicals since it would likely result in a significant decrease in the amount of toxins we spread over our land on an annual basis.

Another half-truth and misleading statement published in the *Neonic Crisis Counterpoint* article is that concerns that "all insects, bees included, face extinction" is false. This is obviously hard to prove false and argue with and on the face of it is true. What is not mentioned is that scientists have confirmed that the level of species extinction we are experiencing on Earth today, rivals the extinction that occurred during the time of the dinosaurs. Things are so bad researchers have coined the phrase "Sixth mass extinction" to define our time where, by some estimates, the majority of species on the planet will no longer exist by the end of the century. (Pimm 2000, Thomas 2004, Wake 2008, Barnosky 2011, Wagler, 2012, Ceballos, 2015, Kolbert 2015) Sure *not all* insects face extinction but it

appears most do, even though some species appear able to increase in population at least temporarily by inhabiting the ecological niche that is opened up by those species that are dying out. (McKinney 1999) Now I am not claiming that the use of pesticides is the cause of the massive loss of biodiversity we are seeing on our planet at this time, but the evidence certainly suggests that these chemicals are part of the problem. (Hayes 2010)

I could go on, but you get the picture. Perhaps the fact that Jon Entine's Genetic Literacy Project is focused primarily on extolling the benefits of Genetic Engineering and downplaying its problems helps explain his desperate defense of neonicotinoids. After all, most genetically modified seeds are treated with neonics and almost all are grown with the aid of glyphosate (Roundup). (Perry 2016) Thus, the bad rap that pesticides are getting does not reflect well on GMOs. Unfortunately, in his haste to defend GMOs and neonics Entine sacrifices his credibility by exposing his lack of journalistic integrity and distorting the facts on the ground by not even trying to communicate all the evidence in a truthful and forthcoming manner. This self-proclaimed "journalist" even misidentified the country in which the bird study he bashes (Eng 2017) was carried out, and as one commenter on his website point out about Entine's article, "You can't expect people to believe your proposition if you get details like that wrong." BC

References

Barnosky, A., Matzke, N., Tomiya, S. *et al.* (2011) *Has the Earth's sixth mass extinction already arrived?* Nature 471**,** 51-57; **doi:10.1038/nature09678**

Bartling, M.T., Vilcinskas, A., Lee, K. (2019) *Sub-Lethal Doses of Clothianidin Inhibit the Conditioning and Biosensory Abilities of the Western Honeybee* Apis mellifera, Insects 10 (10): 340

Berheim, E.H., Jenks, J.A., Lundgren, J.G., Michel, E.S., Grove, D., Jensen, W.F. (2019) *Effects of Neonicotinoid Insecticides on Physiology and Reproductive Characteristics of Captive Female and Fawn White-tailed Deer,* Scientific Reports**,** 9, 4534 (2019) **doi:10.1038/s41598-019-40994-9**

Ceballos, G., Ehrlich, P. R., Barnosky, A. D., Garcia, A., Pringle, R. M., Palmer, T. M. (2015) *Accelerating modern human-induced species losses: Entering the sixth mass extinction*, Science Advances, Vol. 1, No. 5: e1400253 **DOI: 10.1126/sciadv.1400253**

Chensheng, L., Warchol, K. M., Callahan, R. A. (2014) *Sub-lethal exposure to neonicotinoids impaired honey bees winterization before proceeding to colony collapse disorder*, Bulletin of Insectology: 67 (1): 125-130, 2014ISSN 1721-8861

Cimino AM, Boyles AL, Thayer KA, Perry MJ. 2017. *Effects of neonicotinoid pesticide exposure on human health: a systematic review*. Environ Health Perspective 125:155–162; **http://dx.doi.org/10.1289/EHP515**

Eng, M. L., Stutchbury, B. J. M., Morrissey, C. A. (2017) *Imidacloprid and chlorpyrifos insecticides impair migratory ability in a seed-eating songbird*, Scientific Reports, 7: 15176 | **DOI:10.1038/s41598-017-15446-x**

Entine, Jon (2019) *Challenging media narrative about the 'birds and the bees' – neither faces serious threats from neonicotinoids or other crop chemicals,* Genetic Literacy Project **https://geneticliteracyproject.org/2019/11/19/challenging-the-media-narrative-about-the-birds-and-the-bees-neither-of-them-face-serious-threats-from-neonicotinoids-or-other-crop-chemicals/**

Goulson, Dave (2013) *Review: An overview of the environmental risks posed by neonicotinoid insecticides*, Journal of Applied Ecology, **https://doi.org/10.1111/1365-2664.12111**

Han, W., Ying, T., Xiaoming, S (2017) *Human exposure to neonicotinoid insecticides and the evaluation of their potential toxicity: An overview*, Chemosphere, 192: 59-65

Hayes, T. B., Falso, P., Gallipeau, S., Stice, M. (2010) *The cause of global amphibian declines: a developmental endocrinologist's perspective,* Journal of Experimental Biology, 213: 921-933; **doi: 10.1242/jeb.040865**

Kolbert, Elizabeth (2015) *The Sixth Extinction: An Unnatural History*, Publisher: Picador, Reprint Edition

Matheson A. (1995). *First documented findings of* Varroa jacobsoni *outside its presumed natural range*. Apiacta, 30, 1–8.

McKinney, M. L., Lockwood, J. L. (1999) *Biotic homogenization: a few winners replacing many losers in the next mass extinction*, Trends in Ecology and Evolution, 14:11, 450-453

Neumann P., & Carreck N. L. (2010). *Honey bee colony losses*. Journal of Apicultural Research, 49, 1–6. **https://doi.org/10.3896/IBRA.1.49.1.01**

Perry, E. D., Ciliberto, F., Hennessy, D. A., Moschini, G.C. (2016) *Genetically engineered crops and pesticide use in U.S. maize and soybeans*, Science Advances; Vol. 2, no. 8, e1600850 **DOI: 10.1126/sciadv.1600850**

Pimm, S., Raven, P. (2000) *Extinction by numbers*. Nature 403**,** 843–845; **doi:10.1038/35002708**

Pisa, L.W., Amaral-Rogers, V., Belzunces, L.P., Bonmatin, J.M., Downs, C.A., Goulson, D., Kreutzweiser, D.P., Krupke, C., Liess, M., McField, M., Morrissey, C.A., Noome, D.A., Settele, J. Simon-Delso, N., Stark, J.D., Van der Sluiis, J.P., Van Dyck, H., Wiemers, M., (2015) *Effects of neonicotinoids and fipronil on non-target invertebrates*, Environ Sci Pollut Res 22:68–102 **DOI 10.1007/s11356-014-3471-x**

Seidler, Ramon, J., Bronner, D. (2014) *Pesticide use on genetically engineered crops, and Addendum: Traditional Soil-Applied Insecticides are Surging Alongside Neonicotinoid Insecticides on Genetically Engineered Corn, Former Senior Scientist (Seidler) at the Environmental Protection Agency Office of Research and Development, Western Ecology Division in Corvallis, OR*, **https://static.ewg.org/agmag/pdfs/pesticide_use_on_genetically_engineered_crops.pdf**

Thomas, C., Cameron, A., Green, R. *et al.* (2004) *Extinction risk from climate change*. Nature 427, 145–148; **doi:10.1038/nature02121**

Wagler, Ron (2012) *The Sixth Great Mass Extinction*, Science Scope, Vol. 35, No. 7

Wake, David B., Vredenburg, Vance, T., (2008) *Are we in the midst of the sixth mass extinction? A view from the world of amphibians*, Proceedings of the National Academy of Sciences, 105 (Supplement 1) 11466-11473; **DOI: 10.1073/pnas.0801921105**

Woodcock, B.A., Isaac, N.J.B., Bullock, J.M., Roy, D.B., Garthwaite, D.G., Crowe, A, Pywell, R.F. (2016) *Impacts of neonicotinoid use on long-term population changes in wild bees in England,* Nature Communications 7, 12459 **doi:10.1038/ncomms12459**

Woodcock, B.A., Bullock, J.M., Shore, R.F., Heard, M.S., Pereira, M.G., Redhead, J., Ridding, L., Dean, H., Sleep, D., Henrys, P., (2017). *Country-specific effects of neonicotinoid pesticides on honey bees and wild bees*. Science 356, Issue 6345, pp. 1393–1395. **DOI: 10.1126/science.aaa1190**

BIGGER PICTURE

Jessica **Louque**

Springing Into Action

Coming into March, beekeepers usually can't wait to get inside their hives. For most of us, there will be at least a few warm days in the late Winter or early Spring that allow a peek inside the hives. Bees will be flying and you can usually tell which colonies are going to pull through, which ones will need swarm control soon, and which ones need to be thrown out. Some newbees will be in the last dregs of an introductory beekeeping class to give them a crash course before their first packages arrive. New mentorships are made and local beekeeping organizations see a few new faces around the monthly meetings. It's also the time that you repeat beekeepers start the wheels spinning into motion to activate those Winter plans into Spring action. Depending on the level of beekeeping experience, most beekeepers have a plan in mind for the year ahead. If you aren't ready yet, or need a few ideas, I have some options for you to consider.

For some, it's as simple as the joy of beating out their top competitor in the honey judging competition this year. They may go talk to some local landowners who potentially have a good honey source, buy some extra equipment, and get their honey bottling process down to a T. Maybe it's winning a specific category of honey judging by shade of honey, or by entering more categories altogether, or a frame of honey or capped honey. It could also not be honey judging, but wax judging, photography, cooking with honey, or any of the competitions offered by local, state, regional, or even national meetings, or fairs. If you haven't thought about entering a competition, I would highly recommend it. You will definitely learn a lot about the craft because of the focus needed to compete.

If you decide to cook with honey, for example, it will take some practice to get the honey just right without the weird burnt taste. Maybe you learn to only use dark honey to cook with, and move your bees to the tulip poplar trees accordingly. It will definitely give you new cooking skills and an appreciation for natural sweeteners. If you want to try this line but don't consider yourself a baker, you might try sauces. They're fairly forgiving and you can cater it to your taste a little bit more. If you're not a baker or chef, you might want to try the honey competitions, or the wax. This is showing off that your bees were kept well enough to have wax or honey to use in a judging, and that you can follow basic rules. That may sound childish, but I cannot tell you how many people get disqualified from judgings for not following some simple rule, not rereading the rules, or completely disregarding them. If it says to use a dark jar for a tasting competition, don't put it in a clear jar. If you enter dark honey in a light honey contest, you're throwing yourself out of the running. Just pay attention. If you're not sure, ask someone who knows, preferably someone in charge of the contest and not a competitor. You might have alfalfa honey that is clear and light as water and I'd tell you to enter it in medium if I had light honey to compete with yours.

If you're a bit more artistically inclined, there's also candlemaking and wax rendering, which I consider to be an art, and also photography. In places with more interest, I've seen other entries like soap and lip balm, or other hive products judged. If you decide to do any of these, the effort you put in will definitely give you an advantage for expanding your beekeeping, creating new things, or just giving a new purpose to your beekeeping. Talk to others who may help you. We all know most beekeepers can talk the ears off a donkey if you ask them for their advice, so find someone that's knowledgeable and get their opinions.

If you're not the competitive type but looking for some depth to your beekeeping, I might suggest some beekeeping classes. Not everyone is lucky enough to live in a state like North Carolina, where we have a large initiative to educate anyone interested in beekeeping topics.

Between our highly involved

professors like Dr. Tarpy at N.C. State, our amazing staff of apiary inspectors, and the NCSBA, most anything that you'd be interested in learning can be found in a class, and often it will be regional so the travel is not too difficult. Our groups are all pretty good at adapting too, so if you want to have a class on something specific and have people interested, a class can be designed to fit those purposes.

I randomly bring up Don Hopkins because I can't imagine many people having more experience with bees or beekeeping experience, making him a good example in several situations. He has, on multiple occasions, went out of his way to teach pest and disease classes at my behest. Don is also pretty up to date on his knowledge because it's literally his job. His additional remarks or side stories are really the teachable moments in his presentations because that's where you see what stood out to him and where you need to learn. If something sticks in Don's mind enough to mention it out of the presentation, you should probably be paying attention because he's seen it all.

Local beekeeping chapters also have monthly speakers and try to stay current for their active members. If you are in a beekeeping club, please try to help them out. I'm not saying you should go out and do a presentation on something you're not familiar with, but it is hard to come up with new topics, find speakers, and keep your group interested on a monthly basis.

Every organization I've been involved with is begging for ideas for monthly meetings. If there's something you want to hear about, tell one of the officers. If you want to have a candlemaking demonstration for a monthly meeting, tell your club and see if it can be done. If you want to learn queen grafting, see if your club can sponsor a training or set it up through the NCSBA. Sometimes the clubs are hit or miss with speakers, and a lot of times it's because you either don't know what to cover, don't have options for speakers, or don't know the interests of your group. I've been the one organizing speakers before and it's a rough job. If you have suggestions or ideas, it's definitely a help to talk to your group about it. Just some ideas – General Botany, honey plants, social insects, history of beekeeping, diseases and pests, candlemaking and soapmaking, beekeeping business, apiary design and note logging, local pollen sources, woodworking, etc.

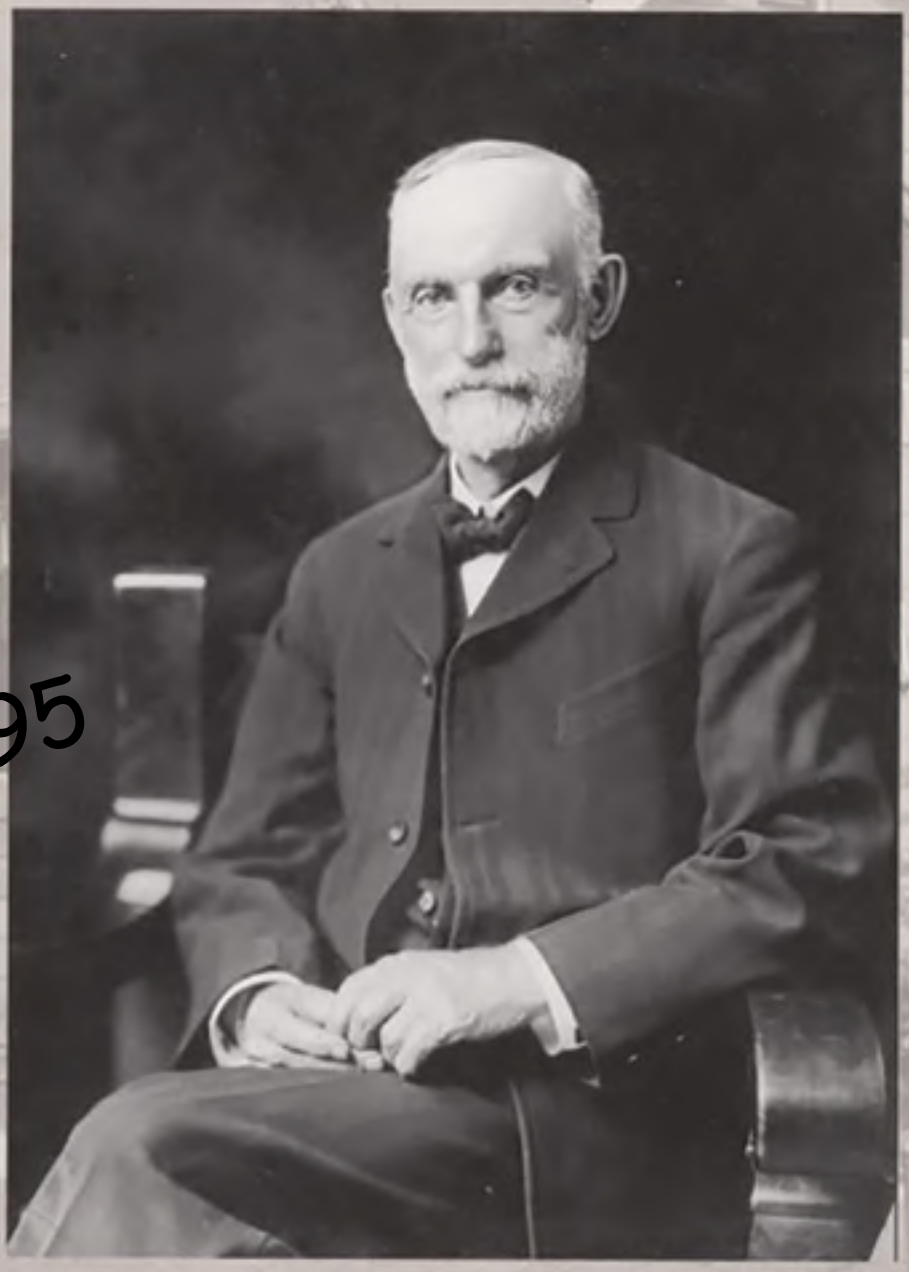
Some beekeepers aren't really out to socialize, and that's okay too. I'm only social when I have to be because I'm so busy all the time that I tend to focus mostly on my family and friends that are like family. With four kids (all teenagers now), collecting stray and rescue animals, moving (still) into our new house, and trying to get new property set up for farming and still in the beginnings of a new business, there's not a lot of time for socialization outside of what needs to be done. For those beekeepers, I'd suggest the business route. Not everyone has a business quite like ours, but most people still want to make money off of beekeeping. Take it upon yourself to learn more business techniques, or take a business class at a local community college. Maybe even take a marketing class. Talk to local store owners and see who needs more honey. Use some time to figure out how to expand your beekeeping into a more profitable side hobby.

Maybe you want to create gift baskets and use your artistic flair to add to your coffers at the next local festival or local owned store. Local bees are really marketable right now and you can figure out what goes the best. Do some market research and try selling different things in different packages. If you can't make good lip balm to save your life, but you are the Lord of All Candlemakers, then team up with a friend and combine forces. If, as stated before, you're not particularly sociable or not looking to create strain on a friendship with business fingers, outright buy the product from someone you know does a good job and look at it purely as a business objective. Or, learn to do it yourself. If you can't produce enough hive products to make soap or candles or whatever you pick, figure out the costs of buying it from a dealer or local beekeeper and what you have to charge to make it worthwhile. Maybe take a look around your area and see what works from a marketing perspective. As an example, if I was selling honey in Chapel Hill, I might use something like burlap and tobacco twine, possibly even used, and maybe hand-write the label and purposely spell it wrong. Then charge $25-30 for each quart. Or, go super fancy and cork it in a one-pound muth jar with dripped wax around the edges for $18-20. If you happen to be from Franklin County in Virginia, you might be thinking that the cost per quart of honey is comparable to other local homemade products, and you'd be right – if you sell it to the right customer base. Where I currently live, the rustic look doesn't matter and people just want the honey. You're looking at maybe $15-20 for the same quart, and roughly $8-10 per pound. Plastic squeeze is the way to go because convenience is key, not packaging. Personally, I think honey is worth its weight in gold for the work it takes to keep the bees, extract honey, bottle it up, and then part with your beautiful work. Not everyone wants to pay quite that much though, and it's your job to learn what's competitive in your area.

Overall, I think everyone has a better year when they set goals for themselves. In beekeeping, you learn something every year, but it's better to learn from a planned endeavor than a novice mistake. Take time to educate yourself, take some chances, and above all, make some honey money! BC

Jessica Louque and husband, Bobby raise bees, kids, and animals and run a business from their home in North Carolina.

AN EYEWITNESS ACCOUNT OF EARLY AMERICAN BEEKEEPING



X1
$14.95

THE AUTOBIOGRAPHY OF AMOS IVES ROOT

Go to www.beeculture.com

Sensor Technology To Monitor Bees

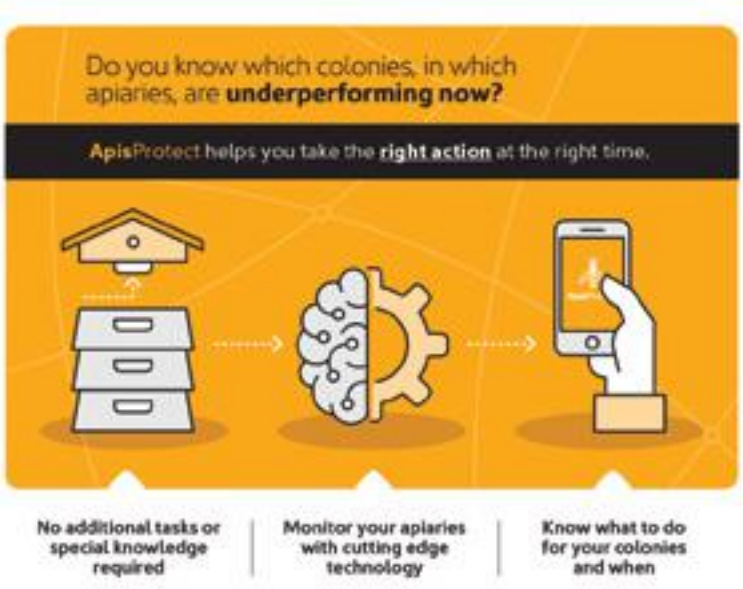
Timely Accurate Information

ApisProtect

Aoife O'Mahony

An Irish Agtech company, ApisProtect, is using sensor technology to monitor honey bees around the world. ApisProtect's bee monitoring technology can alert beekeepers to the weak colonies in time to intervene and save the colony.

By providing timely, accurate information about each colony in each apiary, beekeepers can then spend their time on value-added activities such as splitting and growing strong colonies and preparing for pollination rather than routinely inspecting all colonies.



The issue with periodic checks is that beekeepers want to monitor hives with the minimum amount of disturbance to the colony. Unfortunately, this can lead to problems within colonies being missed before they are too late to resolve. Beekeepers could have two colonies next to each other and one will be fine, while the other has severe problems.

For operators with thousands of hives, manual spot checks can't hope to catch all the issues. Utilizing the ApisMonitor unit can direct the beekeeper's attention to the hives that need it. This technology helps beekeepers identify which hives (out of thousands) need their immediate attention, and plan their resource use (time, materials, labor) much more effectively, leading to more productive and effective colonies.

Following a radio interview during her Ph.D., Dr Fiona Edwards Murphy received phone calls from beekeepers in Ireland and around the world asking when the technology she had developed would be available to beekeepers.

This inspired Dr Edwards Murphy to then establish ApisProtect with her co-founders Dr Pádraig Whelan and Andrew Wood, a team with complementary backgrounds including engineering, scientific, beekeeping and commercial experience.

With this new technology, beekeepers will no longer need to rely solely on periodic, manual hive checks that can allow disease, pests and other issues to deteriorate colony health beyond rescue. Beekeepers will now be able to identify which colonies need care and when.

A key challenge for the traditional beekeeping industry is monitoring beehives in remote locations in harsh environments where traditional communication networks struggle. ApisProtect has tested monitors in many remote and harsh environments during its validation phase with global communications provider Inmarsat.

"The beauty of the whole system is that it can happen remotely," says Dan Borkoski, an apiary research associate at the University of Delaware. More importantly, he adds, this technology reduces how often beekeepers need to open hives, which can be extremely disruptive to colonies.

ApisProtect does not require beekeepers to learn

ApisProtect CEO, Dr. Fiona Edwards Murphy. Shannon M. Carroll photo

ApisMonitor Unit install, Walker's Apiary, Delaware.

new skills or take on additional tasks. Through machine learning technology, beekeepers will gain valuable information about their hives. This will save time and help beekeepers become more effective and cultivate larger, healthier colonies.

For example, instead of expecting beekeepers to look through multiple graphs of temperature data (which they can if they so wish) alerts will be sent highlighting which hives in which apiaries need to be inspected and why. This allows beekeepers to use the beekeeping skills and knowledge they already possess in a much more effective manner. This actionable information also helps commercial beekeepers to maximize pollination and honey yield.

Dr Fiona Edwards Murphy, CEO and Co-Founder, ApisProtect commented, *"With our technology, this time next year beekeepers will be able to identify which of their colonies are strong or weak and ready for pollination. Beekeepers will be able to practice precision beekeeping which will transform the industry"*

ApisProtect is now testing its technology on three continents and monitoring a variety of honey bee subspecies and climates using a unique combination of sensors to monitor the hive 24/7. ApisMonitors collect temperature, humidity, sound, and movement data from a single sensor unit installed inside the hive.

Dr. Pádraig Whelan, ApisProtect, Missouri.

Dr Pádraig Whelan, Chief Science Officer adds, *"We have installed our monitors in locations across the world. It has been fascinating to meet and learn from beekeepers and observe the differences between the subspecies of honey bees in different states and continents."*

We have collected data from the following subspecies: *Apis mellifera mellifera; Apis mellifera scutellata; Apis mellifera capensis*; and hybrids of mixed parentages which include *Apis mellifera mellifera, Apis mellifera ligustica* and *Apis mellifera carnica.*

ApisProtect will help beekeepers identify hives that are behaving differently to most other hives in an apiary. This will enable beekeepers to carry out targeted inspections to determine why such hives are behaving differently and take appropriate action to remedy hive conditions.

Although the ApisMonitor units measure and inform the beekeepers about the temperature, humidity, sound profile, and movement of hives, the key value ApisProtect will provide is the processed data.

A high-level overview of each apiary will be provided to beekeepers with a breakdown of which hives are doing well, which ones are likely to experience problems, and which hives currently need immediate attention, providing a 24/7 early warning system.

Dr Edwards Murphy adds, *"Our mission at ApisProtect, is to save the honey bees, because if we don't take action now, we'll lose our most important insect ally. We want to secure the supply of one third of our diet, and make sure we can nourish and feed the 9.7 billion people on planet earth by 2050."*

ApisProtect was established in Cork in 2017 and has opened its first US office in the Western Growers Association's Center for Innovation and Technology, in Salinas, CA. This center represents 50% of the Fruit, Vegetable and Tree Nut Growers in the U.S.

The first ApisMonitor units will be available for sale in 2020. Register on their website for their newsletter to find out more **www.apisprotect.com** or follow them on Twitter, Instagram, Facebook or LinkedIn. BC

NEWLY REVISED AND BETTER THAN EVER!

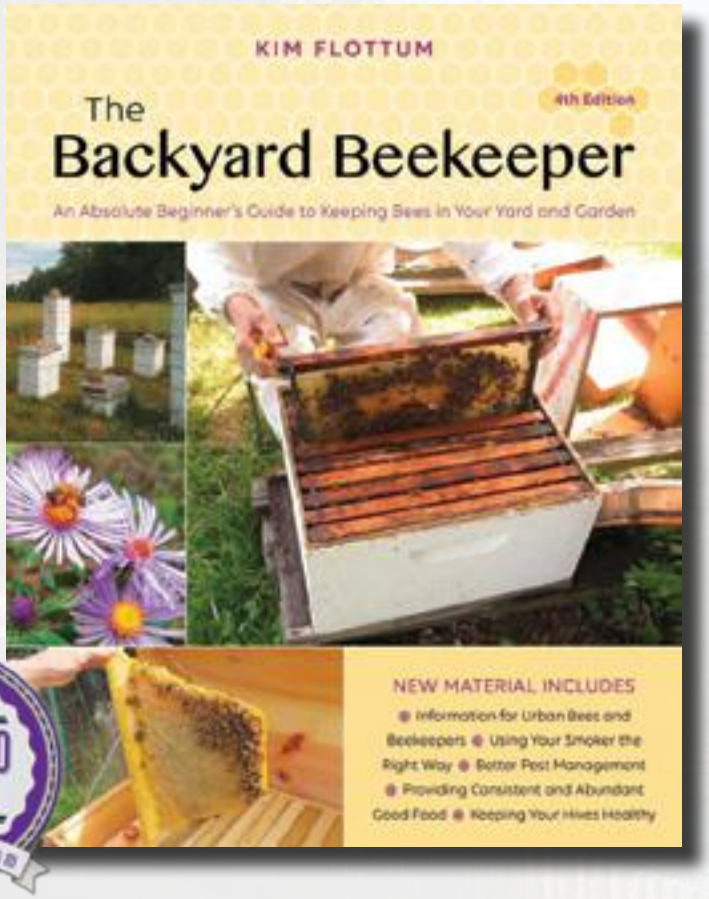
THE BACKYARD BEEKEEPER, NOW IN ITS 4TH EDITION, MAKES THE TIME-HONORED AND COMPLEX TRADITION OF BEEKEEPING AN ENJOYABLE AND ACCESSIBLE BACKYARD PASTIME THAT WILL APPEAL TO URBAN AND RURAL BEEKEEPERS OF ALL SKILL LEVELS.

MORE THAN A GUIDE TO BEEKEEPING, THIS HANDBOOK FEATURES EXPERT ADVICE FOR:

- SETTING UP AND CARING FOR YOUR OWN COLONIES
- THE BEST LOCATION TO PLACE YOUR NEW BEE COLONIES FOR THEIR SAFETY AND YOURS
- THE MOST PRACTICAL AND NONTOXIC WAYS TO CARE FOR YOUR BEES
- SWARM CONTROL
- USING TOP BAR HIVES
- HARVESTING THE PRODUCTS OF A BEEHIVE AND COLLECTING AND USING HONEY
- BEE PROBLEMS AND TREATMENTS

WHAT'S NEW?

- INFORMATION FOR URBAN BEES AND BEEKEEPERS
- USING YOUR SMOKER THE RIGHT WAY
- BETTER PEST MANAGEMENT
- PROVIDING CONSISTENT AND ABUNDANT GOOD FOOD
- KEEPING YOUR HIVES HEALTHY
- 25 RULES FOR MODERN BEEKEEPING



WITH THIS COMPLETE RESOURCE AND THE EXPERT ADVICE OF BEE CULTURE EDITOR KIM FLOTTUM, YOUR BEES WILL BE HEALTHY, HAPPY, AND MORE PRODUCTIVE.

WWW.BEECULTURE.COM

Hello To All Readers

How Do You Read Your *Bee Culture*

Your **March** copy of *Bee Culture* magazine has just landed at your home. Even though you may have some bee work to do right now, I am sure you will be flipping through this copy very soon. Or maybe not for a few more days. Bee work does take precedence over everything else. Swarm signs are prevalent over much of the U.S. right now. That alone keeps beekeepers busy.

I am curious about what you do when the magazine arrives each month. In fact, more than curious – just plain snoopy. But that's really OK since I've been writing articles for this magazine for quite some time. Each month we, the regular authors, send in our articles but once they arrive at your home – what happens? Some may be read right away; others perhaps put off for "later." Sometimes "later" never happens.

Most *Bee Culture* subscribers receive the printed-on-paper copy. Very few read it via computer or other electronic device. That's fine with me. But I will have some special questions for you. The mail is quite prompt today, even with delivering magazines. However some readers today are more used to words on a screen rather than paper.

So this month I am asking questions – not bee or beekeeping questions. Maybe we can do that at some later date. My questions are about reading the magazine. They start upon the arrival of this (March 2020) issue and also include those issues in the past. I really do want answers from you, the readers – whether long answers or short! So here is my mailing address: 1214 North Poes Rd, Flint Hill, VA 22627. Or if you prefer via email: **ahworkerb@aol.com**. I'll repeat these addresses at the end of this article to make it more convenient for answering.

OK – let's go.

You have the March issue in hand and have settled down in your comfy chair. Have your cat or dog settled down with you also? What is the very first article or section you open? Do you know that some magazine subscribers – any magazine, not necessarily about beekeeping – start from the back (the ending) of the magazine, rather than from the front? Some readers may search for a favorite author. So here is your first question: **Do you have a usual place to start reading each issue?**

If yes, then where and what is the reason? You may know where but have no idea why, That's OK. Perhaps you will think of the "why."

If no, then how did you choose to read that particular article? Was it the author? Or perhaps some timely March management guide? Think for a minute – there may be many, and different, answers to that first question. It would be interesting to know just what things led you to choose that article.

Still thinking about that first article you chose, did you read all of it at once? Parts of it? Picture captions? Perhaps this is the first time you were ever asked about choosing what to read. That's fine. I hope my questions did not disturb your enjoyment of reading the article.

Let's suppose your first choice of article was about some management actions to take place in Spring. Now you need to think about where you live compared to where the article author lives. Those with some experience in beekeeping will be able to adapt the article information to another locality.

Every issue has not one editorial but two. Kathy Summers covers an interesting assortment of comments about chickens, ducks and gardening and people. Many beekeepers have gardens and chickens, even in urban settings. **Do you include both the editorials in your monthly reading? Or only one? Or none?**

Each issue has both practical, put-into-use articles and those that are about the biology or anatomy of the honey bee. Some readers may appreciate both types and some may focus on the more practical articles while other readers enjoy both. So my next question is **Do you think there is a good balance of these two types of articles?**

No matter what kind of a magazine exists, there is usually a section reserved for readers' comments. In *Bee Culture* it is simply "the mailbox." Some of the letters received are long, others short. Some have good advice; some have accompanying photos. **Do you read the letters? Have you ever sent a letter and had it published?**

Every issue has an assortment of other items that are not articles. For example, advertisements. Some of these are large one-page ones; others range from partial pages down to quite small ones. All are quite colorful and designed to attract attention. Some are for equipment only; others are, of course advertising bees and queens. Since many types of advertisements appear, several questions arise. **Do you read any of the advertisements? Sometimes seasonal – (queens and bees) or equipment (hives, clothing, special sales)?** If you are looking for a particular advertisement **Are you aware of the index of advertisers that appears at the end of every issue?**

In addition to the index of advertisers at the end of each issue you will also find a small Calendar that gives dates of Short Courses, Bee Schools and other major bee events. **Have you made use of this Calendar?**

Occasionally a new book about bees or keeping bees will be published. A Book Review will be written for the magazine. **Do you pay attention to the Book Reviews? Have they helped you decide if the book will be a useful one for you?**

Although new equipment for beekeepers frequently appears in the yearly catalogs, sometimes during the year the magazine will give a review of a new item on the market. **Do you notice new equipment reviews? Have they helped you to decide its usefulness in your own beekeeping?**

Many children are now part of

family beekeeping, whether small-scale or even sideliner. The magazine devotes two pages for children, but not always monthly. **Do young children look forward to this section and take advantage of the information provided? Do you, as an adult, ever look at these pages?**

Our nation is diverse in many ways. Plants for bees are just one example. Prices paid for honey from various regions are another. The magazine collects information from seven different regions of the U.S. to give readers information on honey prices and also on management tasks. **Do you take advantage of this information? Make use of it? And thought about becoming a Honey Reporter to the magazine?**

Plants are a big problem in a country as diverse as this one. We have the wildflowers that provide nectar and pollen but they even can be local to small areas and also to large areas. Flowers are planted in gardens everywhere. Urban flowers can be quite different from those just a few miles outside of a town. Perhaps your local bee club has provided members with appropriate lists of bee plants. **Do you have any suggestions about articles or other information about bee plants? Just keep in mind that whatever grows in Maine would die if grown in Arizona.**

Several pages are used for **Bee Talk** where reader's questions are answered, The answers come from several different authors of *Bee Culture*. **Is Bee Talk one of your "always read" articles?**

Where do readers live? It is interesting that most live in the eastern part of the United States, from just west of the Mississippi River eastward. This may or may not reflect the distribution of beekeepers in the country. Certainly the very large commercial beekeepers, those with thousands of colonies for pollination as well as honey production, will have beeyards in the north and the south of the western part of the U.S.

So perhaps other questions should be asked – and answered.

Should there be occasional articles for or about larger-scale beekeepers? Would such articles give useful information to the small-scale beekeepers? Would articles about beekeepers and beekeeping in Iowa or Arizona be of general interest?

For those with electronic subscriptions **Do you read the articles on your laptop or on a more portable device? Do you save any articles, such as "how-to-do-it" ones? Do you skip past the advertisements?**

The month of March will be coming to a close. You have read all the parts of the magazine that you want to. Soon the April issue will appear in your mailbox. What will you do then with your March issue? It may have some spots from eating lunch and reading. There may be a coffee cup ring on a page. The March issue now needs to move aside. Some readers will save the entire issue. Some will remove an article for use in the future.

What is the fate of your March issue? Does it get donated to your local club? Comes to rest in a pile of "old magazines?" Get recycled with other "paper" items? Or perhaps given to someone inquisitive about bees?

Now there are just two questions left: **If you were editor for a day...**

what article or topic would you discontinue to make the magazine better?

what type or topic of article would you include each month to make the magazine better?

Those are the last questions (just two) for you, the reader. Remember, all answers to my snoopy questions will remain anonymous unless you specify that a name – or nickname – be used. I promised to repeat my addresses at the end, so here they are: 1214 North Poes Rd, Flint Hill, VA 22627; email: **ahworkerb@aol.com**. I'll be waiting to hear from you, the readers. **Thank you for your answers!** BC

Ann Harman writes for and reads her Bee Culture *at her home in Flint Hill, Virginia.*

KIM FLOTTUM

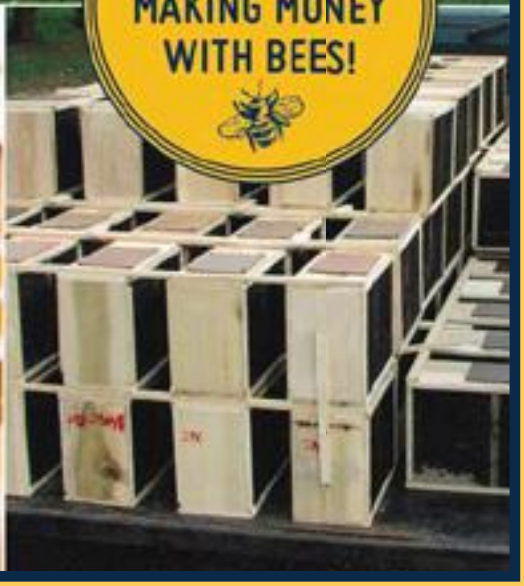
In Business with Bees

How to Expand, Sell, and Market Honey Bee Products and Services Including Pollination, Bees and Queens, Beeswax, Honey, and More

$26

www.beeculture.com

PROVEN STRATEGIES FOR MAKING MONEY WITH BEES!



WHY DID MY HONEY BEES DIE?

Meghan **Milbrath**

Learning To Identify A Common Cause Of Winter Death In Northern Climates

Beekeepers in northern climates continue to lose many colonies every Winter. I originally wrote this article in 2016 after talking with dozens of beekeepers with the same issue. Four years later, I was asked to do a reprint, because we continue to see many colonies that are lost in the same way. When beekeepers lose bees in Winter, their first instinct is to blame the cold weather. However, bees are adapted to handle cold weather, and have been living in cold climates for hundreds of years. Bees, like any other cold adapted animal, however, can only survive *if they are healthy*. The problem is not the cold, but that the bees are not healthy going into Winter (even if they look healthy are in Autumn). In this article, I'll describe the most common type of wintertime honey bee loss for small scale beekeepers in the North. The sad news is that these losses continue to be occurring at high rates. The good news is that beekeepers can take actions to reduce the risk and to keep their bees in good health.

Characteristics of the common early Winter death in northern states:

1. The colony was big and looked healthy in the Fall
2. A lot of honey is left in the top supers
3. The cluster is now small, maybe the size of a softball
4. Near or just below the cluster is a patch of spotty brood – some fully capped, and some with bees dying on emergence (heads facing out, tongues sticking out).
5. If you look closely in the cells around the brood, you will see white crystals stuck to the cell walls, looking like someone sprinkled coarse salt in the brood nest.

AND

6. You don't have records showing that *Varroa* was under control.

Sound familiar?

We see this classic set of symptoms over and over in the states with a period of Winter stress. A big colony seems to just shrink down and disappear. Many people want to use the term colony collapse for this type of death, and while collapse is a good descriptor of what happens, this is not true colony collapse disorder. ***This is death by Varroa-associated viruses.***

How does it happen?

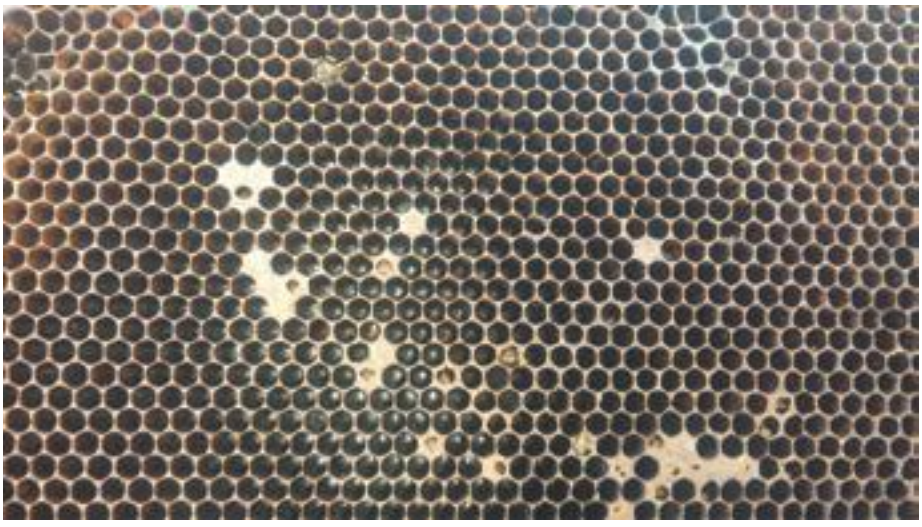
1. **The big colonies** – While beekeepers are often surprised that their big colonies are the ones that are gone first, it makes perfect sense in terms of *Varroa* growth. Since *Varroa* mites reproduce in capped brood, the colonies that make the most brood (i.e. got the biggest) are the ones most at risk of having a high population of *Varroa*. Colonies that swarmed, or didn't take off, or even fought a disease like chalk brood are *less* at risk from high *Varroa* populations, because they didn't consistently have large amounts of brood where *Varroa* can reproduce. You should have good notes that say you had a large cluster going into Winter, but even if you don't, you can see the large circle of food eaten by a large cluster, indicating a high population of bees.

2. **Lots of Honey** – Lots of honey means that the colony died fairly early. Colonies with high levels of *Varroa* tend to die fairly early in the season (before February), leaving lots of honey behind. Once the bees are stressed and in cluster, the viruses take their toll very quickly. In some cases, the colony will even abscond in Fall, or be dead before Winter really hits.

This colony had a large brood nest (indicated by the dark comb in this frame from the top deep box), and a large cluster going into Winter (indicated by the large amount of honey that is eaten away where the Winter cluster started). Varroa *were never monitored or managed in this colony, and it was dead by February, if not sooner. Photo by Meghan Milbrath*

The colony shown above had a third deep box that was filled with capped honey, indicating that the bees died early, and starvation was not the culprit.

3. **Small cluster** – Most of the bees you see in the Fall are Summer bees. These Summer bees are supposed to die in Winter, and the Winter cluster will be made up of a special caste of bees called Winter bees. These Winter bees are physiologically different than Summer bees. The biggest difference is that they have large fat bodies that will provide the energy for them to survive the Winter and feed young in the Spring. Unfortunately, these Winter bees are formed right when *Varroa* mite populations are at their worst. The bees that emerge from *Varroa* infested cells are weakened, and more importantly,



Note the bee in the upper left is fully formed, and died on emergence. You can often see frozen/melted larvae along with dead pupae. Many beekeepers instantly suspect AFB, but AFB-infected colonies usually will not be large and would not have produced a lot of honey going into the Winter. Photo by Meghan Milbrath

are riddled with viruses. *Varroa* mites are notorious for carrying deformed wing virus (DWV), but are known to transmit many more viruses as well. Two not-so-fun facts about deformed wing virus: 1) it doesn't always cause deformed wings. Just because you don't see deformed wings, it doesn't mean that you don't have DWV, and 2) The bees can transmit DWV in the absence of *Varroa* mites. Many beekeepers make the mistake of waiting until the mite populations get high before they treat. At that point, the viruses are in the hive, and will be passed from bee to bee, even if the mites are killed. In colonies that are riddled with mites, so few winter bees live to adulthood, that when the summer bees die off, the cluster is tiny.

It is common to see some spotting (bee poop) near the dead cluster, leading many beekeepers to blame *nosema.* Seeing spotting does not mean that you have nosema. The type of nosema that we mostly see now (*Nosema ceranae)* is not associated with dysentery. What is likely happening is that the bees are too sick with viruses and the cluster is too small for the bees to take a cleansing flight.

In our colony, the cluster was only the size of our hand – some bees had their heads stuck in the cells, trying to stay warm, others had fallen between the frames

4. **Patch of spotty brood / Bees dying on emergence** – When a colony succumbs to *Varroa*-associated viruses or parasitic mite syndrome (PMS), we see a lot of effects in the brood. Unlike American Foulbrood (AFB), which attacks the larvae at one particular stage, PMS will affect developing bees at many stages of development. It is one of the only diseases where you see bees dying right as they emerge.

5. **White crystals in the brood** – Around the cells where the brood died (the last place of the brood nest), you will often see white crystals stuck to the walls of the cells. These are dry (not suspended in liquid like crystalized honey), and are the crystalized pee of *Varroa. Varroa* mites defecate in the cells, and the resulting guanine crystals are left behind, and visible to the naked eye.

6. **No records that varroa was under control.** Notice that this says '*Varroa* was under control', and not that 'the colony was treated'. You may have applied a treatment, but it may have been too little, or (more likely) too late. Many beekeepers view treating as part of "getting the hive ready for Winter," and we get ready for Winter when the air gets cooler. However, we need to keep mite levels low throughout the year, and keep them low when the precious Winter bees are forming. If you wait to treat until after the Winter bees have already been infected with viruses, the damage is done. No amount of treatment or *Varroa* drop after winter bees are damaged can bring a colony back.

Many of these brood cells contain small crystals of guanine acid, indicating varroa defecation. The mite frass is dry and stuck to the walls on the cells. Many dead hives will also contain crystal-ized honey, but it will appear wet/liquid appearance, and largely in the bottom of the cell. Take the time to examine your frames. Dead brood and white crystals are a good (bad) sign that Varroa *got out of control. Photo by Ana Heck*

The only way to know that you have *Varroa* under control is to monitor using a sugar roll or an alcohol wash. Just looking at the bees does not work; *Varroa* mites are so sneaky, that you rarely ever see them, unless the infestation is out of control, and by then it is too late. Many beekeepers say that they never see *Varroa* in their hives, so they don't think that they have a problem. In fact, **a *Varroa* infested hive can actually look like**

it is thriving. Underneath the lovely brood cappings, and away from our view, the mites are reproducing and biting the developing bees. The colony can look fairly healthy until the mites reach a threshold, and the colony succumbs to disease. By the time you see parasitic mite syndrome, or see *Varroa* crawling on bees, it is often too late for that colony (especially if Winter is just around the corner). Getting on a schedule of monitoring and managing mites will give you peace of mind that your healthy looking colony is indeed healthy.

The silver lining

If the above scenario is familiar, don't despair. First, you are not alone. Many beekeepers got caught off guard with *Varroa* this year (again). They didn't realize how bad it was, or got thrown off by odd weather patterns. Even beekeepers with good parasite management plans struggle, as the mite pressure can change. What worked last year doesn't always work this year. Most importantly, if you recognize the above scenario in your colonies, you now have more knowledge as to what is harming your bees, and you can take positive action. You have time for this season to develop a strategy. Monitor your *Varroa* mite levels using a sugar roll kit, or alcohol wash, read about integrated pest management for *Varroa*, write out a plan of action, and make a commitment to prevent high mite levels this year *before* your Winter bees are developing. This is going to be the year! BC

Meghan Milbrath, Ph.D., MPH ***mpi@msu.edu/; www.pollinators.msu.edu****; 517-884-9518*

"I don't know about the honey, but the milk must come from holy cows."

Bee

Its flight is bottom heavy but smooth
legs dangle, useless in the breeze
a black and yellow sneeze streak

Wisp of wings, vibrant, not there
moving quicker than eyes can blink
so don't blink

Antennae twitch along to air
tasting the current's scent
sensing its next collection

It swerves, leans to the left, then
right, adjusts trajectory, its travels
take it past the fruitless

A momentary fight with glass
the window as fourth wall, a barrier
for a second, until a crack is found

Then straight for the alyssum
with it bobbled head and spread out arms
impatient for its visitor

The bee twitches and searches, browses
for nuggets, digs for gold
in a floral purse of petals and pollen

Weighted by wealth, it chugs off
with a new dusty coat fit for the queen
and her soldiers and her workers

It retraces the path and I see my chance
I grab a glass, trap it in an transparent cell
as it near detonates with quivering fury

In the throes of this muffled suffocation
I am busy as a poet and write
'Bee, one inch long, beautiful...'

a poem by Luigi Coppola

On two hands and one foot, I can count the number of local farmers missing a finger. I once thought a missing digit was a prerequisite for advanced farming, seeing as how I've never been accused of advanced farming and had all my fingers. When shaking a hand with a missing digit, I am ashamed to say that I've had to suppress thoughts of missing-finger envy. In rural culture, a missing finger is as much a sign of advanced manliness as advanced farming. As a youngster, this envy manifested itself in me staring. Now as an adult, I now know it's polite to first ask what lead to the separation and then, only after, stare at the hand as the farmer details the events. Still, stories of losing a finger are considered indecent in some circles, and probably some beekeeping magazines, so it's best not to revel in such tales.

Accordingly, in retelling what follows, I revel not at Tightwood's expense, but only relay his misfortune for serious educational purposes. Perhaps it will serve as a warning for readers that promising opportunities to lose fingers also present themselves in beekeeping routinely (remember: finger joints are aptly named).

Known by most as Tightwood, Bud Arrowood had safely maintained all his fingers until he volunteered to help me rob honey. At the time, my wife's poppaw Lowry felt Tightwood's offer was a ploy and insisted on being present during the harvest, so as to ensure nothing turned up missing. But I assured Lowry that Tightwood was many things, but not a thief, and his help lifting boxes would be much appreciated. Lowry shook his head in vigorous dissent: "He should have known better than to buy that sorry hay from down east. I saw the first thistle in this county at his farm from that sorry hay." The Great Thistle Feud had raged for years between Lowry and Tightwood.

Truth be told, both Tightwood and Lowry were men of confidence, especially in antiquated farming knowledge and the origin of weeds on the other man's farm. Unfortunately, neither appreciated the other's knowledge, and I sometimes wondered if both were overcompensating for possessing all their fingers. It was a miracle Tightwood's fingers had survived decades on his rusty outcropping of a farm. Lowry was fond of saying, "It won't be long before the health department requires Tetanus shots for anybody living in a mile radius of the Arrowood Rust Farm."

For me, honey harvest day always started with much anticipation and jittery excitement and usually ended with exhaustion, disillusionment, and threats of bodily harm. Looking back now, I should've worried when threats started the day.

"Someone should knock some sense into Lowry," Tightwood said, as he looked over the welding work on the homemade honey extractor. "This here is gunna get somebody killed. You cain't weld stainless steel to aluminum."

"That's your own weld," I reminded Tighty, "Remember you said Lowry couldn't perform a weld of such technical difficulty."

"That's right. That's a mighty fine weld, if I say so myself."

Here, Lowry walked up and said, "Tightwood--just examining your shotty welds, I see."

Thus began the Great Welding Feud, only to be quickly eclipsed by the Great Finger Feud. The events preceding the Finger Feud were mostly nondescript--just Lowry threatening to sue Tightwood for thistle infestations and Tightwood threatening Lowry with the hot-knife, all while the washing machine motor on the extractor started smoking and Tightwood rested his hand on a honey bee.

To be fair, Tightwood mostly ignored the bee sting at first because he was too busy commenting on Lowry's faulty wiring of the washing machine motor. But eventually his ring finger began to resemble a corn dog. Now it surprised me, as it may you, to know that Tightwood had a ring on his ring finger. I had never once heard him talk about a wife until that moment:

"She left me a long time ago--for a big farmer out in Nebraska."

"Best decision she ever made," snapped Lowry.

"Probably a farmer with nine fingers," I thought, before asking, "Why are you still wearing the ring?"

"Well, it was too tight to get off even back then, so I just left it on. It kept the money grubbers away."

The guffaw was so loud, I thought Lowry had choked on a bee. Still, it was a well-established rumor in our community that Old Tightwood had more money strewn about his grounds than rusty nails. Others believed Tightwood was too lazy to bury the money and just kept it hidden in his washing machine because he wore the

Advanced F

same red flannel shirt everyday. I didn't put stock in either of those two rumors because I once saw Tightwood buy a mini-fridge at the flea market and knew good and well that Tightwood would never justify running electricity to any appliance other than his TV. Afterwards, I confirmed my suspicion while fishing in his pond; I snagged something on the bottom that I thought was an old tire, but began to suspect otherwise when I reeled in an ice tray and saw dollar bills floating to the surface. Regardless, Tightwood still wore a wedding band.

"You'd better get that ring off," Lowry said.

"I've been stung a hundred times before. It'll be fine."

Of course, the swelling only worsened. It wasn't until the finger had progressed in size, shape, and color from corn dog to candy apple that Tightwood began to show any true concern.

"Maybe we ought to get this old ring off," Tightwood suggested.

"I told you that an hour ago," snapped Lowry.

"Maybe I ought to take you on to the emergency room," I said.

"Healthcare is all a racket; I'd rather lose my finger."

"We can make that happen," Lowry said.

"Well, let's try to get the ring off before it does happen," I said.

Now, the real feud began.

"Go get the oil can," Lowry said.

"No, get the grease gun," redirected Tightwood.

"Better get plyers"

"No, the channel locks,"

"Get the wire snips"

"--and the bolt cutters"

By the time Lowry and Tightwood had finished their one upmanship of surgical tools, I had amassed an oil can, grease gun, plyers, wire snips, bolt cutters, gear pullers, side grinder, hacksaw, reciprocating saw, dehorning iron, staple gun, and plasma cutter. Since Tightwood was a prolific bleeder, we decided the best place to perform the ring removal and limit blood stains was an empty stall in the back of the barn. Sanitation is crucial to all medical procedures, so I pitched out some old bedding and threw down some barn lime. Lowry seemed to relish the opportunity to operate. He always thought he could have been a surgeon, at least in terms of "cutting and stitching" though he might struggle with the "bookwork on innards."

At one point, I suggested we forego these tools and pull the ring off with old baling wire and Lowry's truck, but Lowry wouldn't consider that option for fear of pulling off his bumper. At another point, I suggested we heat the ring in hopes it would expand, but Tightwood demurred for fear of cooking his finger. From Tightwood's protest, I began to suspect that he wasn't thrilled about the prospect of joining the Advanced Farmer Club or having Lowry as his surgeon. But, being tight, he still refused the emergency room.

Finally we decided on a surgical procedure to remove the ring; it would start with the side grinder and finish with the dremel tool, with the finger held firm in a vice. But, as Lowry was about to start, he thought Tightwood might need some anesthesia and went to retrieve the bottle of brandy hidden by Betty, Lowry's wife, over their refrigerator purely for cooking purposes. While Lowry was retrieving the brandy, I was about to go find an old horse bridle for Tightwood to bite down on when I started to worry he might faint before the procedure.

To calm his nerves and distract his mind, I suggested Tightwood visit the adjacent stall that had a group of young dairy steers in it. In that particular group was the biggest Holstein calf I've ever laid eyes on. The poor momma cow! The calf was so big it broke a chain while pulling it out. When the newborn finally emerged and hit the ground, it was 150 lbs on day one. By two weeks, the calf could collapse a two-quart milk bottle in 30 seconds. As Tightwood began petting the calf, it latched onto his swollen finger, as young calves are inclined to do, and started sucking with all his might. By the time Lowry had returned with the brandy, the calf had already vacuumed off and swallowed Tightwood's ring, all while licking his swollen finger raw with his long sandpaper tongue.

"Do you still want me to operate on your finger?" Lowry asked, hopeful.

"No," Tightwood responded, "losing a finger now wouldn't be legitimate"

All Tightwood wanted was the brandy, which Lowry billed him for, to help with the physical pain from tongue chaff and emotional distress from losing his wedding ring. After I relocated his ring in a clump of straw bedding a few days later, Tightwood also admitted to some emotional distress from nightmares of Lowry with a side grinder, but mostly he said he was just disappointed the calf ruined his chance for membership in the Advanced Farmer Club.

Farmer Club

Stephen **Bishop**

CALENDAR

♦COLORADO♦

Four Corners Beekeepers Association will hold their annual Spring seminar on April 4 at Fort Lewis College in Durango.

The keynote speakers will be Jim Tew. There will be hands on workshops.

For more information visit **https://entnemdept.ifas.ufl.edu/honey-bee/extension/bee-college/**.

♦FLORIDA♦

Spring Bee College will be held March 6-7 at UF/IFAS Honey Bee Research and Extension Lab, Gainesville.

For more information visit **www4cornersbeekeepers.com**.

♦FLORIDA♦

Spring Bee College will be held March 6-7 at UF/IFAS Honey Bee Research and Extension Lab, Gainesville.

For more information visit **https://entnemdept.ifas.ufl.edu/honey-bee/extension/bee-college/**.

♦GEORGIA♦

Young Harris, Univ of GA Beekeeping Institute will be held May 13-16 at Young Harris College in Young Harris, Georgia.

Classes for all levels will be presented plus the Georgia Master Beekeepers Program and the licensing program for Welsh Honey Judges.

For information visit **www.ent.uga.edu/bees**. More information is available at **ugabeelab@gmail.com** or 706.542.2816.

♦ILLINOIS♦

University of IL Bees and Beekeeping Short Course will be held April 18 at the Bee Research Facility and the Carl R. Woese Institute for Genomic Biology.

The cost is $100. Must bring your own protective gear. Course is limited to 50 participants.

For more information and to register email **cundiff@illinois.edu** or 217.265.7614.

♦INDIANA♦

Heartland Apicultural Society (HAS) will hold their 2020 conference on the campus of the University of Southern IN, July 6-8.

Watch for upcoming details and visit **www.heartland-bees.org for more information**.

Michiana Beekeepers Association will hold their annual meeting May 16 at 7234 W. Moore Road, Nappenee.

Speakers include Jim Tew. The cost is $20 which includes lunch. Reservations required.

For more information and to register contact Debbie, 574.277.0152.

♦MAINE♦

EAS 2020 will be held August 3-7 in Orono at the University of Maine.

For more information visit **www.easternapiculture.org/confereces/eas-2020.html**. Watch these pages for details.

♦MICHIGAN♦

MI Beekeepers Association will hole their Spring Conference March 6-7 at Kellogg Hotel and Conference Center, 219 S. Harrison Road, East Lansing.

Kirsten Traynor is the featured speaker.

To register visit **www.michiganbees.org**.

82nd Annual Southeastern MI Beekeepers Association will hold their conference March 14 at Wayne County Community College District Ted Scott Campus. The theme is 'Celebrating Women in Beekeeping.'

Keynote speakers include Kirsten Traynor and Marla Spivak.

For more information and registration visit **sembabees.org**.

♦NEBRASKA♦

Beekeeping Workshops, UNL Bee Lab – Year 1 Beekeeping - Lecture February 1/Field April 25; Lecture February 15/Field April 4; Lecture February 21 & 28/Field April 17 & 24; Lecture March 14/Field May 2. Year 2 – Lecture March 21/Field May 16. Mead Making – March 28.

For more information visit **https://entomology.unl.edu/bee-lab**.

♦OHIO♦

Lorain County Beekeepers Association will hold their annual Beginning Beekeeping class Fridays, March 6, 13, 20, 27 at 7:00 p.m. at Life Church, 1033 Elm Street, Grafton.

The cost is $50.

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

♦OKLAHOMA♦

OK State Beekeepers Association will hold their Spring meeting in Duncan, March 21 at the First Baptist Church Family Life Center, 901 West Ash Street.

Guest speaker is Sam Comfort.

For information contact **tomokbees@gmail.com**.

The Big Bee Buzz will be held March 27-28 at Asbury United Methodist Church, 6767 S. Mingo Road, Tulsa.

Keynote speakers include Kim Flottum, Landi Simone, Reed Johnson and more.

The cost is $75/members, $85/non-members and $90 after January 16.

For more information contact Carol Jones, 918.844.5493.

♦PENNSYLVANIA♦

Introduction to Beekeeping March 28-29 at Temple University, Ambler.

Vince Aloyo is the instructor.

For more information visit **http://vincemasterbeekeeper.com/courses/**.

♦VIRGINIA♦

March 7-8 – Principles & Practices of Biodynamic Beekeeping - Part I & II: The Spikenard Method Spikenard's full introduction to basic biodynamic/sustainable beekeeping methods. This two day workshop includes the Introduction class and a more robust introduction to the Spikenard Method. Classes take place at Spikenard Honeybee Sanctuary in Floyd, VA.

Website: **www.spikenardfarm.org contact: info@spikenardfarm.org** or 540-745-2153

March 28 – Top Bar Beekeeping

For those interested in learning to work with top bar hives.Classes take place at Spikenard Honeybee Sanctuary in Floyd, VA.

website: **www.spikenardfarm.org** contact: **info@spikenardfarm.org** or 540-745-2153

♦WYOMING♦

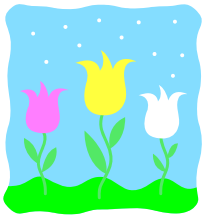
Wyoming Bee College will be held March 21-22 in Cheyenne, with a Pre-Conference Workshop held March 20.

The cost of the workshop is $125/person. The cost for the conference is $85/person or you can do both for $195.

Featured speakers are Phil Craft, Jamie Ellis, Scott Debnam, Reyah Carlson and more.

For information visit **www.wyomingbeecollege.org**.

Display Advertisers



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

Check Us Out At

- **www.BeeCulture.com**
- **www.Facebook.com/Bee Culture Magazine**
- **Twitter.com/beeculture**

Sign up for the FREE News Service **– CATCH THE BUZZ – at BeeCulture.com, and read hundreds of recent BUZZ posts at BeeCulture.com/category/catch-the-buzz**

The gal Marilyn and I bring our own honey everywhere we go, because good honey is hard to find on the road. At the January American Beekeeping Federation (ABF) meeting in Schaumberg, IL, I made a stink about the honey served at convention center. If you were an Outer Space alien, and your earthling hosts said, "Hey, take a taste! It's honey, nectar of the gods!" and offered you this, you'd likely gag and never eat honey again. It was that vile. Maybe it wasn't even honey. The mini-jars listed no country of origin.

This, while in the next room, commercial beekeepers railed about the abysmal wholesale price of American honey and losing market share to adulterated foreign product.

So when I ran into Deep Throat, I made my pitch. Couldn't our venerable beekeeping fraternity at least provide decent American honey at its own convention? "Look," I said, "you can make the wheels turn at the ABF, right?"

Deep Throat laughed. "Not really, but real honey at our own meetings? I can make that happen. Don't worry!"

Deep Throat e-mailed me after the conference and said the honey issue was discussed at the board meeting. She wrote, "We forcefully and unanimously agreed that we need real honey . . ." Amen!

The convention kicked off with a keynote talk from charming and entertaining USDA Beltsville Bee Lab researcher Dr. Samuel "Sammy" Ramsey. He made waves even before he earned his PhD, when he discovered that *Varroa* feed not on bee blood, as was widely believed, but on bees' fat bodies. Ramsey gave us an update on his Tropilaelaps mite research in Thailand. Even smaller than *Varroa*, *Tropilaelaps vector* deformed wing virus in honey bees. They spend most of their lives under capped brood, where, like *Varroa*, they're hard to murder. They thrive not only in the Asian tropics, but in the colder regions of China and Korea. Let's be thankful this pest so far hasn't landed on our shores!

Unlike our sluggish *Varroa* mites, "tropis" jump around on bee combs, like fleas! Sammy's kind of like that, too. He's not a big guy. He has a wild hairdo. He throws his arms and leaps around the stage as he speaks, while his audience listens rapt. In Thailand he's gone native, learning to speak and even sing in Thai. This kid's got the fire in his belly.

Rather than stay at the hotel venue, Marilyn and I opted for an inconveniently located dump of an airbnb. We usually luck out with lodging, because Marilyn's naturally lucky, but not this time. We spent a lot of time commuting to and from the venue on public transit and Lyfts. The Lyft drivers were mainly foreigners – Egyptian, Serbian, Indian, Polish. When I asked the Serbian how he liked the States, he told us he was "a USA guy." Most spoke passable English. We talked some politics. Our Palestinian hotel shuttle driver told us his mother kept honey bees in 21 mud hives in the old country. He seemed grateful when we tipped him with a jar of Colorado alfalfa honey.

Marilyn was relieved to get back her lost wallet, after someone turned it in to the hotel. Her credit cards and important documents were still there, but $100 of her $145 cash stash had been removed. You wonder what goes through someone's mind when they do something like this.

On the ride home, as I sat in the Amtrak observation car re-reading Richard Taylor's classic *The Best of Bee Talk*, a gray-bearded Amish gentleman interrupted my reverie.

"Are you a beekeeper?" he inquired. He knew all about Richard Taylor, the Ivy League philosophy professor, lifelong beekeeper and columnist for *Gleanings in Bee Culture*, who is no longer with us. I pointed to Richard Taylor's illustration on the book jacket. He wears a sensible, broad-brimmed, very Amish-like black hat, and sports a beard but no mustache. "He looks just like you guys," I said.

Now we were off and running. A lifelong beekeeper himself, my new friend, "John," explained that he'd recently shipped his eight hives to the California almonds. His Central Michigan community pooled their bees to make a semi load.

Just outside of Grand Junction, Colorado, John marveled at rugged, barren Mount Garfield standing sentinel at the desert's edge. "My wife Sarah can't understand why God would make something Man can't use," he said.

"Maybe God made that mountain for us to admire," I replied.

He paused and smiled before he replied. "Maybe," he said.

Every time I go to a bee convention, I resolve to become a better beekeeper – to do more, work smarter, always be prepared, stay ahead of the evolving chaos. Time management is my principal hang-up. In beekeeping, you should do what you need to do when you need to do it, not a week or a month later. But I'm always behind. It's like I'm surfing a tidal wave. The bees – those unpredictable little darlings – keep me jumping.

So it struck a chord when our Kansas friends Steve and Becky Tipton ended their presentation with a slide that read: "A survey asked 100 beekeepers what they'd do if they had more spare time. Ninety-five said they didn't understand the question, and other five didn't know what day of the week it was!"

This got a roar from the audience, proving that I'm not alone. I find some solace in that.

Ed **Colby**

I'm Surfing A Tidal Wave

Blue Sky bee supply®

PRO-NUC BOX
$15.95 each
Buy 10 or more
for $12.95 each

SUPER DFM
Starting at $3.95

Modern Clover

Green Hive

15% OFF
CUSTOMIZABLE LABELS
On Orders Placed In February & March

It'll be time to harvest and bottle honey before you know it! Order your labels now before the busy season hits!

New Designs & Styles to choose from

Customizable
Victorian
Tamper Proof

Classic

Granulation: Most natural honey will crystalize. To reliquify, place in warm water. Do not feed to children under 1 year of age.

Honey Bottling

GLASS 3 OZ. MINI MASON
$19.95 /36 ct. Case
Gold Metal Lids Included

GLASS 12 OZ. HEX EMBOSSED CYLINDER
$11.55 /12 ct. Case
Gold Metal Lids Included

12 oz & 3 oz GLASS SKEP JARS
12 oz skep jars $12.35/12 ct.
3 oz skep jars $14.95/24 ct.
Gold Metal Lids Included

CLASSIC PLASTICS
8 oz - $19.99/50 ct. Case
16 oz - $23.99/50 ct. Case
32 oz - $39.99/50 ct. Case
No Caps

DECO EMBOSSED JUGS
5 LB- $82.95/72 ct. Case
3 LB - $109.95/126 ct. Case
No Caps

MUTH JARS
4 oz - $29.49/36 ct. Case
8 oz - $13.95/12 ct. Case
16 oz - $18.95/12 ct. Case
includes corks

PLASTIC PANEL BEARS
2 oz Panel Bears $229.95/800 ct. Case *No Caps*
6 oz Panel Bears $199.95/660 ct. Case *No Caps*
8 oz Panel Bears $159.95/525 ct. Case *No Caps*
12 oz Panel Bears $119.95/400 ct. Case *No Caps*
16 oz Panel Bears $86.95/200 ct. Case *No Caps*
24 oz Panel Bears $89.50/195 ct. Case *No Caps*

CLASSIC GLASS JARS
8oz - $16.50/24 ct. Case
16 oz - $9.45/12 ct. Case
32 oz - $13.75/12 ct. Case

FOR BEES. FOR HONEY. FOR EVERYONE | (877) 529-9BEE | www.blueskybeesupply.com

NATIONWIDE SHIPPING

PACKAGE BEES

DIRECT TO YOUR DOOR

Get quality bee packages sent directly to you! Our bee supplier produces strong and healthy bees to ensure that you're getting productive packages with gentle queens.

CERTIFIED TO BE FREE OF HIVE BEETLE FREE

FOUNDING MEMBER BEE INFORMED

CARNIOLANS & ITALIANS

$199.95 per 3 lb package

Price includes shipping and insurance.

OHB

SASKATRAZ

$203.95 per 3 lb package

Price includes shipping and insurance.

STILL AVAILABLE TO ORDER!
LIMITED QUANTITIES

ORDER BY PHONE OR ONLINE!

MANN LAKE
WE KNOW BEES

800-880-7694
www.mannlakeltd.com

Hackensack, MN • Wilkes-Barre, PA • Woodland, CA • Marshall, TX • Winter Haven, FL

*Prices include shipping and insurance. All package bee orders will be subject to a $10 change or cancellation fee.